1402

آکادمی بین‌المللی دان



mailto:info@daanacademy.com

**Question 1**

Wrong answer

Score -25.00 out of 100.00

Only one of the following statements is correct; identify which one.

(A) Two rectangular trapezoids with the same perimeter are necessarily similar

(B) Two rhombuses with the same area are necessarily similar ✗

(C) Two rectangles with the same area are necessarily similar

(D) Two isosceles triangles with an congruent base angle are necessarily similar

(E) Two scalene triangles with the same perimeter are necessarily similar

The correct answer is: Two isosceles triangles with an congruent base angle are necessarily similar

**Question 2**

Correct answer

Score 100.00 out of 100.00

A common divisor of monomials $8a^3x^6, 4a^2x^6y, a^4bx^3y^2$and '

(TO) $x^6y^2$

(B) $a^2bx^6y$

(C) $a^2x^3$ ✓

(D) $a^3x^6y^2$

(IS) $axy$

The correct answer is: $a^2x^3$

**Question 3**

Correct answer

Score 100.00 out of 100.00

The sum of the ages of two brothers is now 20 years old. In four years the age of the elder will be equal to three times its current age minus double the current age of the minor. How old are the two brothers?

- (A) are twins
- (B) 15 and 5 years old
- (C) 12 and 8 years old
- (D) 13 and 7 years old
- (E) 11 and 9 years old ✓

The correct answer is: 11 and 9 years old

**Question 4**

Wrong answer

Score -25.00 out of 100.00

The equation $\log_2(x+5)^4 = 4$

- (A) has the only solution $x = -3$ ✗
- (B) has no real solutions
- (C) has the only solution $x = 2 - \log_2 5$
- (D) has the solutions $x = -3$ and $x = -7$
- (E) has the only solution $x = -7$

The correct answer is: it has the solutions $x = -3$ and $x = -7$

**Question 5**

Wrong answer

Score -25.00 out of 100.00

A company has pieces of fabric in three different colors available to prepare jackets. Each of the jackets must be made up of three different colors: one for the interior, one for the exterior and one for the collar. How many types of jackets can be prepared?

- (TO) $2! \cdot 3!$
- (B) three
- (Are you there
- (D) $3^3$ ✗
- (E) nine

The correct answer is: you are

**Question 6**

Correct answer

Score 100.00 out of 100.00

Which of these equations represents a straight line parallel to the straight line passing through the points $(0, -1)$ and $(2, 3)$?

- (TO) $2x + y = 0$
- (B) $x - 3y - 2 = 0$
- (C) $2x + y - 1 = 0$
- (D) $2x - y - 2 = 0$ ✓
- (IS) $x - 2y + 3 = 0$

The correct answer is: $2x - y - 2 = 0$

**Question 7**

Correct answer

Score 100.00 out of 100.00

For $x > 0$, the expression

$$5^{2\log_5 x}$$

It's equal to:

- (TO) $5x^2$
- (B) $x^2$ ✓
- (C) $5^2 x$
- (D) $5^2 + x$
- (IS) $2x$

The correct answer is: $x^2$

**Question 8**

Correct answer

Score 100.00 out of 100.00

Simplifying the expression $\left[\left(\frac{1}{3}a^3b^2\right)^2 : \left(\frac{1}{9}a^2b\right)\right]^3$, where $a$ and $b$ are two non-zero real numbers, we obtain

- (TO) $\frac{1}{81}a^9b^{12}$
- (B) $a^9b^{12}$
- (C) $9a^{12}b^9$
- (D) $a^{12}b^9$ ✓
- (IS) $\frac{1}{9}a^{12}b^9$

The correct answer is: $a^{12}b^9$

**Question 9**

Wrong answer

Score -25.00 out of 100.00

The set of solutions of the inequality $ax > -2$, with $a$ non-zero real number, is

- (A) the half-line $x < -2/a$ or the half-line $x > -2/a$
- (B) the empty set
- (C) the whole real axis
- (D) the half-line $x > -2/a$ ✗
- (E) the half-line $x < -2/a$

The correct answer is: the half-straight $x < -2/a$ or the half-straight $x > -2/a$

**Question 10**

Correct answer

Score 100.00 out of 100.00

The prime factorization of the number $(4^4 - 4^2)^2 3^3$ is:

- (TO) $2^8 3^5 5^2$ ✓
- (B) $2^4 3^5 5^2$
- (C) $2^6 3^5 5^2$
- (D) $2^8 3^4 5$
- (IS) $2^8 3^5 5^3$

The correct answer is: $2^8 3^5 5^2$

**Question 11**

Correct answer

Score 100.00 out of 100.00

Consider two spheres in space both of radius 1 and of centers $P_1$ and $P_2$ respectively. If the distance between $P_1$ and $P_2$ is 3, then the intersection of the spheres is:

- (A) a point
- (B) a hyperbola
- (C) the empty set ✓
- (D) an ellipse with different axle shafts
- (E) a circumference

The correct answer is: the empty set

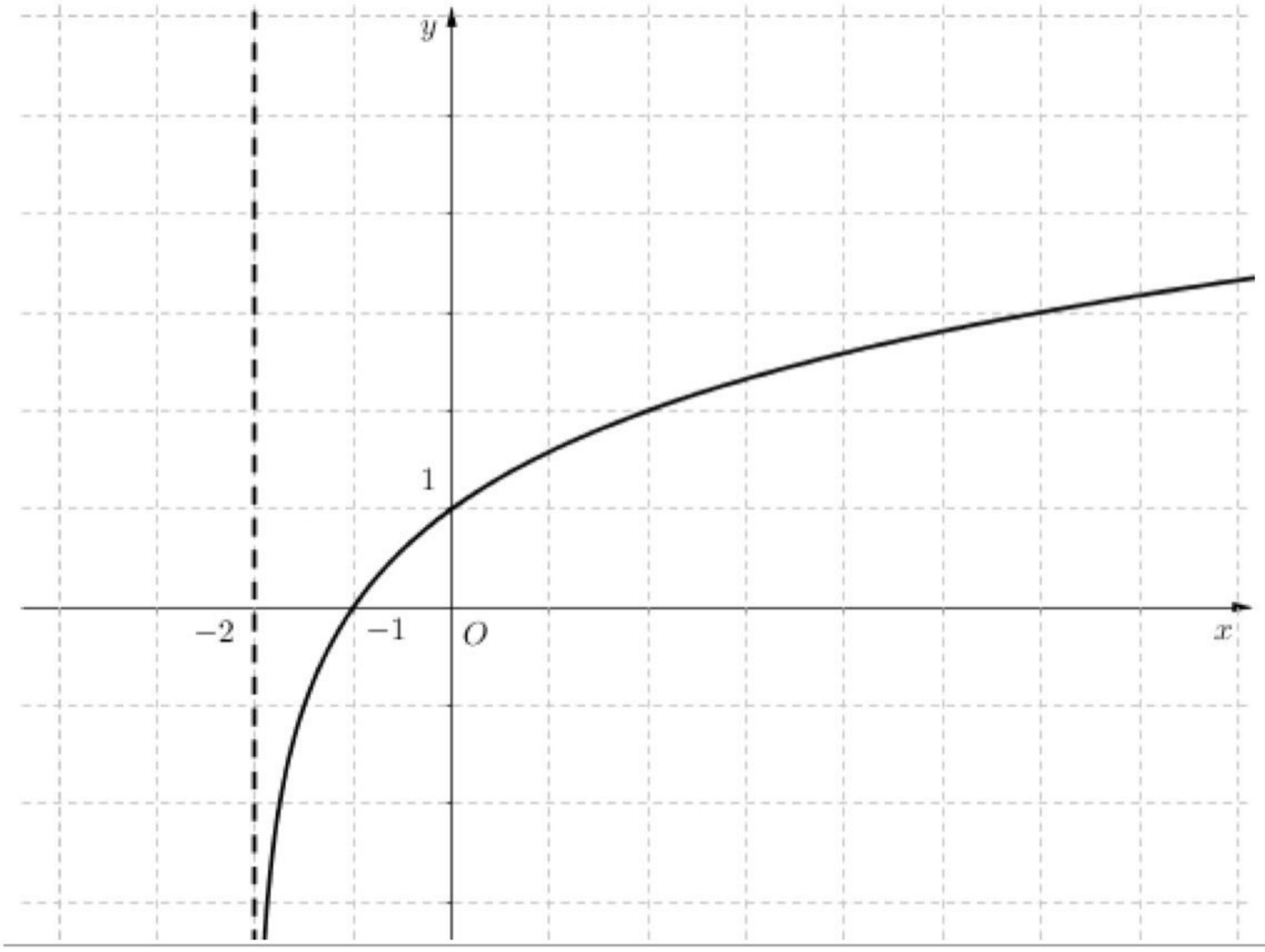
 

**Question 12**

Correct answer

Score 100.00 out of 100.00

The figure shows the graph of the function




(TO) $y = 2 \cdot \log_4 (x - 2)$

(B) $y = 2 \cdot \log_4 (x + 2)$ ✓

(C) $y = 2 \cdot \log_2 (x + 2)$

(D) $y = \log_4 (x - 2)$

(IS) $y = \log_4 (x + 2)$

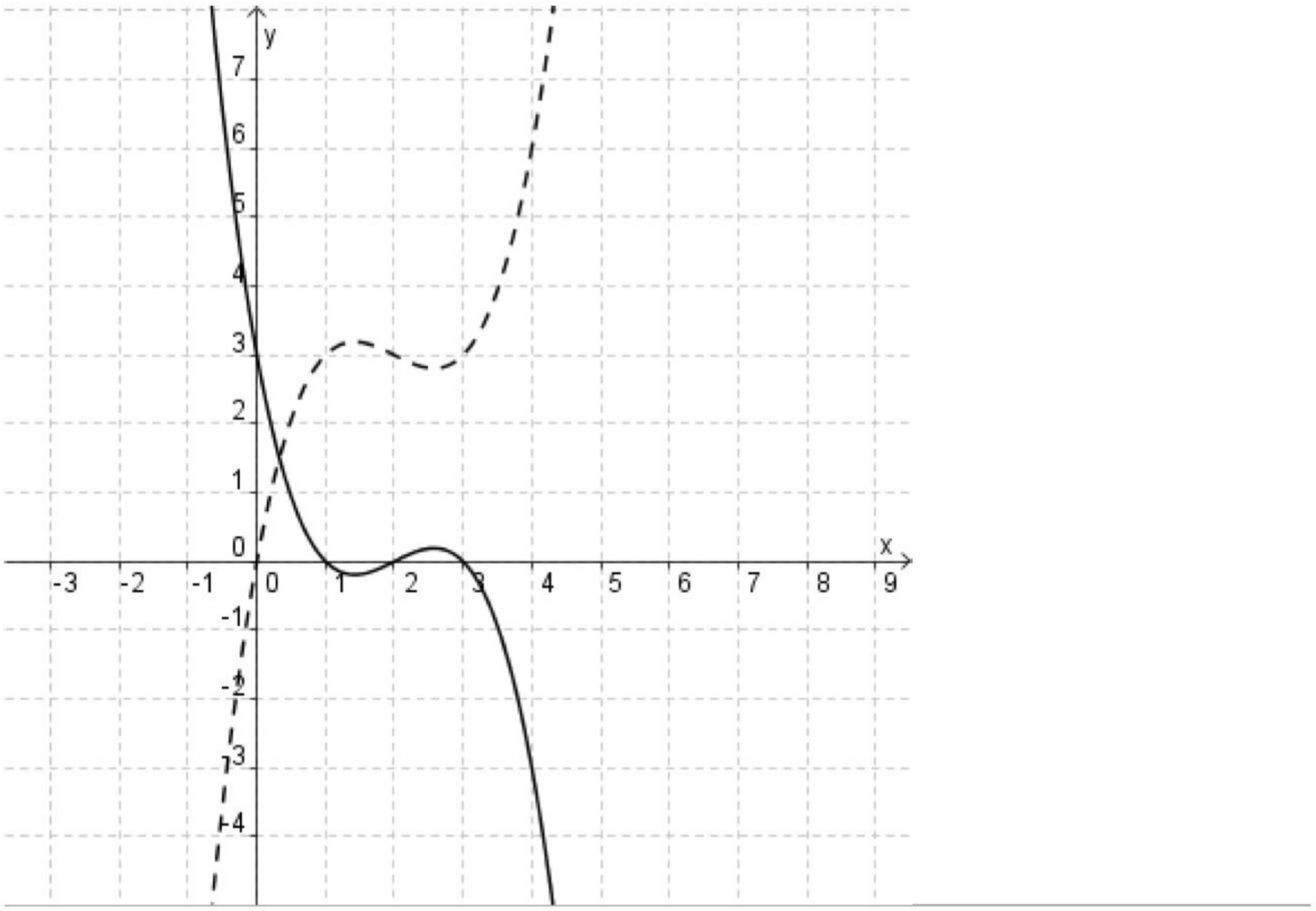
The correct answer is: $y = 2 \cdot \log_4 (x + 2)$

**Question 13**

Wrong answer

Score -25.00 out of 100.00

The figure shows the graph of $y = f(x)$ the continuous stroke function . The dotted curve is instead the graph of the function:




- (TO) $y = -3f(x)$
- (B) $y = 3 - f(x)$
- (C) $y = -f(x)$
- (D) $y = -f(x+3)$ ✗
- (IS) $y = -3 - f(x)$

The correct answer is: $y = 3 - f(x)$

**Question 14**

Wrong answer

Score -25.00 out of 100.00

Equation circles are given

$$x^2 + y^2 - 2x - 4y - 4 = 0, \qquad x^2 + y^2 - 4x - 2y + 4 = 0.$$

We can say that the two circumferences

- (A) intersect at four distinct points
- (B) intersect at two distinct points
- (C) are tangent ✗
- (D) are separated and the second is internal to the first
- (E) are disjointed and the former is internal to the latter

The correct answer is: they are disjointed and the second is internal to the first

**Question 15**

Correct answer

Score 100.00 out of 100.00

In a restaurant there are 24 square tables with 4 seats each, which can be arranged individually or combined to form a 6 or 8-seater table. By forming the same number of 4-seater, 6-seater and 8-seater tables, how many seats are obtained?

- (A) 78
- (B) 84
- (C) 72 ✓
- (D) 68
- (E) 60

The correct answer is: 72

**Question 16**

Correct answer

Score 100.00 out of 100.00

The expression $\cos^2 \frac{5\pi}{8} - \sin^2 \frac{5\pi}{8}$ is equal to:

- (TO) $\cos \frac{5\pi}{16}$
- (B) $-\frac{\sqrt{2}}{2}$ ✓
- (C) $\left(\frac{\sqrt{2}}{2}\right)^2$
- (D) $\frac{\sqrt{3}}{2}$
- (IS) $1$

The correct answer is: $-\frac{\sqrt{2}}{2}$

**Question 17**

Correct answer

Score 100.00 out of 100.00

Let be $x$ a positive real number. The real number

$$\frac{\sqrt{\sqrt[3]{(x+1)^5}}}{\sqrt[4]{(x+1)^3}}$$

It's equal to

- (TO) $\sqrt[12]{(x+1)}$ ✓
- (B) $\sqrt[4]{(x+1)}$
- (C) $\sqrt[9]{(x+1)^{10}}$
- (D) $(x+1)^{12}$
- (IS) $x+1$

The correct answer is: $\sqrt[12]{(x+1)}$

**Question 18**

Correct answer

Score 100.00 out of 100.00

The equation $4x^6 - 12x^3 = -9$

- (A) cannot be resolved, because it is too high
- (B) has one and only one real solution ✓
- (C) has six distinct real solutions
- (D) has two (and only two) distinct real solutions
- (E) has three distinct solutions

The correct answer is: it has one and only one real solution

# Training test

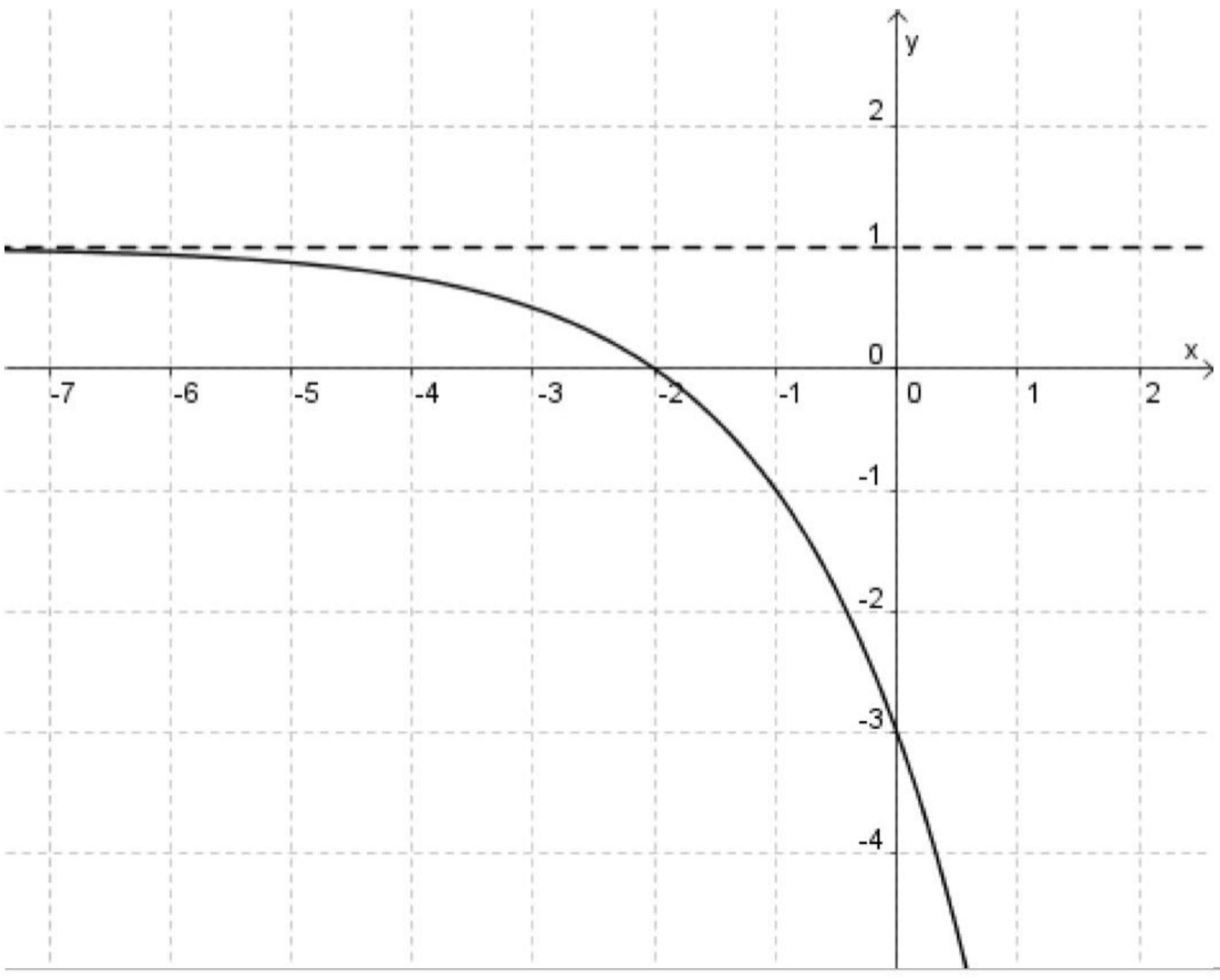
| | |
|---|---|
| **Started on** | Thursday, March 12 2020, 11:09 AM |
| **State** | finished |
| **Completed on** | Thursday, March 12 2020, 11:49 AM |
| **Time taken** | 40 mins 1 sec |
| **Marks** | 1425.00 / 1800.00 |
| **Grade** | **14.25** out of 18.00 ( **79** %) |

**Question 1**

correct

Mark 100.00 out of 100.00

The figure shows the graph of the function




(TO) $y = 1 - 2 \cdot 4^x$

(B) $y = 1 - 2^x$

(C) $y = 1 - 4 \cdot 2^x$ ✓

(D) $y = 1 - 4^x$

(IS) $y = 1 - 2 \cdot 2^x$

The correct answer is: $y = 1 - 4 \cdot 2^x$

**Question 2**

correct

Mark 100.00 out of 100.00

Simplifying the expression $\left(-\frac{3}{10}a^2b^2c^2\right)\times\left(\frac{4}{3}a^2b^2+\frac{1}{6}a^2b^2-\frac{1}{4}a^2b^2\right)$, where $a$ and $b$ are two real numbers, we obtain

- (TO) $-\frac{3}{8}a^4b^4c^2$ ✓
- (B) $-\frac{6}{25}a^2b^2c^2$
- (C) $-\frac{3}{8}a^2b^2c^2$
- (D) $-\frac{6}{25}a^4b^2c^2$
- (IS) $-\frac{3}{8}c^2$

The correct answer is: $-\frac{3}{8}a^4b^4c^2$

**Question 3**

correct

Mark 100.00 out of 100.00

To cover the 120 km that separate Turin from Milan, a truck takes 2 hours and 40 minutes. A car, which leaves Turin for Milan three quarters of an hour after the truck, travels at an average speed twice that of the truck. Then

- (A) the car arrives in Milan 15 minutes before the truck
- (B) the car arrives in Milan 35 minutes before the truck ✓
- (C) the car and the truck arrive together in Milan
- (D) the car arrives in Milan 15 minutes after the truck
- (E) the car arrives in Milan 35 minutes after the truck

The correct answer is: the car arrives in Milan 35 minutes before the truck

**Question 4**

correct

Mark 100.00 out of 100.00

Let be $x$ a positive real number. The real number

$$\frac{\sqrt{\sqrt[3]{(x+1)^5}}}{\sqrt[4]{(x+1)^3}}$$

It's equal to

- (TO) $\sqrt[12]{(x+1)}$ ✓
- (B) $(x+1)^{12}$
- (C) $\sqrt[9]{(x+1)^{10}}$
- (D) $\sqrt[4]{(x+1)}$
- (IS) $x+1$

The correct answer is: $\sqrt[12]{(x+1)}$

**Question 5**

incorrect

Mark -25.00 out of 100.00

Consider two spheres in space both of radius 2 and of centers $P_1$ and $P_2$ respectively. If the distance between $P_1$ and $P_2$ is 3, then the intersection of the spheres is:

- (A) a point
- (B) the empty set
- (C) a circumference
- (D) a parable
- (E) an ellipse with different axle shafts ✗

The correct answer is: a circumference

**Question 6**

incorrect

Mark -25.00 out of 100.00

The equation $(x^5 - 4x^3)^2 = 0$ has:

- (A) no real solution
- (B) only the solution $x = 0$
- (C) only the solutions $x = 0$ e $x = 2$
- (D) three distinct real solutions
- (E) ten distinct real solutions ✗

The correct answer is: three distinct real solutions

**Question 7**

correct

Mark 100.00 out of 100.00

A car factory provides the customer with the opportunity to choose six different body colors, two different interior fittings and three different types of alloy wheels for a car. How many different ways can the car be set up?

- (TO) $12^3$
- (B) $6^6$
- (C) 11
- (D) $6^{2^3}$
- (E) 36 ✓

The correct answer is: 36

**Question 8**

correct

Mark 100.00 out of 100.00

The expression $2 \sin \frac{5\pi}{12} \cos \frac{5\pi}{12}$ is equal to:

- (TO) $1/2$ ✓
- (B) $\sqrt{3}/2$
- (C) $2$
- (D) $-1/2$
- (IS) $\sin \frac{5\pi}{24}$

The correct answer is: $1/2$

**Question 9**

correct

Mark 100.00 out of 100.00

A common divisor of monomials $8a^3x^6, 4a^2x^6y, a^4bx^3y^2$ and '

- (TO) $a^2bx^6y$
- (B) $x^6y^2$
- (C) $a^2x^3$ ✓
- (D) $axy$
- (IS) $a^3x^6y^2$

The correct answer is: $a^2x^3$

**Question 10**

correct

Mark 100.00 out of 100.00

Which of these equations represents a straight line parallel to the straight line passing through the points $(0, -1)$ and $(2, 3)$?

- (TO) $x - 3y - 2 = 0$
- (B) $2x - y - 2 = 0$ ✓
- (C) $2x + y - 1 = 0$
- (D) $x - 2y + 3 = 0$
- (IS) $2x + y = 0$

The correct answer is: $2x - y - 2 = 0$

**Question 11**

correct

Mark 100.00 out of 100.00

The expression $\frac{2^{x-y}}{6^{x+y}}$ is equal to:

- (TO) $\frac{1}{3^{2x}}$
- (B) $12^{-y}$
- (C) $3^{-x-y}4^{-y}$ ✓
- (D) $\frac{1}{3^{x}}$
- (IS) $12^{-x}$

The correct answer is: $3^{-x-y}4^{-y}$

**Question 12**

correct

Mark 100.00 out of 100.00

The sum of the ages of two brothers is now 20 years old. In four years the age of the elder will be equal to three times its current age minus double the current age of the minor. How old are the two brothers?

- (A) 13 and 7 years old
- (B) 12 and 8 years old
- (C) 11 and 9 years old ✓
- (D) are twins
- (E) 15 and 5 years old

The correct answer is: 11 and 9 years

**Question 13**

correct

Mark 100.00 out of 100.00

The prime factorization of the number $(2^6 - 2^2)^2 3^2$ is:

- (TO) $2^4 3^6 5^2$
- (B) $2^4 3^3 5^2$
- (C) $2^4 3^4 5^2$ ✓
- (D) $2^2 3^4 5^2$
- (IS) $2^3 3^3 5$

The correct answer is: $2^4 3^4 5^2$

**Question 14**

correct

Mark 100.00 out of 100.00

In $\left[\frac{\pi}{2}, \frac{3}{2}\pi\right]$ the interval the equation $\cos^2 x = \frac{1}{5}$

- (A) has only one solution
- (B) has four distinct solutions
- (C) has infinite solutions
- (D) has no solutions
- (E) has two distinct solutions ✓

The correct answer is: it has two distinct solutions

**Question 15**

correct

Mark 100.00 out of 100.00

Equation circles are given

$$x^2 + y^2 - 2x - 4y - 4 = 0, \qquad x^2 + y^2 - 4y + 3 = 0.$$

We can say that the two circumferences

- (A) are separated and the first is internal to the second
- (B) are tangent
- (C) are separated and the second is internal to the first ✓
- (D) intersect at two distinct points
- (E) intersect at four distinct points

The correct answer is: they are separate and the second is internal to the first

**Question 16**

incorrect

Mark -25.00 out of 100.00

Consider the inequalities

$$A)\ P(x) > 0, \qquad B)\ \frac{P(x)}{x^2+1} > 0, \qquad C)\ \frac{P(x)}{x^2-1} > 0,$$

where $P(x)$ is a second degree polynomial. Which of the following statements is correct?

- (A) inequalities A) and C) have the same set of solutions
- (B) you can't answer because you don't know the polynomial $P(x)$ ✗
- (C) the three inequalities have the same set of solutions
- (D) inequalities B) and C) have the same set of solutions
- (E) inequalities A) and B) have the same set of solutions

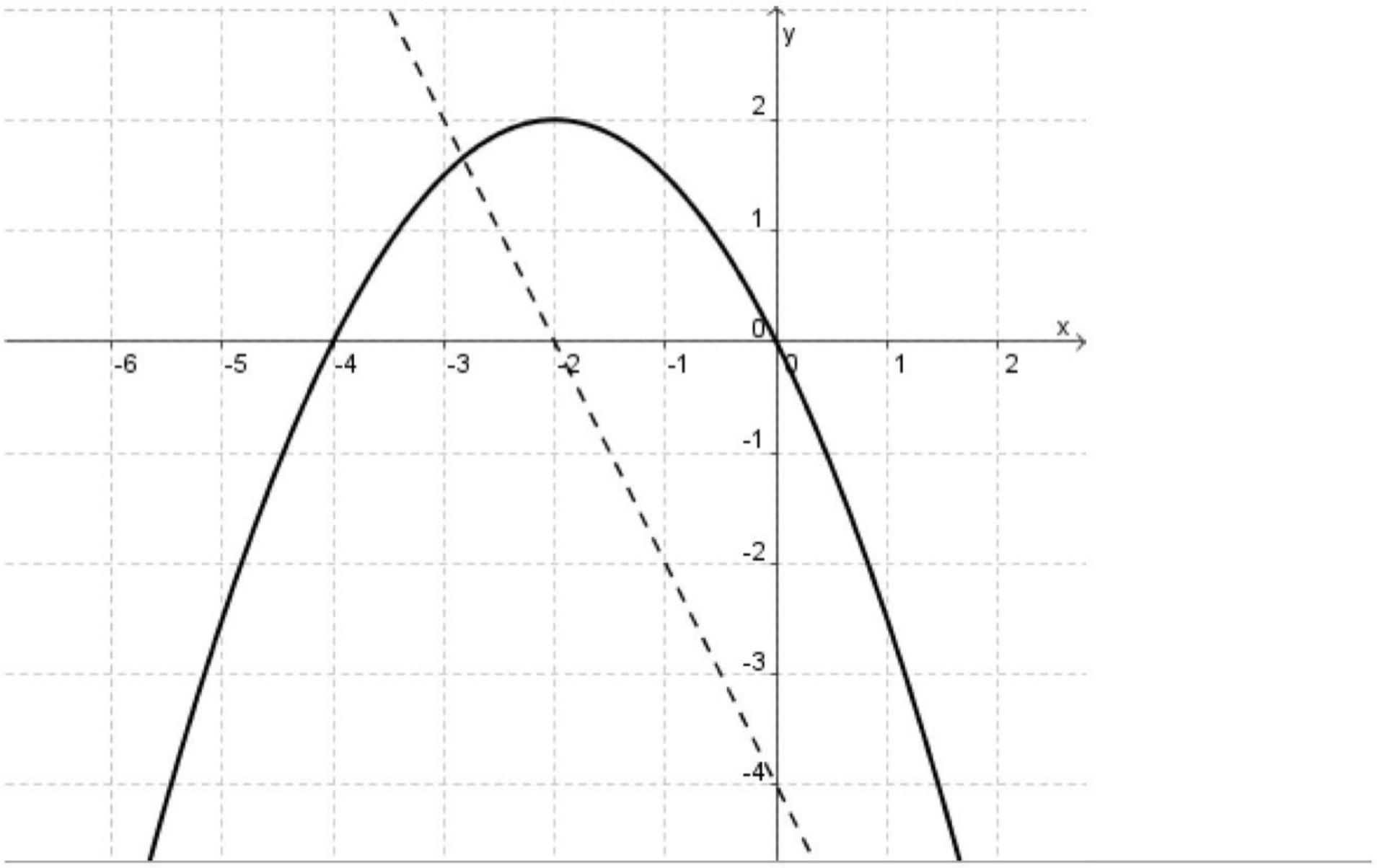
The correct answer is: inequalities A) and B) have the same set of solutions

**Question 17**

correct

Mark 100.00 out of 100.00

The figure shows a straight line and a parabola, which are the graph of the functions




(A) $f(x) = -2x - 4, g(x) = -x^2 - 4x$

(B) $f(x) = -2x - 4, g(x) = -\frac{1}{2}x^2 + 2x - 1$

(C) $f(x) = -2x - 2, g(x) = -\frac{1}{2}x(x + 4)$

(D) $f(x) = -2x - 4, g(x) = -\frac{1}{2}x(x + 4)$ ✓

(E) $f(x) = -x - 2, g(x) = -x^2 - 4x$

The correct answer is: $f(x) = -2x - 4, g(x) = -\frac{1}{2}x(x + 4)$

**Question 18**

correct

Mark 100.00 out of 100.00

Only one of the following statements is correct; identify which one.

(A) Two rhombuses with the same perimeter are necessarily similar

(B) Two trapezes with the same area are necessarily similar

(C) Two rectangles with the same area are necessarily similar

(D) Two isosceles triangles with the same base are necessarily similar

(E) Two right triangles with the two neatly congruent acute angles are necessarily similar ✓

The correct answer is: Two right triangles with the two neatly congruent acute angles are necessarily similar

# Training test

| | |
|---|---|
| **Started on** | Sunday, March 15 2020, 4:28 PM |
| **State** | finished |
| **Completed on** | Sunday, March 15 2020, 5:02 PM |
| **Time taken** | 33 mins 43 secs |
| **Marks** | 1550.00 / 1800.00 |
| **Grade** | **15.50** out of 18.00 ( **86** %) |

**Question 1**

correct

Mark 100.00 out of 100.00

The equation $x^4 - 3x^2 - 10 = 0$

- (A) has four distinct real solutions
- (B) has at least two solutions of the same sign
- (C) has no real solutions
- (D) has only negative solutions
- (E) has two (and only two) distinct real solutions ✓

The correct answer is: it has two (and only two) distinct real solutions

**Question 2**

correct

Mark 100.00 out of 100.00

A man has two children, Aldo and Maria. The age of man plus that of Aldo exceeds that of Maria of 80 years. The age of man plus that of Maria exceeds that of Aldo by 90 years. How old is the man?

- (A) 68 years old
- (B) 70 years old
- (C) 54 years old
- (D) 85 years old ✓
- (E) 45 years old

The correct answer is: 85 years

**Question 3**

incorrect

Mark -25.00 out of 100.00

The data below refer to a questionnaire on the preferences of 30 cyclists:

| | in citta' | in campagna |
|---|---|---|
| da solo | 12 | 3 |
| in due | 9 | 6 |

Calculate the percentage of individuals who prefer to ride a bicycle together in the countryside.

- (A) 90%
- (B) about 33%
- (C) 9%
- (D) 50% ✗
- (E) about 67%

The correct answer is: about 67%

**Question 4**

correct

Mark 100.00 out of 100.00

A round cylinder $C$ has radius $r$ and height $h$. The cylinder $C'$ has triple radius and double height compared to $C$. By indicating with $V_C$ and $V_{C'}$ the respective volumes we can say that

- (TO) $V_{C'} = 27V_C$
- (B) $V_{C'} = 6V_C$
- (C) $V_{C'} = 9V_C$
- (D) it is impossible to answer without further information
- (IS) $V_{C'} = 18V_C$ ✓

The correct answer is: $V_{C'} = 18V_C$

**Question 5**

correct

Mark 100.00 out of 100.00

In a restaurant there are 24 square tables with 4 seats each, which can be arranged individually or combined to form a 6 or 8-seater table. By forming the same number of 4-seater, 6-seater and 8-seater tables, how many seats are obtained?

- (A) 60
- (B) 68
- (C) 84
- (D) 72 ✓
- (E) 78

The correct answer is: 72

**Question 6**

incorrect

Mark -25.00 out of 100.00

Only one of the following statements is correct; identify which one.

- (A) Two isosceles triangles with the same vertex angle are always congruent ✗
- (B) Two scalene triangles with the same area are always congruent
- (C) Two right triangles with neatly congruent cathets are always congruent
- (D) Two equiangular triangles are always congruent
- (E) Two equilateral triangles are always congruent

The correct answer is: Two right triangles with neatly congruent cathets are always congruent

**Question 7**

correct

Mark 100.00 out of 100.00

For $x > 0$, the expression

$$7^{-4\log_7 x}$$

It's equal to:

- (TO) $7^{-4} + x$
- (B) $x^4$
- (C) $7x^{-4}$
- (D) $x^{-4}$ ✓
- (IS) $7^{-4}x$

The correct answer is: $x^{-4}$

**Question 8**

correct

Mark 100.00 out of 100.00

Which of these equations represents a straight line passing through the point $(-1, -3)$and perpendicular to the bisector of the first quadrant?

- (TO) $x - 3y - 10 = 0$
- (B) $2x + y = 0$
- (C) $2x + 2y + 8 = 0$ ✓
- (D) $x - 5y - 2 = 0$
- (IS) $x + y - 4 = 0$

The correct answer is: $2x + 2y + 8 = 0$

**Question 9**

correct

Mark 100.00 out of 100.00

A common divisor of monomials $3a^2b^4, 4a^3b^3x^5, a^2b^4x^6$and '

- (TO) $a^2b^4$
- (B) $abx$
- (C) $a^3b^3x^4$
- (D) $a^2b^3$ ✓
- (IS) $a^2b^3x^4$

The correct answer is: $a^2b^3$

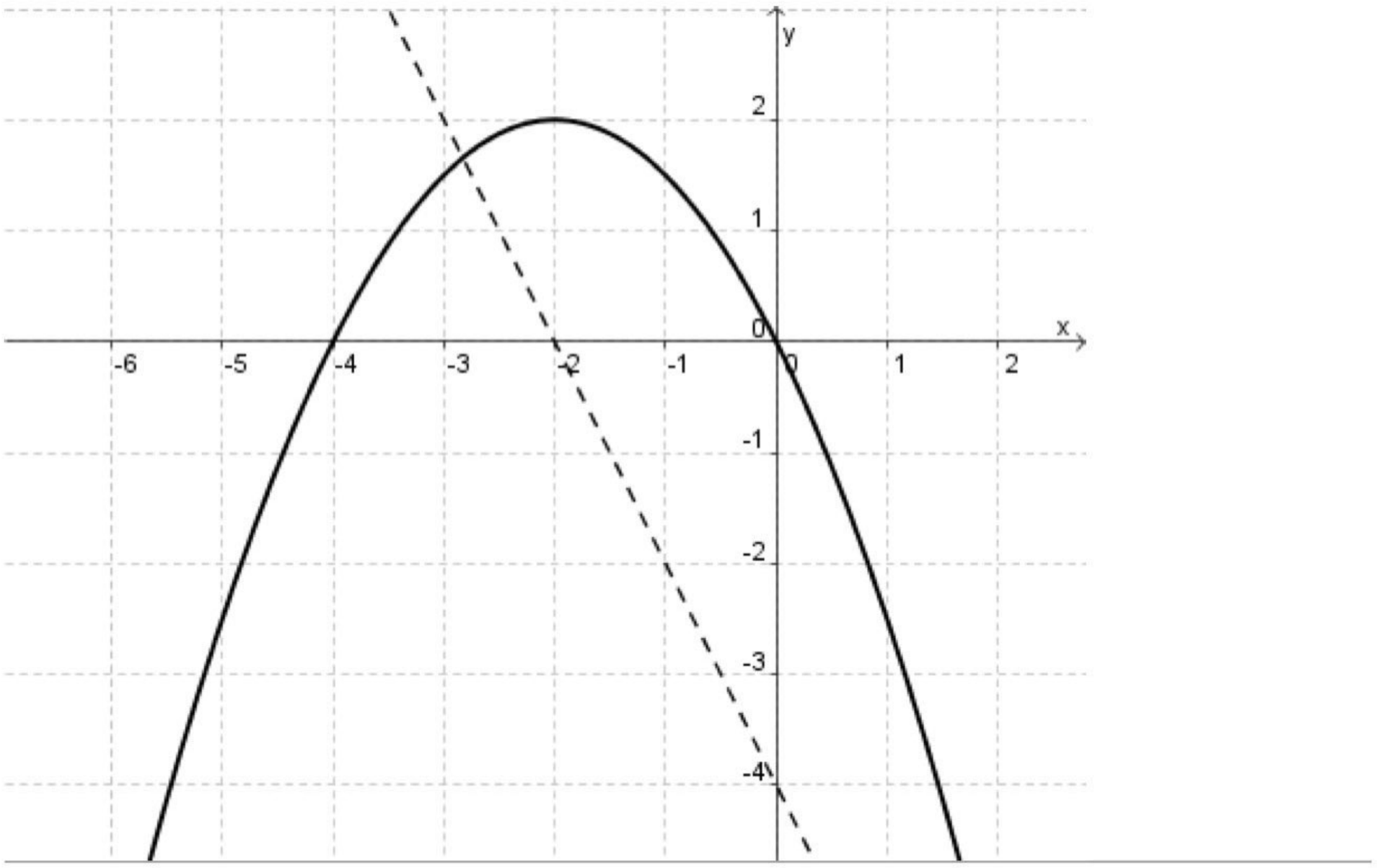
 

**Question 10**

correct

Mark 100.00 out of 100.00

The figure shows a straight line and a parabola, which are the graph of the functions




(A) $f(x) = -2x - 4, g(x) = -x^2 - 4x$

(B) $f(x) = -2x - 2, g(x) = -\frac{1}{2}x(x+4)$

(C) $f(x) = -x - 2, g(x) = -x^2 - 4x$

(D) $f(x) = -2x - 4, g(x) = -\frac{1}{2}x(x+4)$ ✓

(E) $f(x) = -2x - 4, g(x) = -\frac{1}{2}x^2 + 2x - 1$

The correct answer is: $f(x) = -2x - 4, g(x) = -\frac{1}{2}x(x+4)$

**Question 11**

correct

Mark 100.00 out of 100.00

Consider the equations

$$A)\ \frac{x^2-3x+2}{x^3+27}=0 \quad \text{e} \quad B)\ \frac{x^2-3x+2}{x^3-27}=0\ .$$

Which of the following statements is true?

- (A) the two equations have the same set of solutions ✓
- (B) the set of solutions of B) is included in the set of solutions of A)
- (C) the set of solutions of A) is included in the set of solutions of B)
- (D) the two equations have only one solution in common
- (E) the two equations have no common solutions

The correct answer is: the two equations have the same set of solutions

**Question 12**

correct

Mark 100.00 out of 100.00

The equation $\log_3(x+2)^2=2$

- (A) has no real solutions
- (B) has the solutions $x=1 \text{and} x=-5$ ✓
- (C) has the only solution $x=1-\log_3 2$
- (D) has the only solution $x=-5$
- (E) has the only solution $x=1$

The correct answer is: it has the solutions $x=1 \text{and} x=-5$

**Question 13**

correct

Mark 100.00 out of 100.00

The prime factorization of the number $(5^4+5^2)^3 2^4$ is:

- (TO) $2^4 5^6 13^2$
- (B) $2^3 5^4 13^2$
- (C) $2^6 5^4 13$
- (D) $2^7 5^6 13^3$ ✓
- (IS) $2^7 5^2 13^2$

The correct answer is: $2^7 5^6 13^3$

**Question 14**

correct

Mark 100.00 out of 100.00

Simplifying the expression $\left[\left(\frac{1}{3}a^3b^2\right)^2 : \left(\frac{1}{9}a^2b\right)\right]^3$, where $a$ and $b$ are two non-zero real numbers, we obtain

- (TO) $a^9b^{12}$
- (B) $a^{12}b^9$ ✓
- (C) $\frac{1}{9}a^{12}b^9$
- (D) $\frac{1}{81}a^9b^{12}$
- (IS) $9a^{12}b^9$

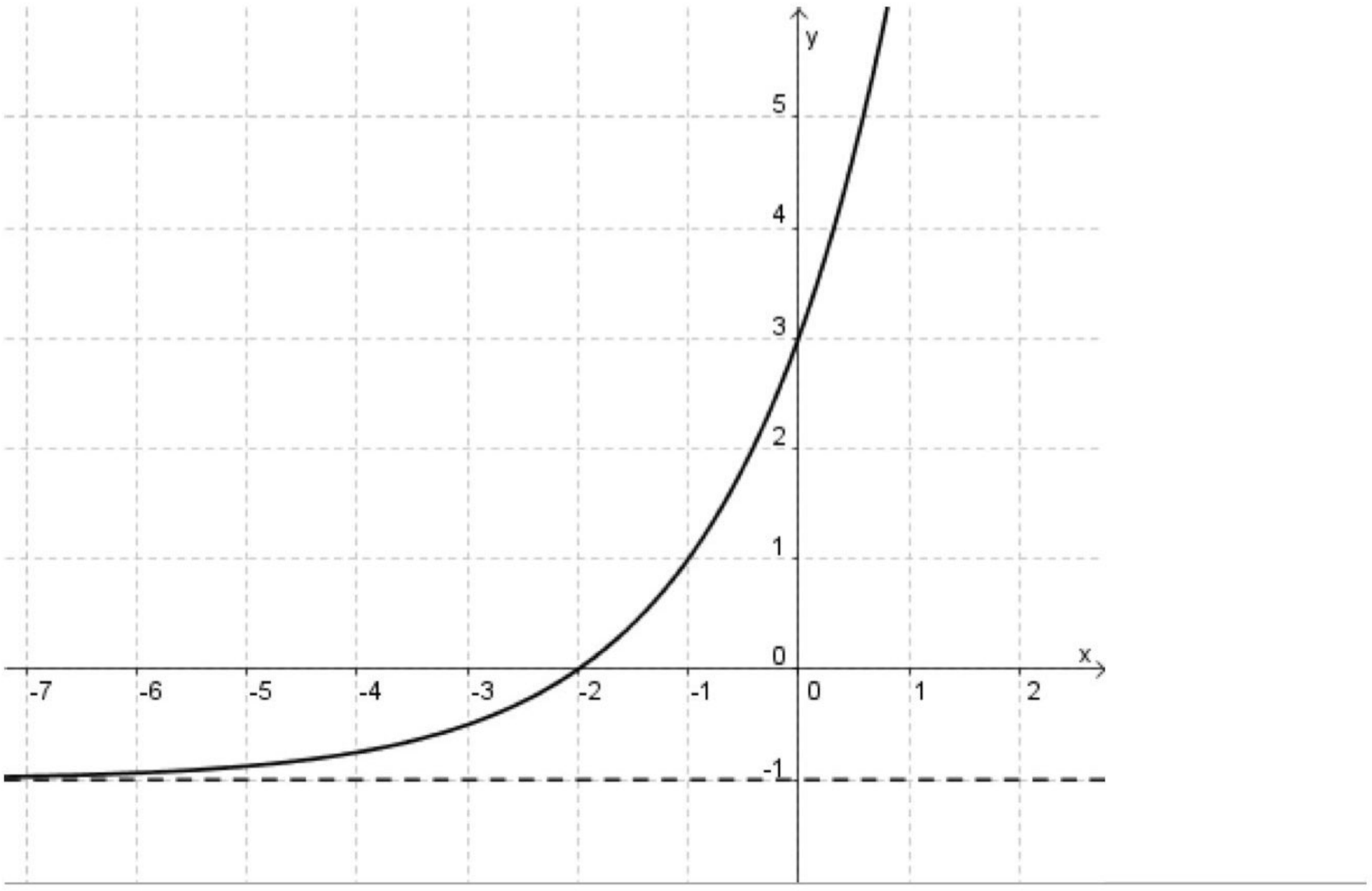
The correct answer is: $a^{12}b^9$

**Question 15**

correct

Mark 100.00 out of 100.00

The figure shows the graph of the function




- (TO) $y = 2^x - 1$
- (B) $y = 4^x - 1$
- (C) $y = 2 \cdot 4^x - 1$
- (D) $y = 2 \cdot 2^x - 1$
- (IS) $y = 4 \cdot 2^x - 1$ ✓

The correct answer is: $y = 4 \cdot 2^x - 1$

**Question 16**

correct

Mark 100.00 out of 100.00

The real number

$$x = \sqrt{2\sqrt[3]{2}\sqrt[3]{\frac{3}{8}}}$$

It's equal to

- (TO) $\sqrt{2\sqrt[3]{3}}$
- (B) $\sqrt[6]{6}$ ✓
- (C) $\sqrt[6]{5}$
- (D) $\sqrt{6}$
- (IS) $\sqrt[3]{6}$

The correct answer is: $\sqrt[6]{6}$

**Question 17**

correct

Mark 100.00 out of 100.00

The expression $2 \sin \frac{13\pi}{12} \cos \frac{13\pi}{12}$ is equal to:

- (TO) $\sqrt{3}/2$
- (B) $-1/2$
- (C) $2$
- (D) $\sin \frac{13\pi}{24}$
- (IS) $1/2$ ✓

The correct answer is: $1/2$

**Question 18**

correct

Mark 100.00 out of 100.00

Equation circles are given

$$x^2 + y^2 + 2x + 2y + 1 = 0, \qquad x^2 + y^2 + 4x + 2y + 4 = 0.$$

We can say that the two circumferences

- (A) are tangent
- (B) are separated and the second is internal to the first
- (C) intersect at four distinct points
- (D) intersect at two distinct points ✓
- (E) are disjointed and the former is internal to the latter

The correct answer is: they intersect in two distinct points

# Training test

| | |
|---|---|
| **Started on** | Monday, March 16 2020, 9:47 AM |
| **State** | finished |
| **Completed on** | Monday, March 16 2020, 10:07 AM |
| **Time taken** | 20 mins 7 secs |
| **Marks** | 1550.00 / 1800.00 |
| **Grade** | **15.50** out of 18.00 ( **86** %) |

**Question 1**

correct

Mark 100.00 out of 100.00

The set of solutions of the inequality $bx + 3 < 0$, with $b$ non-zero real number, is

- (A) the empty set
- (B) the whole real axis
- (C) the half-line $x > -3/b$
- (D) the half-line $x < -3/b$
- (E) the half-line $x < -3/b$ or the half-line $x > -3/b$ ✓

The correct answer is: the half-straight $x < -3/b$ or the half-straight $x > -3/b$

**Question 2**

correct

Mark 100.00 out of 100.00

Equation circles are given

$$x^2 + y^2 + 2x + 2y + 1 = 0, \qquad x^2 + y^2 + 6x + 2y + 9 = 0.$$

We can say that the two circumferences

- (A) are tangent ✓
- (B) intersect at four distinct points
- (C) are disjointed and the former is internal to the latter
- (D) intersect at two distinct points
- (E) are separate and the second is internal to the first

The correct answer is: they are bribes

**Question 3**

incorrect

Mark -25.00 out of 100.00

Only one of the following statements is correct; identify which one.

- (A) Two scalene triangles with the same perimeter are always congruent
- (B) Two right triangles with the same area are always congruent
- (C) Two isosceles triangles with the same base are always congruent
- (D) Two equiangular triangles with the same perimeter are always congruent
- (E) Two equilateral triangles are always congruent ✗

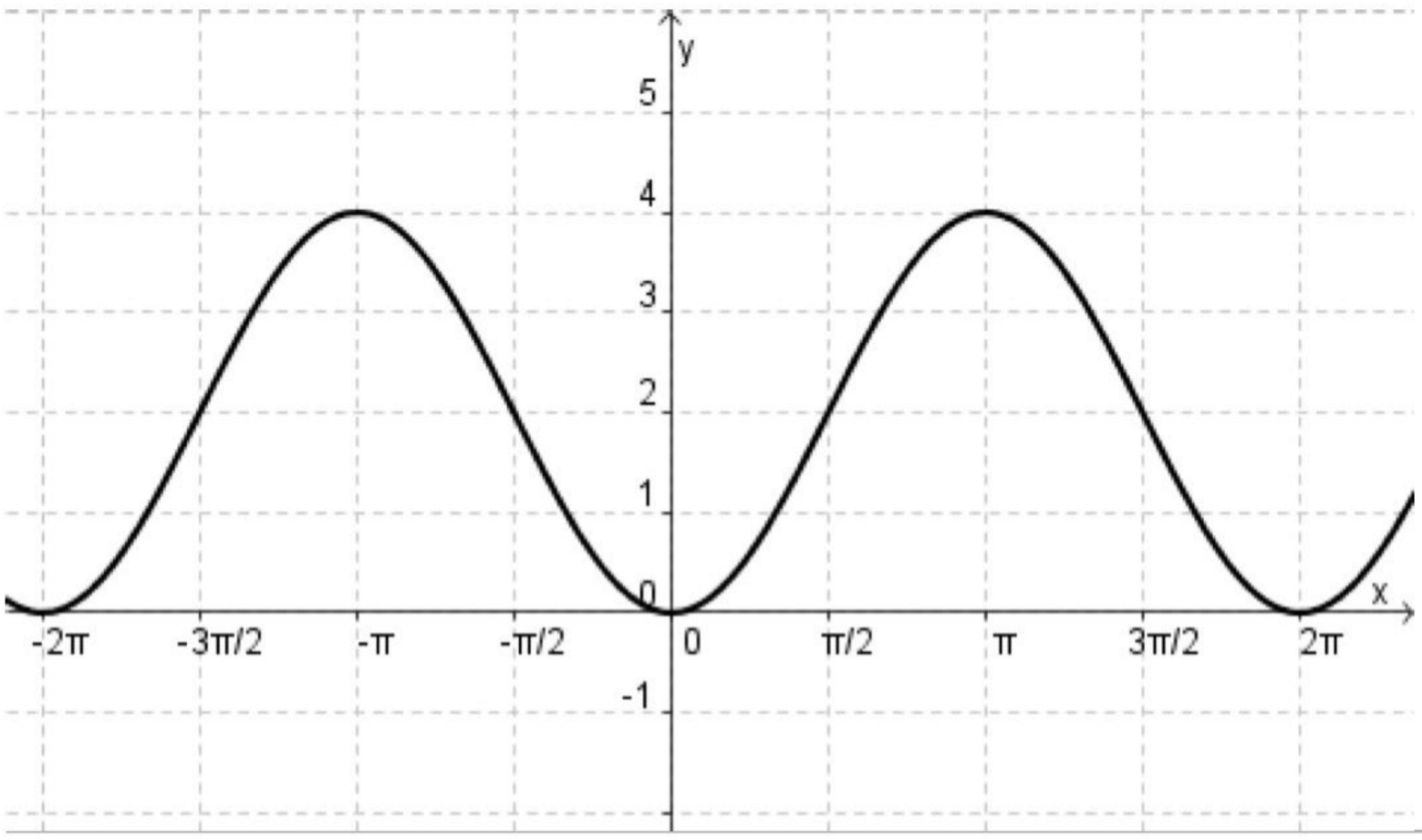
The correct answer is: Two equiangular triangles with the same perimeter are always congruent

**Question 4**

correct

Mark 100.00 out of 100.00

The figure shows the graph of the function




- (TO) $y = 2 - 2\sin x$
- (B) $y = 1 - \cos x$
- (C) $y = -2\cos x$
- (D) $y = 2 - 2\cos x$ ✓
- (IS) $y = 2 - \cos x$

The correct answer is: $y = 2 - 2\cos x$

**Question 5**

correct

Mark 100.00 out of 100.00

For $x > 0$, the expression

$$7^{-4\log_7 x}$$

It's equal to:

- (TO) $7^{-4}x$
- (B) $x^{-4}$ ✓
- (C) $7x^{-4}$
- (D) $x^4$
- (IS) $7^{-4} + x$

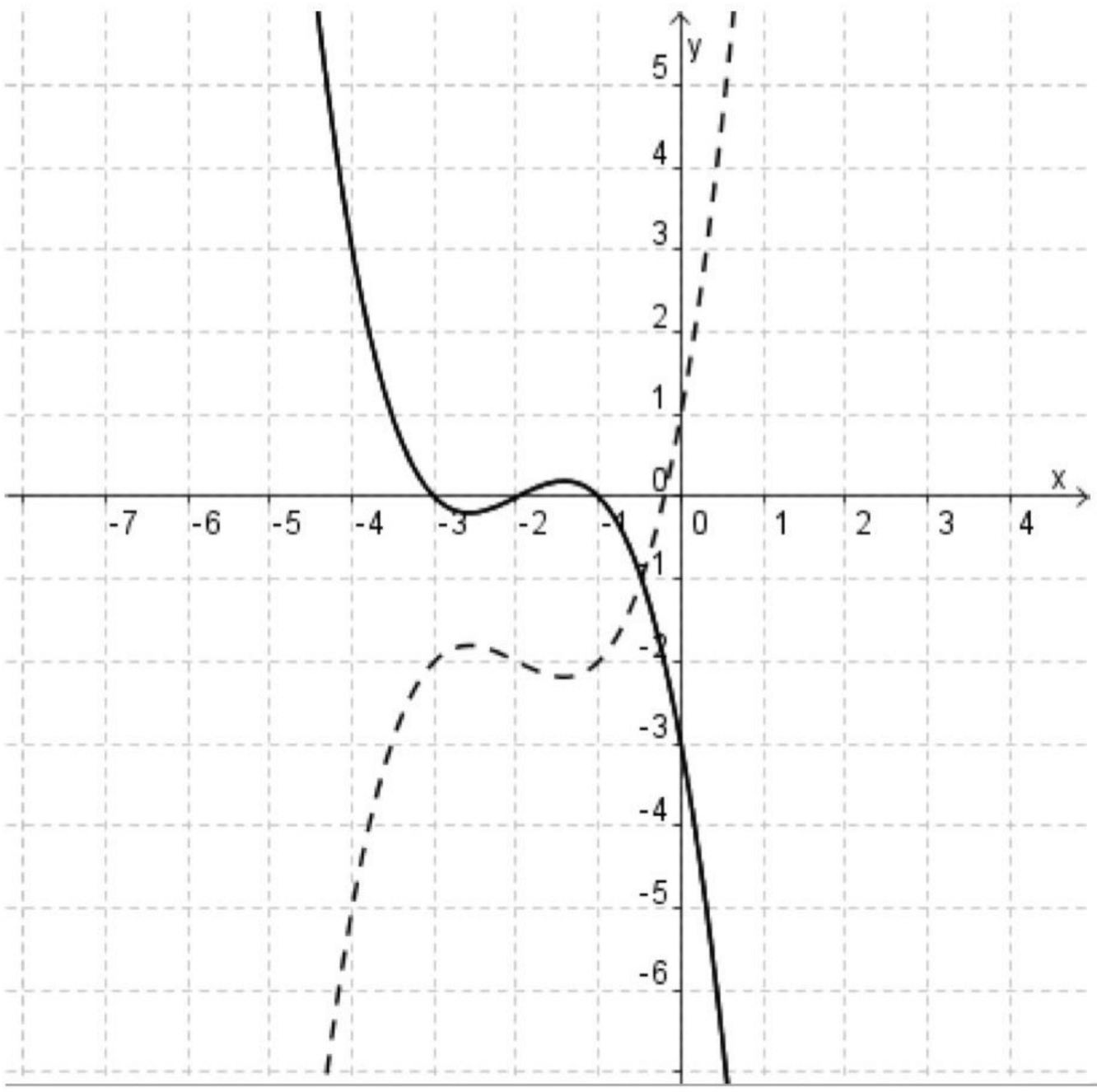
The correct answer is: $x^{-4}$

**Question 6**

correct

Mark 100.00 out of 100.00

The figure shows the graph of $y = f(x)$ the continuous stroke function . The dotted curve is instead the graph of the function:




- (TO) $y = -f(x) - 2$ ✓
- (B) $y = -f(x-2)$
- (C) $y = 2 - f(x)$
- (D) $y = -2f(x)$
- (IS) $y = -f(x)$

The correct answer is: $y = -f(x) - 2$

**Question 7**

correct

Mark 100.00 out of 100.00

The data below refer to a questionnaire on the preferences of 30 cyclists:

| | in citta' | in campagna |
|---|---|---|
| da solo | 12 | 3 |
| in due | 9 | 6 |

Calculate the percentage of individuals who prefer to ride a bicycle together in the countryside.

- (A) 50%
- (B) about 67% ✓
- (C) about 33%
- (D) 90%
- (E) 9%

The correct answer is: about 67%

**Question 8**

correct

Mark 100.00 out of 100.00

The prime factorization of the number $(2^5 - 2^3)^4 3^2$ is:

- (TO) $2^4 3^2$
- (B) $2^4 3^4$
- (C) $2^{32} 3^{12}$
- (D) $2^8 3^2$
- (IS) $2^{12} 3^6$ ✓

The correct answer is: $2^{12} 3^6$

**Question 9**

correct

Mark 100.00 out of 100.00

Simplifying the expression $(1 - 3x)(4x^3 + 12x^4) : (-4x^3)$, where there $x$ is a non-zero real number, we obtain

- (TO) $9x^2 - 1$ ✓
- (B) $1 + 9x^2 - 6x$
- (C) $1 - 3x$
- (D) $1$
- (IS) $1 - 9x^2$

The correct answer is: $9x^2 - 1$

**Question 10**

correct

Mark 100.00 out of 100.00

Before going on vacation, a tourist changes 500 euros into Norwegian kroner, at the rate of 7.8 crowns per 1 euro. During his stay he spends 3000 crowns. On returning to Italy, change the advanced crowns into euros at the rate of 10 crowns for 1.2 euros. How many euros have you left?

- (A) 100 euros
- (B) 120 euros
- (C) 108 euros ✓
- (D) 75 euros
- (E) 90 euros

The correct answer is: 108 euros

**Question 11**

correct

Mark 100.00 out of 100.00

A common divisor of monomials $48x^5y^3z, 60x^4y^4z^2, 18x^3y^5$and '

- (TO) $4x^4y^2$
- (B) $x^4y^3$
- (C) $6x^3y^3$ ✓
- (D) $4x^2y^2z$
- (IS) $6xy^4z^2$

The correct answer is: $6x^3y^3$

**Question 12**

correct

Mark 100.00 out of 100.00

The real number $x = \dfrac{13}{5-2\sqrt{3}}$checks the condition

- (TO) $x = \sqrt{7}$
- (B) $x$is whole
- (C) $x = 5+2\sqrt{3}$ ✓
- (D) $x = 5-2\sqrt{3}$
- (IS) $x > 9$

The correct answer is: $x = 5+2\sqrt{3}$

**Question 13**

correct

Mark 100.00 out of 100.00

In space, consider a point $Q$ and a plane that is 1 from $Q$. the intersection between this plane and the sphere of center $Q$ and radius 2 is

- (A) a parable
- (B) a circumference ✓
- (C) the empty set
- (D) a point
- (E) an ellipse with different axle shafts

The correct answer is: a circumference

**Question 14**

correct

Mark 100.00 out of 100.00

The equation $(x^5 - 4x^3)^2 = 0$ has:

- (A) no real solution
- (B) only the solutions $x = 0$ e $x = 2$
- (C) ten distinct real solutions
- (D) only the solution $x = 0$
- (E) three distinct real solutions ✓

The correct answer is: three distinct real solutions

**Question 15**

incorrect

Mark -25.00 out of 100.00

A boy's age is a quarter of his father's age. In 20 years the sum of their ages will be 100 years. How old is the boy now?

- (A) 15 years
- (B) 13 years old
- (C) 16 years old ✗
- (D) 14 years old
- (E) 12 years old

The correct answer is: 12 years

**Question 16**

correct

Mark 100.00 out of 100.00

Which of these equations represents a straight line passing through the point $(-2, 3)$ and perpendicular to the bisector of the first quadrant?

- (TO) $4x + 5y = 0$
- (B) $x - 8y - 6 = 0$
- (C) $x + y + 1 = 0$
- (D) $x - 2y + 8 = 0$
- (IS) $2x + 2y - 2 = 0$ ✓

The correct answer is: $2x + 2y - 2 = 0$

**Question 17**

correct

Mark 100.00 out of 100.00

The expression $2 \sin \frac{11\pi}{12} \cos \frac{11\pi}{12}$ is equal to:

- (TO) $\sqrt{3}/2$
- (B) $\sin \frac{11\pi}{24}$
- (C) $1/2$
- (D) $2$
- (IS) $-1/2$ ✓

The correct answer is: $-1/2$

**Question 18**

correct

Mark 100.00 out of 100.00

The equation $\log_3 (x + 2)^2 = 2$

- (A) has the only solution $x = 1 - \log_3 2$
- (B) has no real solutions
- (C) has the only solution $x = -5$
- (D) has the only solution $x = 1$
- (E) has the solutions $x = 1$ and $x = -5$ ✓

The correct answer is: it has the solutions $x = 1$ and $x = -5$

# Training test

| | |
|---|---|
| **Started on** | Wednesday, March 18 2020, 1:23 PM |
| **State** | finished |
| **Completed on** | Wednesday, March 18 2020, 1:47 PM |
| **Time taken** | 24 mins 6 secs |
| **Marks** | 1675.00 / 1800.00 |
| **Grade** | **16.75** out of 18.00 ( **93** %) |

**Question 1**

correct

Mark 100.00 out of 100.00

Let be $x$ a positive real number. The real number

$$\frac{\sqrt{\sqrt{(2x+3)^3}}}{\sqrt[6]{(2x+3)}}$$

It's equal to

(TO) $\sqrt{(2x+3)}$

(B) $\sqrt[24]{(2x+3)^3}$

(C) $\sqrt[12]{(2x+3)^7}$ ✓

(D) $\sqrt[7]{(2x+3)^{12}}$

(IS) $\sqrt[6]{(2x+3)^2}$

The correct answer is: $\sqrt[12]{(2x+3)^7}$

**Question 2**

correct

Mark 100.00 out of 100.00

The real number $x$ tests the relationship $\frac{\sqrt{x}(x+1)}{(x-2)} \leq 0$ if and only if

- (TO) $0 \leq x < 2$ ✓
- (B) $-1 \leq x \leq 0$
- (C) $x \leq -1 \text{ or } x \geq 2$
- (D) $x < -1 \text{ or } 0 \leq x \leq 2$
- (IS) $-1 \leq x < 2$

The correct answer is: $0 \leq x < 2$

**Question 3**

correct

Mark 100.00 out of 100.00

The data below refer to a questionnaire on the preferences of 30 cyclists:

| | in citta' | in campagna |
|---|---|---|
| da solo | 12 | 3 |
| in due | 9 | 6 |

Calculate the percentage of individuals who prefer to ride a bicycle together in the countryside.

- (A) about 67% ✓
- (B) 50%
- (C) 90%
- (D) 9%
- (E) about 33%

The correct answer is: about 67%

**Question 4**

correct

Mark 100.00 out of 100.00

The expression $\log_3 2^{(x^2)}$ is equal to:

- (A) $x^2 \log_2 3$ for each $x$ real
- (B) $(\log_3 2^x)^2$ for each $x$ real
- (C) $2 \log_3 2^x$ for each $x$ real
- (D) $x^2 \log_3 2$ for each $x$ real ✓
- (E) $x^2 \log_3 2$ only for $x > 0$

The correct answer is: $x^2 \log_3 2$ for every $x$ real

**Question 5**

correct

Mark 100.00 out of 100.00

The equation $x^2 + y^2 + 2 = 0$ defines in the Cartesian plane

- (A) a pair of straight accidents
- (B) a straight line
- (C) the empty set ✓
- (D) a point
- (E) a pair of parallel lines

The correct answer is: the empty set

**Question 6**

correct

Mark 100.00 out of 100.00

Consider the equations

$$A)\ \frac{x^2 - 3x + 2}{x^3 + 27} = 0 \quad \text{e} \quad B)\ \frac{x^2 - 3x + 2}{x^3 - 27} = 0\ .$$

Which of the following statements is true?

- (A) the set of solutions of B) is included in the set of solutions of A)
- (B) the two equations have only one solution in common
- (C) the two equations have the same set of solutions ✓
- (D) the set of solutions of A) is included in the set of solutions of B)
- (E) the two equations have no common solutions

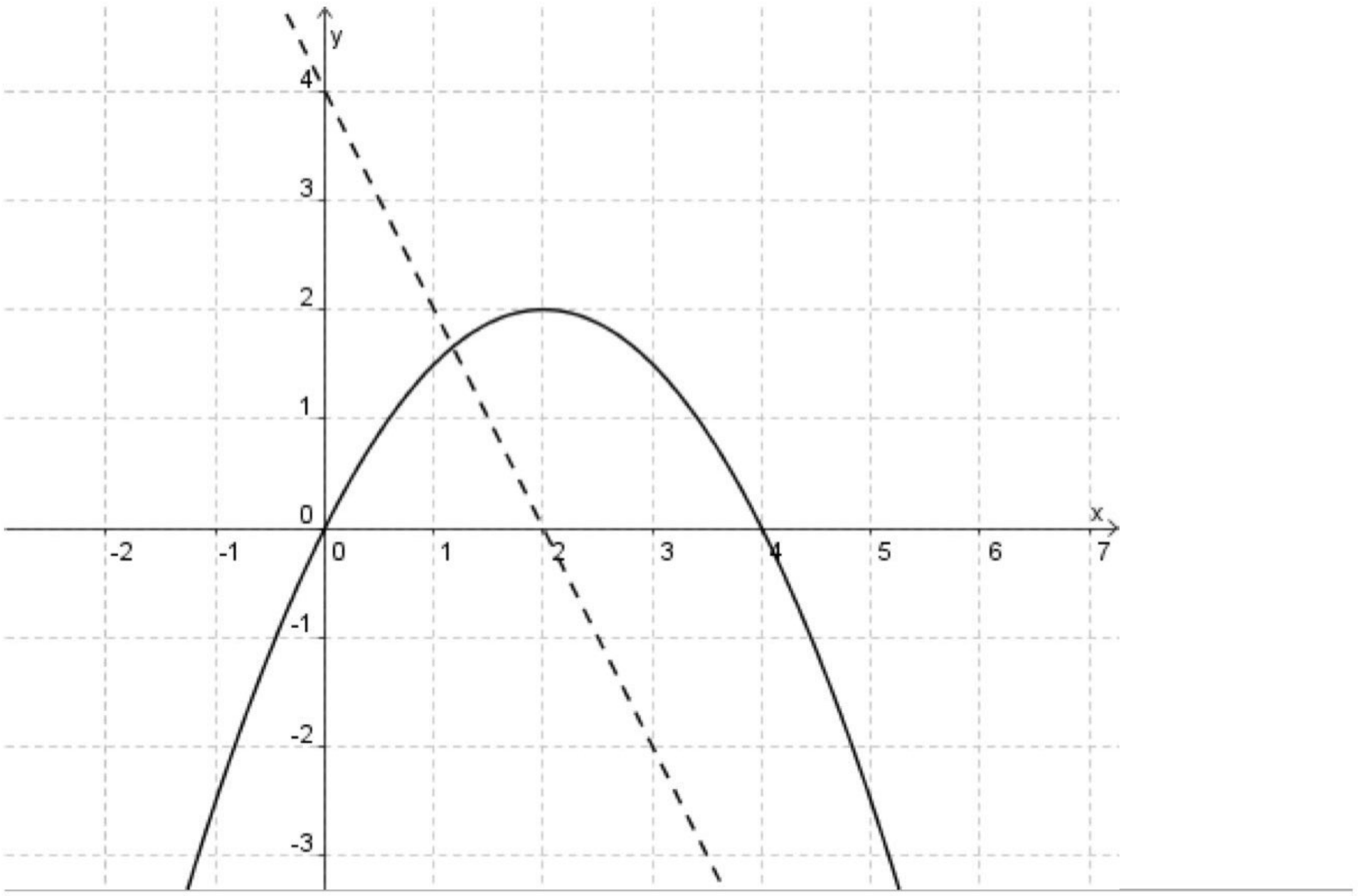
The correct answer is: the two equations have the same set of solutions

**Question 7**

correct

Mark 100.00 out of 100.00

The figure shows a straight line and a parabola, which are the graph of the functions




(A) $f(x) = 4 - 2x, g(x) = 4x - x^2$

(B) $f(x) = 4 - 2x, g(x) = 2x - \frac{1}{2}x^2 + 1$

(C) $f(x) = 2 - 2x, g(x) = -\frac{1}{2}x(x-4)$

(D) $f(x) = 2 - x, g(x) = 4x - x^2$

(E) $f(x) = 4 - 2x, g(x) = -\frac{1}{2}x(x-4)$ ✓

The correct answer is: $f(x) = 4 - 2x, g(x) = -\frac{1}{2}x(x-4)$

**Question 8**

correct

Mark 100.00 out of 100.00

To cover the 120 km that separate Turin from Milan, a truck takes 2 hours and 40 minutes. A car, which leaves Turin for Milan three quarters of an hour after the truck, travels at an average speed twice that of the truck. Then

(A) the car arrives in Milan 35 minutes before the truck ✓

(B) the car arrives in Milan 15 minutes before the truck

(C) the car arrives in Milan 15 minutes after the truck

(D) the car and the truck arrive together in Milan

(E) the car arrives in Milan 35 minutes after the truck

The correct answer is: the car arrives in Milan 35 minutes before the truck

**Question 9**

correct

Mark 100.00 out of 100.00

By simplifying and factorizing the expression $[b^3 \times (2b)^4 : b^2]^2 : [(-2b)^2 : (-b)^6 \times (-b)^5]^5$, where there $b$is a non-zero real number, we obtain

- (TO) $-\frac{1}{8b}$
- (B) $\frac{1}{4}b^5$
- (C) $-\frac{1}{4}b^5$ ✓
- (D) $-\frac{1}{2}b^2$
- (IS) $\frac{1}{8b}$

The correct answer is: $-\frac{1}{4}b^5$

**Question 10**

correct

Mark 100.00 out of 100.00

The age of a child is now a ninth of the age of his father. In 30 years the sum of their ages will be 100 years. How old is the child now?

- (A) 4 years ✓
- (B) 7 years
- (C) 3 years
- (D) 6 years
- (E) 5 years

The correct answer is: 4 years

**Question 11**

correct

Mark 100.00 out of 100.00

Which of these equations represents a straight line passing through the point $(-2, 3)$and perpendicular to the bisector of the first quadrant?

- (TO) $4x + 5y = 0$
- (B) $x - 8y - 6 = 0$
- (C) $2x + 2y - 2 = 0$ ✓
- (D) $x - 2y + 8 = 0$
- (IS) $x + y + 1 = 0$

The correct answer is: $2x + 2y - 2 = 0$

**Question 12**

correct

Mark 100.00 out of 100.00

In $[0, 2\pi]$ the interval the equation $\sin^2 x = \frac{1}{4}$

- (A) has only one solution
- (B) has two distinct solutions
- (C) has no solutions
- (D) has infinite solutions
- (E) has four distinct solutions ✓

The correct answer is: it has four distinct solutions

**Question 13**

correct

Mark 100.00 out of 100.00

The expression $2 \sin \frac{5\pi}{12} \cos \frac{5\pi}{12}$ is equal to:

- (TO) $1/2$ ✓
- (B) $2$
- (C) $-1/2$
- (D) $\sin \frac{5\pi}{24}$
- (IS) $\sqrt{3}/2$

The correct answer is: $1/2$

**Question 14**

correct

Mark 100.00 out of 100.00

The prime factorization of the number $(3^3 + 3^2)^3 2^4$ is:

- (TO) $2^8 3^8$
- (B) $2^6 3^6$
- (C) $2^4 3^6$
- (D) $2^{10} 3^6$ ✓
- (IS) $2^6 3^{10}$

The correct answer is: $2^{10} 3^6$

**Question 15**

correct

Mark 100.00 out of 100.00

Consider two spheres in space both of radius 2 and of centers $P_1$ and $P_2$ respectively. If the distance between $P_1$ and $P_2$ is 3, then the intersection of the spheres is:

- (A) an ellipse with different axle shafts
- (B) the empty set
- (C) a parable
- (D) a point
- (E) a circumference ✓

The correct answer is: a circumference

**Question 16**

correct

Mark 100.00 out of 100.00

A common divisor of monomials $3a^2b^4, 4a^3b^3x^5, a^2b^4x^6$ and '

- (TO) $abx$
- (B) $a^3b^3x^4$
- (C) $a^2b^4$
- (D) $a^2b^3$ ✓
- (IS) $a^2b^3x^4$

The correct answer is: $a^2b^3$

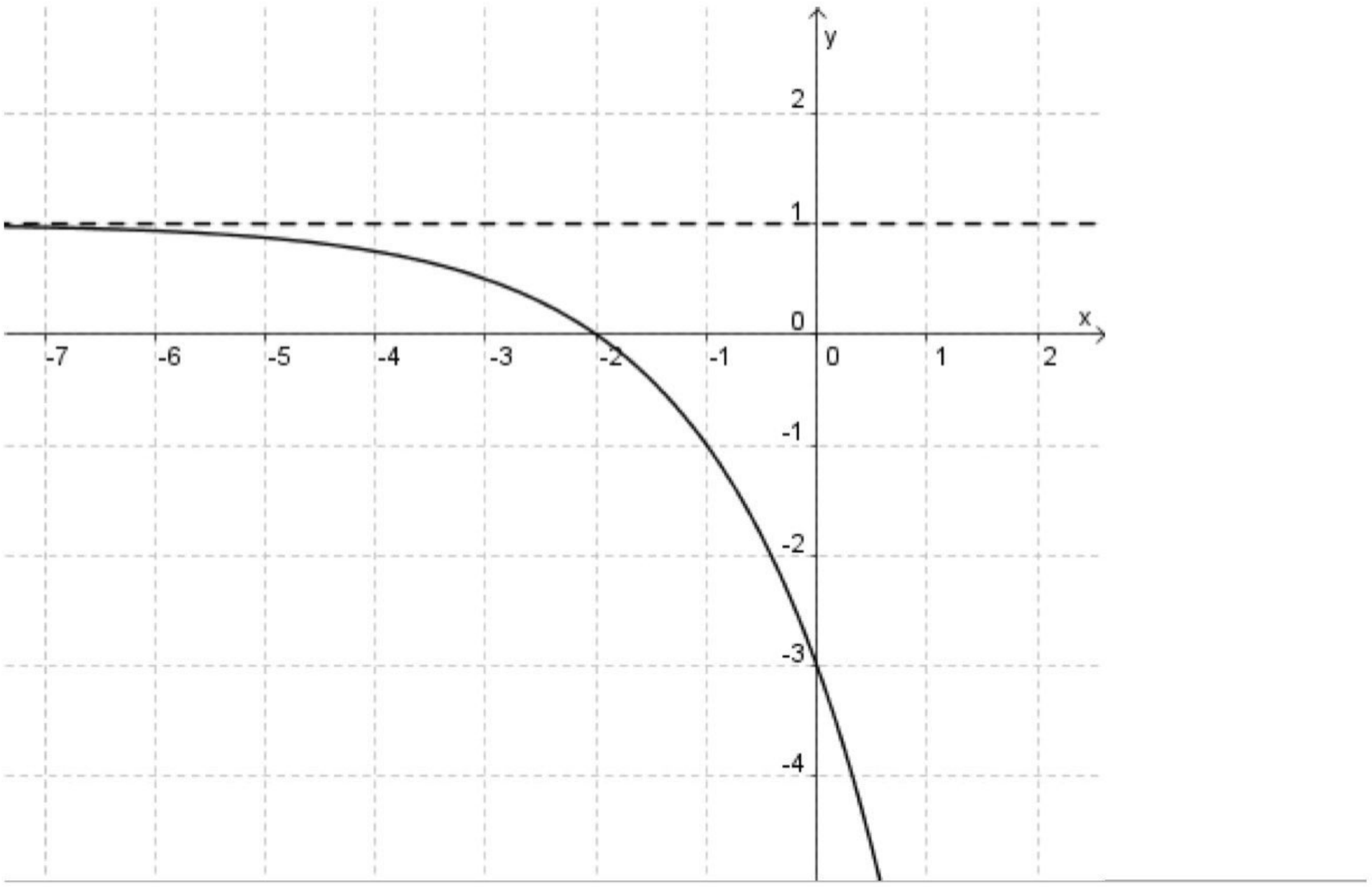
 

**Question 17**

correct

Mark 100.00 out of 100.00

The figure shows the graph of the function




- (TO) $y = 1 - 4 \cdot 2^x$ ✓
- (B) $y = 1 - 2 \cdot 4^x$
- (C) $y = 1 - 4^x$
- (D) $y = 1 - 2^x$
- (IS) $y = 1 - 2 \cdot 2^x$

The correct answer is: $y = 1 - 4 \cdot 2^x$

**Question 18**

incorrect

Mark -25.00 out of 100.00

Only one of the following statements is correct; identify which one.

- (A) Two isosceles triangles with the same area are always congruent
- (B) Two right triangles with the hypotenuse of the same length are always congruent ✗
- (C) Two equilateral triangles with the same perimeter are always congruent
- (D) Two isosceles triangles with the same height are always congruent
- (E) Two triangles with two neatly congruent sides are always congruent

The correct answer is: Two equilateral triangles with the same perimeter are always congruent

# Training test

| | |
|---|---|
| **Started on** | Thursday, March 19 2020, 12:37 PM |
| **State** | finished |
| **Completed on** | Thursday, March 19 2020, 1:01 PM |
| **Time taken** | 23 mins 54 secs |
| **Marks** | 1550.00 / 1800.00 |
| **Grade** | **15.50** out of 18.00 ( **86** %) |

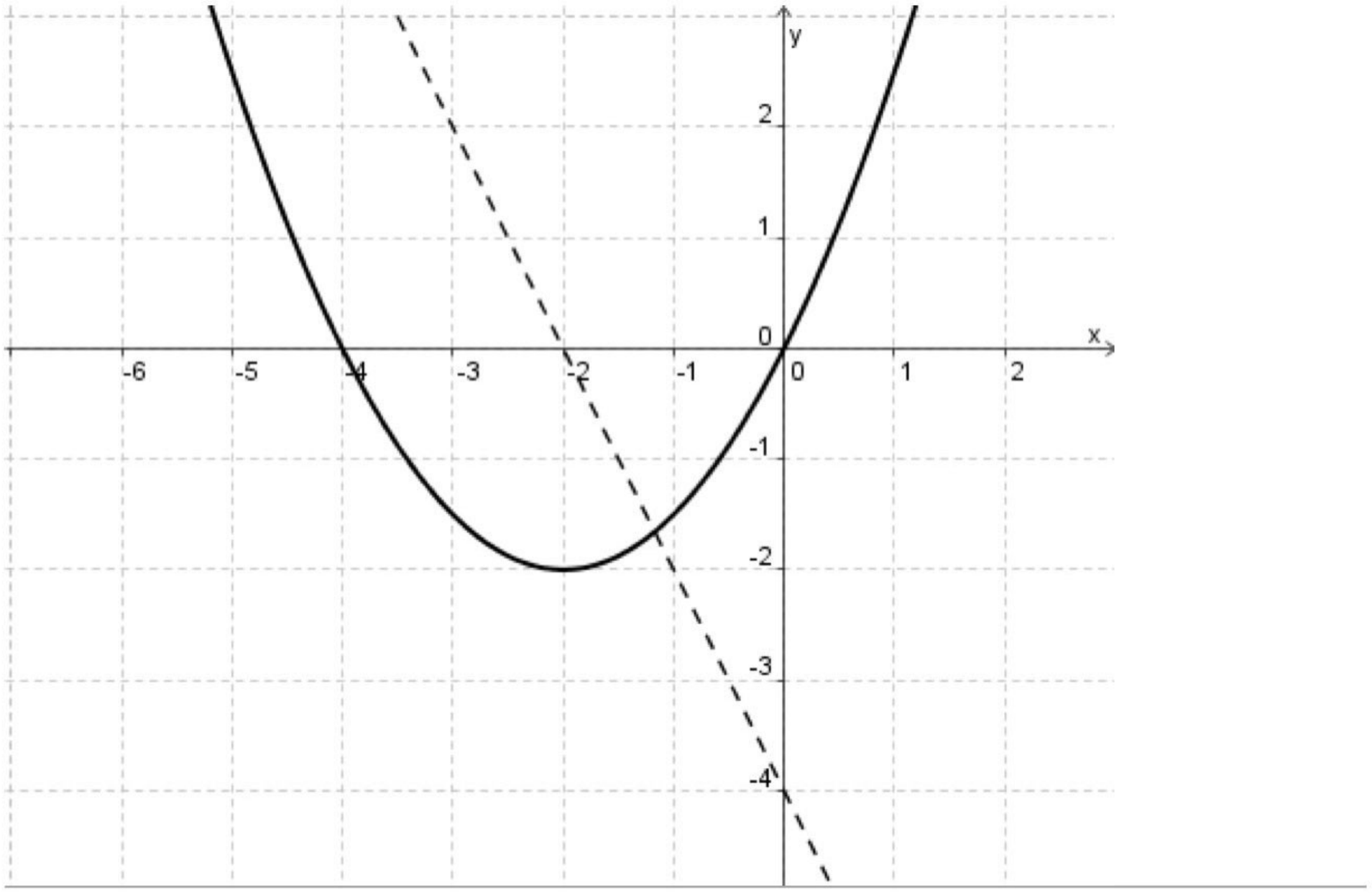
 

**Question 1**

correct

Mark 100.00 out of 100.00

The figure shows a straight line and a parabola, which are the graph of the functions




(A) $f(x) = -2x - 2, g(x) = \frac{1}{2}x(x+4)$

(B) $f(x) = -x - 2, g(x) = x^2 + 4x$

(C) $f(x) = -2x - 4, g(x) = \frac{1}{2}x^2 + 2x - 1$

(D) $f(x) = -2x - 4, g(x) = x^2 + 4x$

(E) $f(x) = -2x - 4, g(x) = \frac{1}{2}x(x+4)$ ✓

The correct answer is: $f(x) = -2x - 4, g(x) = \frac{1}{2}x(x+4)$

**Question 2**

correct

Mark 100.00 out of 100.00

The prime factorization of the number $(4^4 - 4^2)^2 3^3$ is:

(TO) $2^6 3^5 5^2$

(B) $2^8 3^4 5$

(C) $2^8 3^5 5^3$

(D) $2^8 3^5 5^2$ ✓

(IS) $2^4 3^5 5^2$

The correct answer is: $2^8 3^5 5^2$

**Question 3**

correct

Mark 100.00 out of 100.00

To cover the 120 km that separate Turin from Milan, a truck takes 2 hours and 40 minutes. A car, which leaves Turin for Milan three quarters of an hour after the truck, travels at an average speed twice that of the truck. Then

- (A) the car arrives in Milan 15 minutes before the truck
- (B) the car arrives in Milan 15 minutes after the truck
- (C) the car arrives in Milan 35 minutes before the truck ✓
- (D) the car and the truck arrive together in Milan
- (E) the car arrives in Milan 35 minutes after the truck

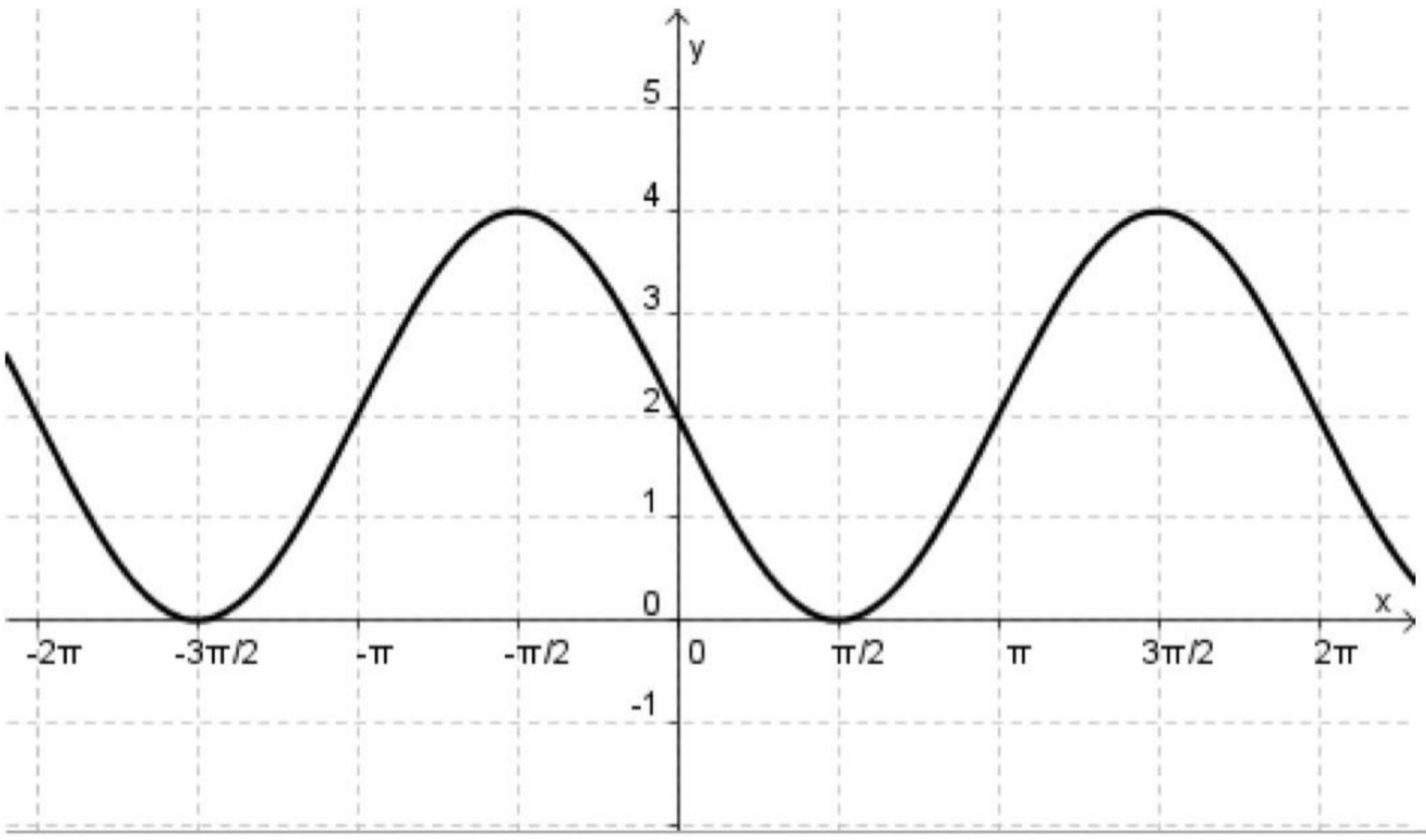
The correct answer is: the car arrives in Milan 35 minutes before the truck

**Question 4**

correct

Mark 100.00 out of 100.00

The figure shows the graph of the function




- (TO) $y = 2 - \sin x$
- (B) $y = 1 - \sin x$
- (C) $y = 2 - 2\sin x$ ✓
- (D) $y = -2\sin x$
- (IS) $y = 2 - 2\cos x$

The correct answer is: $y = 2 - 2\sin x$

**Question 5**

correct

Mark 100.00 out of 100.00

The real number $x = \dfrac{\sqrt{2}}{\sqrt{2}+1}$ checks the condition

- (TO) $x > 2$
- (B) $x = 2 - \sqrt{2}$ ✓
- (C) $x$ is whole
- (D) $x = 2 + \sqrt{2}$
- (IS) $x = \dfrac{\sqrt{2}+1}{2}$

The correct answer is: $x = 2 - \sqrt{2}$

**Question 6**

correct

Mark 100.00 out of 100.00

The equation $\log_5 (x+3)^2 = 2$

- (A) has the only solution $x = 1 - \log_5 3$
- (B) has the solutions $x = 2$ and $x = -8$ ✓
- (C) has the only solution $x = -2$
- (D) has no real solutions
- (E) has the only solution $x = 2$

The correct answer is: it has the solutions $x = 2$ and $x = -8$

**Question 7**

correct

Mark 100.00 out of 100.00

In space, consider a point $Q$ and a plane that is 4 from $Q$. the intersection between this plane and the sphere of center $Q$ and radius 3 is

- (A) a point
- (B) an ellipse with different axle shafts
- (C) the empty set ✓
- (D) a circumference
- (E) a parable

The correct answer is: the empty set

**Question 8**

incorrect

Mark -25.00 out of 100.00

Only one of the following statements is correct; identify which one.

- (A) Two parallelograms with the same area are necessarily similar
- (B) Two scalene triangles with the same area are necessarily similar
- (C) Two rectangles with the same perimeter are necessarily similar
- (D) Two isosceles triangles with the same height are necessarily similar ✗
- (E) Two right triangles with proportionally cathets are necessarily similar

The correct answer is: Two right triangles with the proportional cathets are necessarily similar

**Question 9**

correct

Mark 100.00 out of 100.00

Which of these equations represents a straight line passing through the point $(6, -2)$ and perpendicular to the bisector of the first quadrant?

- (TO) $4x + 2y = 0$
- (B) $x + y - 4 = 0$ ✓
- (C) $x + y + 4 = 0$
- (D) $x - y - 8 = 0$
- (IS) $3x - 6y - 2 = 0$

The correct answer is: $x + y - 4 = 0$

**Question 10**

correct

Mark 100.00 out of 100.00

The sum of the ages of two sisters is now 24 years old. In eight years the age of the major will be equal to three times its current age minus double the current age of the minor. How old are the two sisters?

- (A) 15 and 9 years old
- (B) 16 and 8 years old
- (C) are twins
- (D) 13 and 11 years old
- (E) 14 and 10 years old ✓

The correct answer is: 14 and 10 years

**Question 11**

correct

Mark 100.00 out of 100.00

By simplifying and factorizing the expression $[(-a)^2 \times (-a)^3 : (-a)^4]^2 + 5(a^6 : a^4 - 6a)$, where there $a$ is a non-zero real number, we obtain

- (TO) $6a(a-5)$ ✓
- (B) $a(a-6)$
- (C) $(a-5)(a-6)$
- (D) $a(a-5)$
- (IS) $5a(a-6)$

The correct answer is: $6a(a-5)$

**Question 12**

incorrect

Mark -25.00 out of 100.00

The equation $x^2 + y^2 + 2xy = 0$ defines in the Cartesian plane

- (A) a straight line
- (B) the empty set
- (C) a pair of straight accidents ✗
- (D) a point
- (E) a pair of distinct parallel lines

The correct answer is: a straight line

**Question 13**

correct

Mark 100.00 out of 100.00

The expression $\log_5 3^{(x^2)}$ is equal to:

- (A) $x^2 \log_5 3$ for each $x$ real ✓
- (B) $x^2 \log_5 3$ only for $x > 0$
- (C) $x^2 \log_3 5$ for each $x$ real
- (D) $2 \log_5 3^x$ for each $x$ real
- (E) $(\log_5 3^x)^2$ for each $x$ real

The correct answer is: $x^2 \log_5 3$ for every $x$ real

**Question 14**

correct

Mark 100.00 out of 100.00

Consider the equations

$$A)\ \frac{x^2-3x+2}{x^3+27}=0 \quad \text{e} \quad B)\ \frac{x^2-3x+2}{x^3-27}=0\ .$$

Which of the following statements is true?

- (A) the two equations have no common solutions
- (B) the set of solutions of A) is included in the set of solutions of B)
- (C) the set of solutions of B) is included in the set of solutions of A)
- (D) the two equations have the same set of solutions ✓
- (E) the two equations have only one solution in common

The correct answer is: the two equations have the same set of solutions

**Question 15**

correct

Mark 100.00 out of 100.00

The least common multiple of the monomials $x^5y^3z$, $x^4y^4z^2$, $x^3y^5$and '

- (TO) $x^4y^3$
- (B) $x^2y^2z$
- (C) $xy^4z^2$
- (D) $x^4y^2$
- (IS) $x^5y^5z^2$ ✓

The correct answer is: $x^5y^5z^2$

**Question 16**

correct

Mark 100.00 out of 100.00

The expression $2\sin\frac{\pi}{12}\cos\frac{\pi}{12}$is equal to:

- (TO) $-1/2$
- (B) $\sqrt{3}/2$
- (C) $\sin\frac{\pi}{24}$
- (D) $1/2$ ✓
- (IS) $2$

The correct answer is: $1/2$

**Question 17**

correct

Mark 100.00 out of 100.00

The equation $(x^4 - 2x^2 + 7)(x^2 - 13) = 0$

- (A) has six real solutions
- (B) has no real solutions
- (C) has only negative solutions
- (D) has at least two real solutions of the same sign
- (E) has two (and only two) real solutions ✓

The correct answer is: it has two (and only two) real solutions

**Question 18**

correct

Mark 100.00 out of 100.00

An ant travels 1 meter on a long and very thin wire, starting from a point of the wire marked in red; then he turns and runs in the opposite direction 50% of the route just taken. At this point he turns again and covers 50% of the route just finished. In the end, how far is the ant from the point of the wire marked in red?

- (A) 150 centimeters
- (B) 50 centimeters
- (C) 75 centimeters ✓
- (D) 100 centimeters
- (E) 125 centimeters

The correct answer is: 75 centimeters

# Training test

| | |
|---|---|
| **Started on** | Sunday, March 22 2020, 3:33 PM |
| **State** | finished |
| **Completed on** | Sunday, March 22 2020, 3:56 PM |
| **Time taken** | 22 mins 26 secs |
| **Marks** | 1800.00 / 1800.00 |
| **Grade** | **18.00** out of 18.00 ( **100** %) |

**Question 1**

correct

Mark 100.00 out of 100.00

The sum of the ages of two sisters is now 45 years old. In ten years the age of the major will be equal to three times its current age minus double the current age of the minor. How old are the two sisters?

- (A) 23 and 22 years old
- (B) are twins
- (C) 26 and 19 years old
- (D) 24 and 21 years old
- (E) 25 and 20 years old ✓

The correct answer is: 25 and 20 years

**Question 2**

correct

Mark 100.00 out of 100.00

Which of these equations represents a straight line passing through the point $(-2, 3)$ and perpendicular to the bisector of the first quadrant?

- (TO) $x - 2y + 8 = 0$
- (B) $2x + 2y - 2 = 0$ ✓
- (C) $x + y + 1 = 0$
- (D) $x - 8y - 6 = 0$
- (IS) $4x + 5y = 0$

The correct answer is: $2x + 2y - 2 = 0$

**Question 3**

correct

Mark 100.00 out of 100.00

By simplifying and factorizing the expression $[b^3 \times (2b)^4 : b^2]^2 : [(-2b)^2 : (-b)^6 \times (-b)^5]^5$, where there $b$is a non-zero real number, we obtain

- (TO) $-\frac{1}{4}b^5$ ✓
- (B) $-\frac{1}{2}b^2$
- (C) $\frac{1}{4}b^5$
- (D) $\frac{1}{8b}$
- (IS) $-\frac{1}{8b}$

The correct answer is: $-\frac{1}{4}b^5$

**Question 4**

correct

Mark 100.00 out of 100.00

The prime factorization of the number $(3^3 + 3^2)^3 2^4$ is:

- (TO) $2^8 3^8$
- (B) $2^{10} 3^6$ ✓
- (C) $2^6 3^{10}$
- (D) $2^6 3^6$
- (IS) $2^4 3^6$

The correct answer is: $2^{10} 3^6$

**Question 5**

correct

Mark 100.00 out of 100.00

Consider the inequalities

$$A)\ P(x) > 0, \qquad B)\ \frac{P(x)}{x^2+1} > 0, \qquad C)\ \frac{P(x)}{x^2-1} > 0,$$

where $P(x)$ is a second degree polynomial. Which of the following statements is correct?

- (A) you can't answer because you don't know the polynomial $P(x)$
- (B) inequalities A) and C) have the same set of solutions
- (C) the three inequalities have the same set of solutions
- (D) inequalities A) and B) have the same set of solutions ✓
- (E) inequalities B) and C) have the same set of solutions

The correct answer is: inequalities A) and B) have the same set of solutions

**Question 6**

correct

Mark 100.00 out of 100.00

Equation circles are given

$$x^2 + y^2 - 4y + 3 = 0, \qquad x^2 + y^2 - 2x - 4y - 4 = 0.$$

We can say that the two circumferences

- (A) are separated and the second is internal to the first
- (B) intersect at two distinct points
- (C) are tangent
- (D) intersect at four distinct points
- (E) are disjointed and the former is internal to the latter ✓

The correct answer is: they are separate and the first is internal to the second

**Question 7**

correct

Mark 100.00 out of 100.00

The expression $2 \sin \frac{5\pi}{12} \cos \frac{5\pi}{12}$ is equal to:

- (TO) $-1/2$
- (B) $1/2$ ✓
- (C) $2$
- (D) $\sin \frac{5\pi}{24}$
- (IS) $\sqrt{3}/2$

The correct answer is: $1/2$

**Question 8**

correct

Mark 100.00 out of 100.00

The real number

$$x = \sqrt{\sqrt{(5+2\sqrt{6})}\sqrt{(5-2\sqrt{6})}}$$

It's equal to

- (TO) $\sqrt[3]{(5-2\sqrt{6})}$
- (B) $1$ ✓
- (C) $\sqrt[4]{49}$
- (D) $\sqrt[4]{(5-2\sqrt{6})}$
- (IS) $\sqrt[4]{(49+20\sqrt{6})}$

The correct answer is: $1$

**Question 9**

correct

Mark 100.00 out of 100.00

The real number $x$ tests the relationship $\frac{\sqrt{x}(x+1)}{(x-2)} \leq 0$ if and only if

- (TO) $-1 \leq x < 2$
- (B) $x < -1 \text{ or } 0 \leq x \leq 2$
- (C) $x \leq -1 \text{ or } x \geq 2$
- (D) $-1 \leq x \leq 0$
- (IS) $0 \leq x < 2$ ✓

The correct answer is: $0 \leq x < 2$

**Question 10**

correct

Mark 100.00 out of 100.00

The data below refer to a survey carried out among 150 graduates in the last academic year in the two Turin universities and concerning their working position within six months of graduation:

| | ha trovato lavoro | non ha trovato lavoro |
|---|---|---|
| laurea in ingegneria | 42 | 14 |
| altra laurea | 44 | 50 |

Calculate the percentage of engineering graduates who found a job.

- (A) 86%
- (B) 90%
- (C) 75% ✓
- (D) about 43%
- (E) about 57%

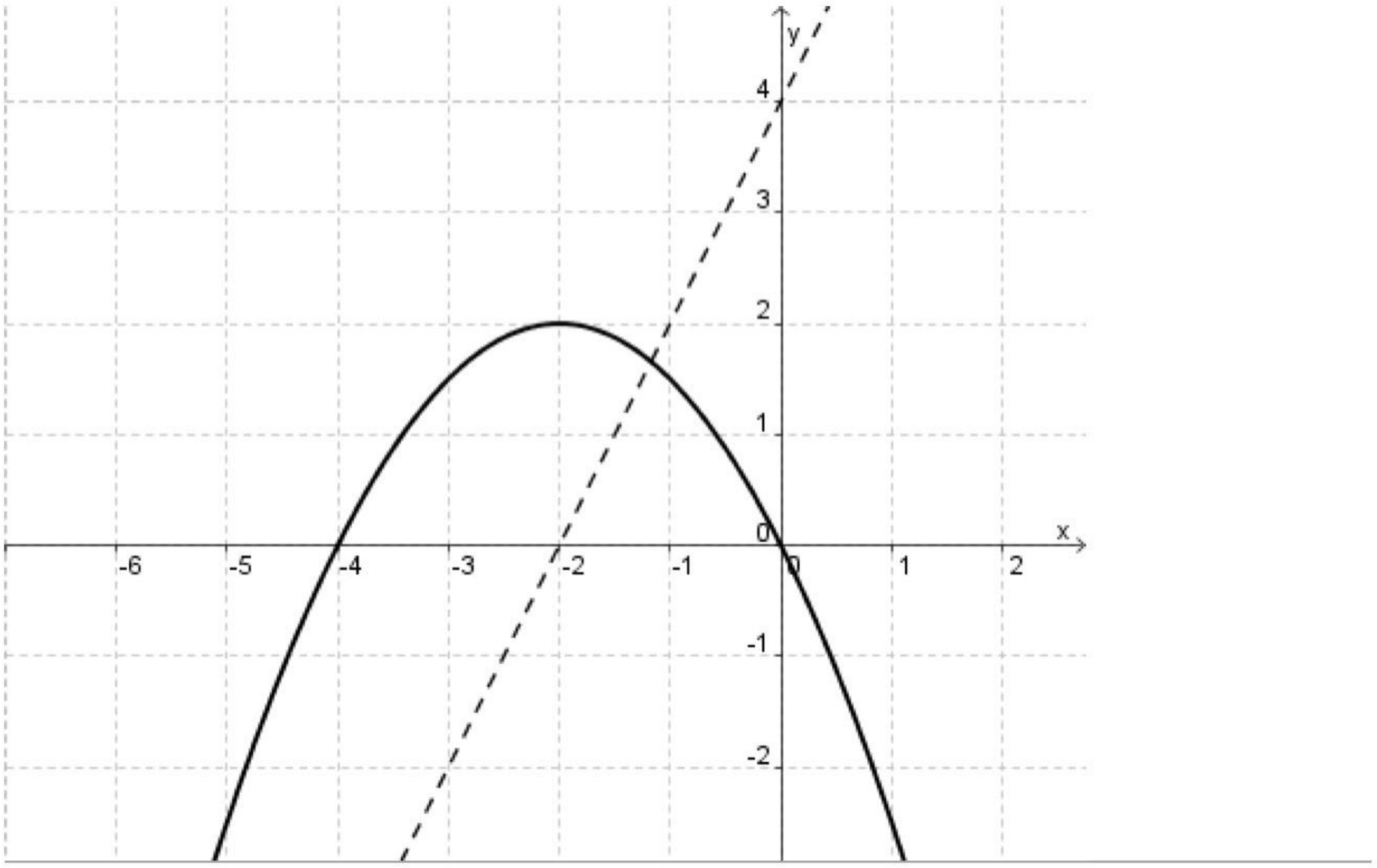
The correct answer is: 75%

**Question 11**

correct

Mark 100.00 out of 100.00

The figure shows a straight line and a parabola, which are the graph of the functions




(A) $f(x)=x+2,g(x)=-x^2-4x$

(B) $f(x)=2x+4,g(x)=-\frac{1}{2}x(x+4)$ ✓

(C) $f(x)=2x+4,g(x)=-\frac{1}{2}x^2-2x+1$

(D) $f(x)=2x+2,g(x)=-\frac{1}{2}x(x+4)$

(E) $f(x)=2x+4,g(x)=-x^2-4x$

The correct answer is: $f(x)=2x+4,g(x)=-\frac{1}{2}x(x+4)$

**Question 12**

correct

Mark 100.00 out of 100.00

For $x > 0$, the expression

$$7^{-4\log_7 x}$$

It's equal to:

- (TO) $7^{-4}x$
- (B) $x^{-4}$ ✓
- (C) $x^4$
- (D) $7^{-4} + x$
- (IS) $7x^{-4}$

The correct answer is: $x^{-4}$

**Question 13**

correct

Mark 100.00 out of 100.00

Consider two spheres in space both of radius 2 and of centers $P_1$ and $P_2$ respectively. If the distance between $P_1$ and $P_2$ is 3, then the intersection of the spheres is:

- (A) a parable
- (B) an ellipse with different axle shafts
- (C) a circumference ✓
- (D) a point
- (E) the empty set

The correct answer is: a circumference

**Question 14**

correct

Mark 100.00 out of 100.00

Only one of the following statements is correct; identify which one.

- (A) Two right triangles with hypotenuse of the same length are always congruent
- (B) Two right and isosceles triangles are always congruent
- (C) Two right triangles with neatly congruent cathets are always congruent ✓
- (D) Two isosceles triangles with the same vertex angle are always congruent
- (E) Two isosceles triangles with the same area are always congruent

The correct answer is: Two right triangles with neatly congruent cathets are always congruent

**Question 15**

correct

Mark 100.00 out of 100.00

The least common multiple of the monomials $x^5y^3z, x^4y^4z^2, x^3y^5$and '

- (TO) $x^4y^3$
- (B) $x^2y^2z$
- (C) $x^5y^5z^2$ ✓
- (D) $x^4y^2$
- (IS) $xy^4z^2$

The correct answer is: $x^5y^5z^2$

**Question 16**

correct

Mark 100.00 out of 100.00

To cover the 400 km that separate Turin from Venice, a truck takes 6 hours and 20 minutes. A car, which leaves Turin for Venice 4 hours after the truck, travels at an average speed twice that of the truck. Then

- (A) the car and the truck arrive together in Venice
- (B) the car arrives in Venice 30 minutes before the truck
- (C) the car arrives in Venice 50 minutes before the truck
- (D) the car arrives in Venice 50 minutes after the truck ✓
- (E) the car arrives in Venice 45 minutes after the truck

The correct answer is: the car arrives in Venice 50 minutes after the truck

**Question 17**

correct

Mark 100.00 out of 100.00

In $\left[\frac{\pi}{2}, \frac{3}{2}\pi\right]$ the interval the equation $\cos^2 x = \frac{1}{5}$

- (A) has no solutions
- (B) has infinite solutions
- (C) has only one solution
- (D) has four distinct solutions
- (E) has two distinct solutions ✓

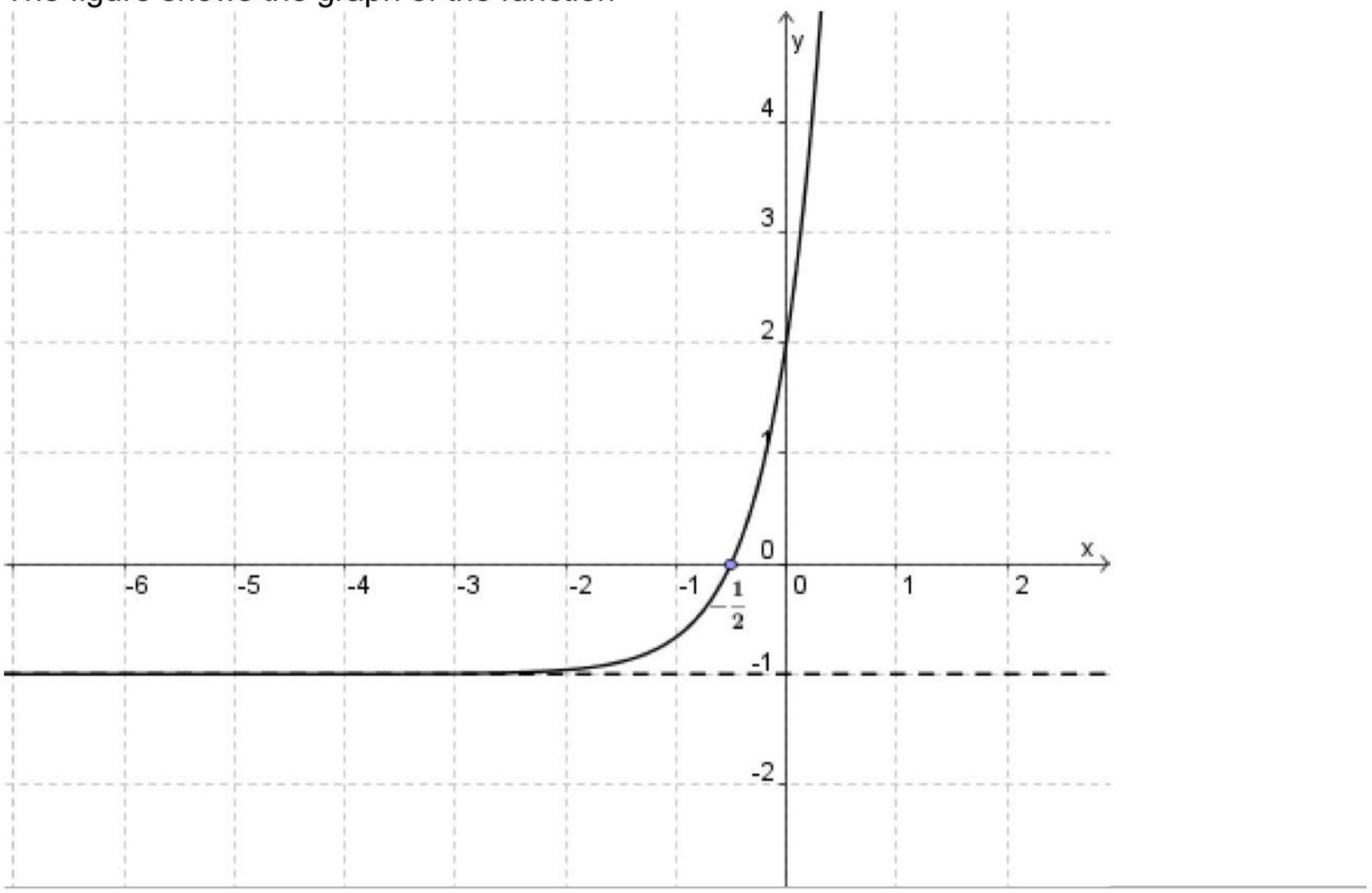
The correct answer is: it has two distinct solutions

**Question 18**

correct

Mark 100.00 out of 100.00

The figure shows the graph of the function




- (TO) $y = 3 \cdot 3^x - 1$
- (B) $y = 2^x - 1$
- (C) $y = 3 \cdot 9^x - 1$ ✓
- (D) $y = 3^x - 1$
- (IS) $y = 2 \cdot 4^x - 1$

The correct answer is: $y = 3 \cdot 9^x - 1$

# Training test

| | |
|---|---|
| **Started** | Friday, March 27 2020, 6:37 PM |
| **State** | Completed |
| **terminated** | Friday, March 27 2020, 6:45 pm |
| **The time spent on** | 7 mins 35 seconds |
| **Score** | 475.00 / 600.00 |
| **Rating** | **4.75 out** of a maximum of 6.00 ( **79** %) |

**Question 1**

Correct answer

Score 100.00 out of 100.00

Which row of signs +, - in charge of the following numbers, gives the result +15?

12 9 42 42 18

(A) + + - - +

(B) - - - + +

(C) - + - + + ✓

(D) + - + - +

(E) + + - + -

The correct answer is: - + - + +

**Question 2**

Correct answer

Score 100.00 out of 100.00

At a tango competition the 200 dancers wear the bodice and / or the rhinestone jacket. 114 dancers wear bodices, 156 wear rhinestone jackets. How many dancers wear only the bodice?

(A) 44 ✓

(B) 114

(C) 72

(D) 86

(E) 42

The correct answer is: 44

**Question 3**

Wrong answer

Score -25.00 out of 100.00

A soccer team and a ski team were formed in one class. Some pupils practice only one sport, others both, others still none. Which of the following statements is certainly true?

- (A) The best footballer among skiers is also the best skier among footballers ✗
- (B) The worst skier among skiers is the best skier among footballers
- (C) If the oldest of the skiers does not play soccer, then the oldest of the skiers does not ski
- (D) If the best of the players does not ski, even the best of the skiers do not play football
- (E) The youngest among the skiers who practice skiing is also the youngest among the skiers who play football

The correct answer is: The youngest among the skiers who practice skiing is also the youngest among the skiers who play football.

**Question 4**

Correct answer

Score 100.00 out of 100.00

If it is true that:
- Alma and Bice love the singer Jo-Jo
- the singer Jo-Jo loves the Neapolitans
- the Neapolitans love the sun

then it is certain that:

- (A) of the answers (a), (b), (c), (d), (e), at least two are false ✓
- (B) the sun loves singer Jo-Jo
- (C) Neapolitans love Alma and Bice
- (D) Alma and Bice don't like the sun
- (E) Neapolitans love the singer Jo-Jo

The correct answer is: of the answers (a), (b), (c), (d), (e), at least two are false

**Question 5**

Correct answer

Score 100.00 out of 100.00

In the municipality of Topolinia, the school regulations dictate that, if a school has more than 300 pupils, then it must have a gym and an infirmary. Since the rules are always respected in Topolinia, which of the following statements is necessarily true?

- (A) There is a school that has a gym and has no infirmary
- (B) If a school does not have a gym then it has a maximum of 300 pupils ✓
- (C) If a school has an infirmary then it has over 300 pupils
- (D) If a school doesn't have a gym then it doesn't have an infirmary
- (E) If a school has a gym then it also has an infirmary

The correct answer is: If a school does not have a gym then it has a maximum of 300 pupils

**Question 6**

Correct answer

Score 100.00 out of 100.00

On the dial of a clock, somewhat strange, the hours are numbered from 1 to 12; the shorter and longer hands mark both 12 at this time. The shorter hand moves clockwise by 2 numbers per hour while the long hand moves clockwise by 3 numbers per hour. What time will it be when the two hands mark the same number again?

- (A) 6:00
- (B) 10am
- (C) 8am
- (D) 12 o'clock ✓
- (E) 4 o'clock

The correct answer is: 12 o'clock

# Training test

| | |
|---|---|
| **Started** | Tuesday, March 31 2020, 1:08 pm |
| **State** | Completed |
| **terminated** | Tuesday, March 31 2020, 1:14 pm |
| **The time spent on** | 5 min 43 seconds |
| **Score** | 600.00 / 600.00 |
| **Rating** | **6.00 out** of a maximum of 6.00 ( **100** %) |

**Question 1**

Correct answer

Score 100.00 out of 100.00

If it is true that:
- All engineers are made for logic
- Asdrubale is an engineer
- Who is made for logic has a soft spot for scooters

which of the following statements is definitely NOT true?

- (A) There is no denying that Asdrubale has a soft spot for scooters
- (B) All engineers have a soft spot for scooters
- (C) Asdrubale has all the requirements to be a good logician
- (D) Who is brought for logic is an engineer ✓
- (E) Asdrubale is a deep thinker and has a soft spot for scooters

The correct answer is: Who is well versed in logic is an engineer

**Question 2**

Correct answer

Score 100.00 out of 100.00

A firm is based in a building in which it has 18 offices spread over 5 floors, with at least one office per floor.

Which of the following statements is always true (regardless of the distribution of offices between floors)?

- (A) If there is a plan with six offices, another exists with at least three ✓
- (B) There are certainly two floors with at least three offices each
- (C) If there is a plan with two offices, another exists with at least five
- (D) There are certainly at least two floors with at most three offices each
- (E) If there is a plan with only one office, there is another with at least seven

The correct answer is: If there is a plan with six offices, there is another with at least three

**Question 3**

Correct answer

Score 100.00 out of 100.00

The integers a, b, c, d, satisfy the following conditions:
a = b + 1
b = c - 2
c = d + 4
e = d + 2
Which of the following statements is TRUE?

- (A) The order is alphabetical
- (B) d> a
- (C) and> b
- (D) a <c <b
- (E) e = b ✓

The correct answer is: e = b

**Question 4**

Correct answer

Score 100.00 out of 100.00

On the dial of a clock, somewhat strange, the hours are numbered from 1 to 12; the shorter and longer hands mark both 12 at this time. The shorter hand moves clockwise by 2 numbers per hour while the long hand moves counterclockwise by 5 numbers every hour. What time will it be when the two hands mark the same number again?

- (A) 8:00
- (B) The hands will never mark the same number again
- (C) Le 2
- (D) 6 o'clock
- (E) 12 o'clock ✓

The correct answer is: 12 o'clock

**Question 5**

Correct answer

Score 100.00 out of 100.00

Five books, identified with the abbreviations An-Bo-Ch-Di-El, are stacked in descending alphabetical order (ie with the book An at the top and the book El at the bottom).
The last three books from the bottom are simultaneously removed and placed on top, maintaining their vertical order. If you repeat this procedure two more times, which book will end exactly at the bottom of the pile?

- (A) The book Bo
- (B) The book Ch
- (C) The book El
- (D) The book Di
- (E) The book An ✓

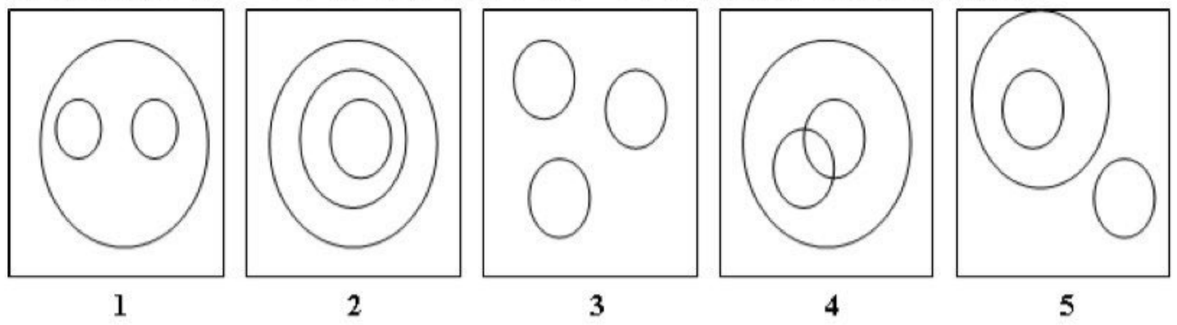
The correct answer is: The book An

**Question 6**

Correct answer

Score 100.00 out of 100.00

Which of these diagrams represents the correct relationship between:
SQUARES - RECTANGLES - PARALLELOGRAMS




- (A) Figure 5
- (B) Figure 2 ✓
- (C) Figure 1
- (D) Figure 3
- (E) Figure 4

The correct answer is: Figure 2

# Training test

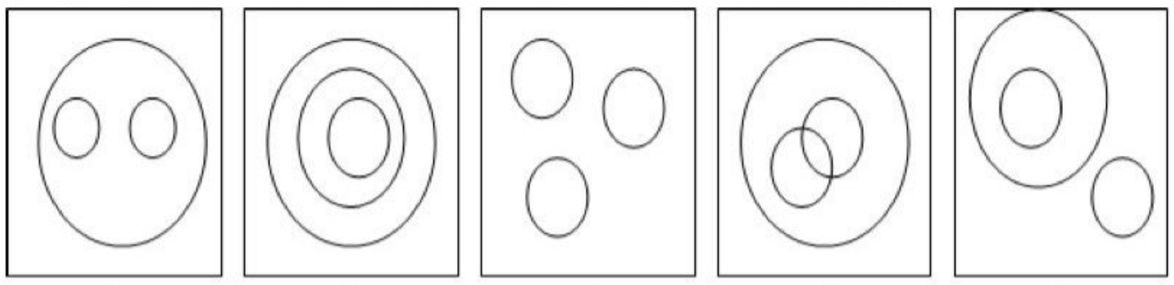
| | |
|---|---|
| **Started** | Tuesday, March 31 2020, 5:39 pm |
| **State** | Completed |
| **terminated** | Tuesday, March 31 2020, 5:50 PM |
| **The time spent on** | 10 min 37 seconds |
| **Score** | 600.00 / 600.00 |
| **Rating** | **6.00 out** of a maximum of 6.00 ( **100** %) |

**Question 1**

Correct answer

Score 100.00 out of 100.00

Which of these diagrams represents the correct relationship between:
SQUARES - RECTANGLES - PARALLELOGRAMS




(A) Figure 5

(B) Figure 4

(C) Figure 2 ✓

(D) Figure 3

(E) Figure 1

The correct answer is: Figure 2

**Question 2**

Correct answer

Score 100.00 out of 100.00

The integers a, b, c, d, satisfy the following conditions:

a = b + 1

b = c - 2

c = d + 4

e = d + 2

Which of the following statements is TRUE?

- (A) The order is alphabetical
- (B) and> b
- (C) e = b ✓
- (D) d> a
- (E) a <c <b

The correct answer is: e = b

**Question 3**

Correct answer

Score 100.00 out of 100.00

The regulations of the Department of Mathematics foresee that each piece of furniture in the Department must bear an inventory number and the number of the room in which it is located. The Director has communicated that the regulation has NOT been respected. So necessarily:

- (A) in the Department of Mathematics no furniture has an inventory number and a room number
- (B) in the Department of Mathematics there is a piece of furniture with the wrong room number and inventory number
- (C) in the Department of Mathematics every piece of furniture if it bears the inventory number does not bear the room number
- (D) in the Department of Mathematics each piece of furniture, if it bears the room number, does not bear the inventory number
- (E) in the Department of Mathematics a piece of furniture was found which does not bear the inventory number or does not bear the room number ✓

The correct answer is: in the Department of Mathematics a piece of furniture was found that does not bear the inventory number or does not bear the room number

**Question 4**

Correct answer

Score 100.00 out of 100.00

If it is true that:
- Who eats veal or quail is not vegetarian
- Berengario is not vegetarian
- Who eats quail does not get the flu

which of the following conclusions is NOT correct?

- (A) It is impossible for Berengario to eat veal ✓
- (B) It is possible that Berengario will not eat veal
- (C) It is impossible for a vegetarian to eat veal
- (D) It is possible that Berengario does not catch the flu
- (E) It is possible that Berengario will eat veal

The correct answer is: It is impossible for Berengario to eat veal

**Question 5**

Correct answer

Score 100.00 out of 100.00

The four friends, Anita, Basilio, Carlo, Donato, discussing their finances, show that:
- Anita has less money than Carlo
- Basilio has less money than Carlo
- Carlo has more money than Donato
- Basilio has more money than Anita

Which among these statements is NOT necessarily correct?

- (A) Basilio is not the one who has the least money
- (B) Donato has less money than Carlo
- (C) The one who has the most money of all is Carlo
- (D) The alphabetical order of their names does not correspond to the order of their cash capital
- (E) Anita is the one who has the least money of all ✓

The correct answer is: Anita is the one who has the least money of all

**Question 6**

Correct answer

Score 100.00 out of 100.00

If the product of fifteen whole numbers is positive, then you can be absolutely sure that:

- (A) there is an odd number of positive integers ✓
- (B) an integer is positive and the others are negative
- (C) seven integers are positive and the others are negative
- (D) there is at least a pair of negative integers
- (E) the number of negative integers is equal and not zero

The correct answer is: there is an odd number of positive integers

# Training test

| | |
|---|---|
| **Started on** | Tuesday, March 31 2020, 9:26 AM |
| **State** | finished |
| **Completed on** | Tuesday, March 31 2020, 9:46 AM |
| **Time taken** | 20 mins 43 secs |
| **Marks** | 1675.00 / 1800.00 |
| **Grade** | **16.75** out of 18.00 ( **93** %) |

**Question 1**

correct

Mark 100.00 out of 100.00

A common divisor of monomials $8a^3x^6, 4a^2x^6y, a^4bx^3y^2$ and '

- (TO) $a^3x^6y^2$
- (B) $a^2x^3$ ✓
- (C) $x^6y^2$
- (D) $a^2bx^6y$
- (IS) $axy$

The correct answer is: $a^2x^3$

**Question 2**

correct

Mark 100.00 out of 100.00

The expression $\log_5 3^{(x^2)}$ is equal to:

- (A) $x^2 \log_3 5$ for each $x$ real
- (B) $x^2 \log_5 3$ only for $x > 0$
- (C) $(\log_5 3^x)^2$ for each $x$ real
- (D) $x^2 \log_5 3$ for each $x$ real ✓
- (E) $2 \log_5 3^x$ for each $x$ real

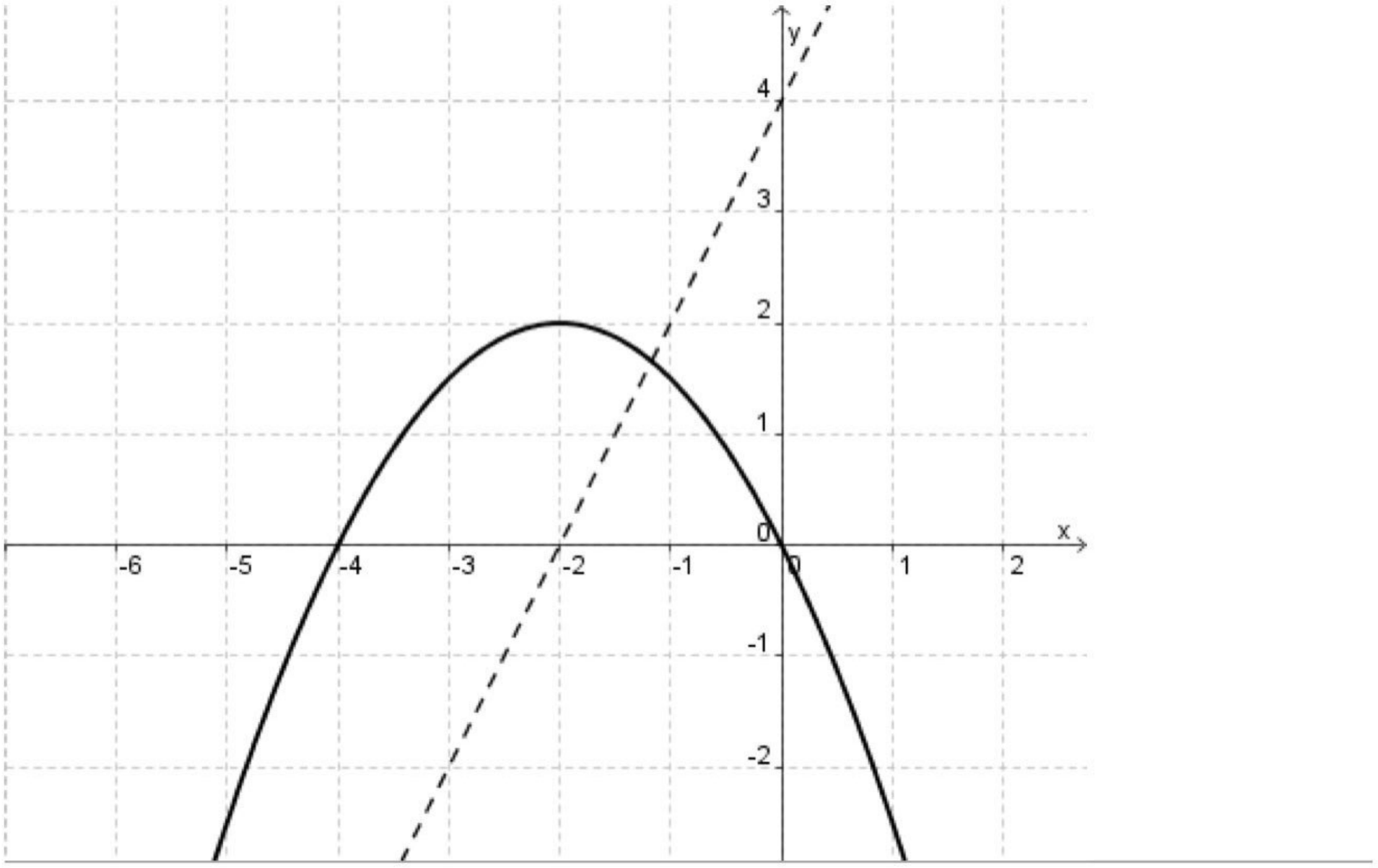
The correct answer is: $x^2 \log_5 3$ for every $x$ real

**Question 3**

correct

Mark 100.00 out of 100.00

The figure shows a straight line and a parabola, which are the graph of the functions




(A) $f(x) = 2x + 2, g(x) = -\frac{1}{2}x(x+4)$

(B) $f(x) = 2x + 4, g(x) = -\frac{1}{2}x^2 - 2x + 1$

(C) $f(x) = 2x + 4, g(x) = -x^2 - 4x$

(D) $f(x) = x + 2, g(x) = -x^2 - 4x$

(E) $f(x) = 2x + 4, g(x) = -\frac{1}{2}x(x+4)$ ✓

The correct answer is: $f(x) = 2x + 4, g(x) = -\frac{1}{2}x(x+4)$

**Question 4**

correct

Mark 100.00 out of 100.00

Which of these equations represents a straight line parallel to the straight line passing through the points $(2, 1)$ and $(-1, 0)$?

(TO) $2x - 4y = 0$

(B) $x - y + 1 = 0$

(C) $x - 7y - 4 = 0$

(D) $x - 3y - 3 = 0$ ✓

(IS) $x + y - 3 = 0$

The correct answer is: $x - 3y - 3 = 0$

**Question 5**

correct

Mark 100.00 out of 100.00

The sum of the ages of father and son is now 60 years. In eighty years the age of the father will be equal to three times his current age minus double the current age of the son. How old are father and son?

- (A) 50 and 10 years ✓
- (B) 45 and 15 years old
- (C) 42 and 18 years old
- (D) 52 and 8 years old
- (E) 48 and 12 years old

The correct answer is: 50 and 10 years

**Question 6**

correct

Mark 100.00 out of 100.00

A solution of the equation $\log_3(2+x)^2 = 6$ is

- (TO) $x = 3^{3-\log_3 2}$
- (B) $x = 1$
- (C) $x = \log_2 3$
- (D) $x = \log_3 2$
- (IS) $x = 25$ ✓

The correct answer is: $x = 25$

**Question 7**

correct

Mark 100.00 out of 100.00

To cover the 120 km that separate Turin from Milan, a truck takes 2 hours and 40 minutes. A car, which leaves Turin for Milan three quarters of an hour after the truck, travels at an average speed twice that of the truck. Then

- (A) the car arrives in Milan 15 minutes before the truck
- (B) the car arrives in Milan 15 minutes after the truck
- (C) the car and the truck arrive together in Milan
- (D) the car arrives in Milan 35 minutes before the truck ✓
- (E) the car arrives in Milan 35 minutes after the truck

The correct answer is: the car arrives in Milan 35 minutes before the truck

**Question 8**

correct

Mark 100.00 out of 100.00

A car factory provides the customer with the opportunity to choose six different body colors, two different interior fittings and three different types of alloy wheels for a car. How many different ways can the car be set up?

- (A) 11
- (B) $6^6$
- (C) $6^{2^3}$
- (D) 36 ✓
- (IS) $12^3$

The correct answer is: 36

**Question 9**

correct

Mark 100.00 out of 100.00

Consider two spheres in space both of radius 1 and of centers $P_1$ and $P_2$ respectively. If the distance between $P_1$ and $P_2$ is 3, then the intersection of the spheres is:

- (A) a hyperbola
- (B) a circumference
- (C) a point
- (D) the empty set ✓
- (E) an ellipse with different axle shafts

The correct answer is: the empty set

**Question 10**

correct

Mark 100.00 out of 100.00

Consider the inequalities

$$A)\ \frac{Q(x)}{x^4-1}<0, \qquad B)\ \frac{Q(x)}{x^4+1}<0, \qquad C)\ Q(x)<0,$$

where $Q(x)$ is a second degree polynomial. Which of the following statements is correct?

- (A) the three inequalities have the same set of solutions
- (B) you can't answer because you don't know the polynomial $Q(x)$
- (C) inequalities B) and C) have the same set of solutions ✓
- (D) inequalities A) and C) have the same set of solutions
- (E) inequalities A) and B) have the same set of solutions

The correct answer is: inequalities B) and C) have the same set of solutions

**Question 11**

incorrect

Mark -25.00 out of 100.00

The equation $x^2 - 9y^2 = 0$ defines in the Cartesian plane

- (A) a pair of parallel straight lines
- (B) a pair of straight accidents
- (C) a point ✗
- (D) the empty set
- (E) a straight line

The correct answer is: a couple of straight accidents

**Question 12**

correct

Mark 100.00 out of 100.00

The prime factorization of the number $(2^6 - 2^2)^2 3^2$ is:

- (TO) $2^4 3^6 5^2$
- (B) $2^4 3^3 5^2$
- (C) $2^3 3^3 5$
- (D) $2^4 3^4 5^2$ ✓
- (IS) $2^2 3^4 5^2$

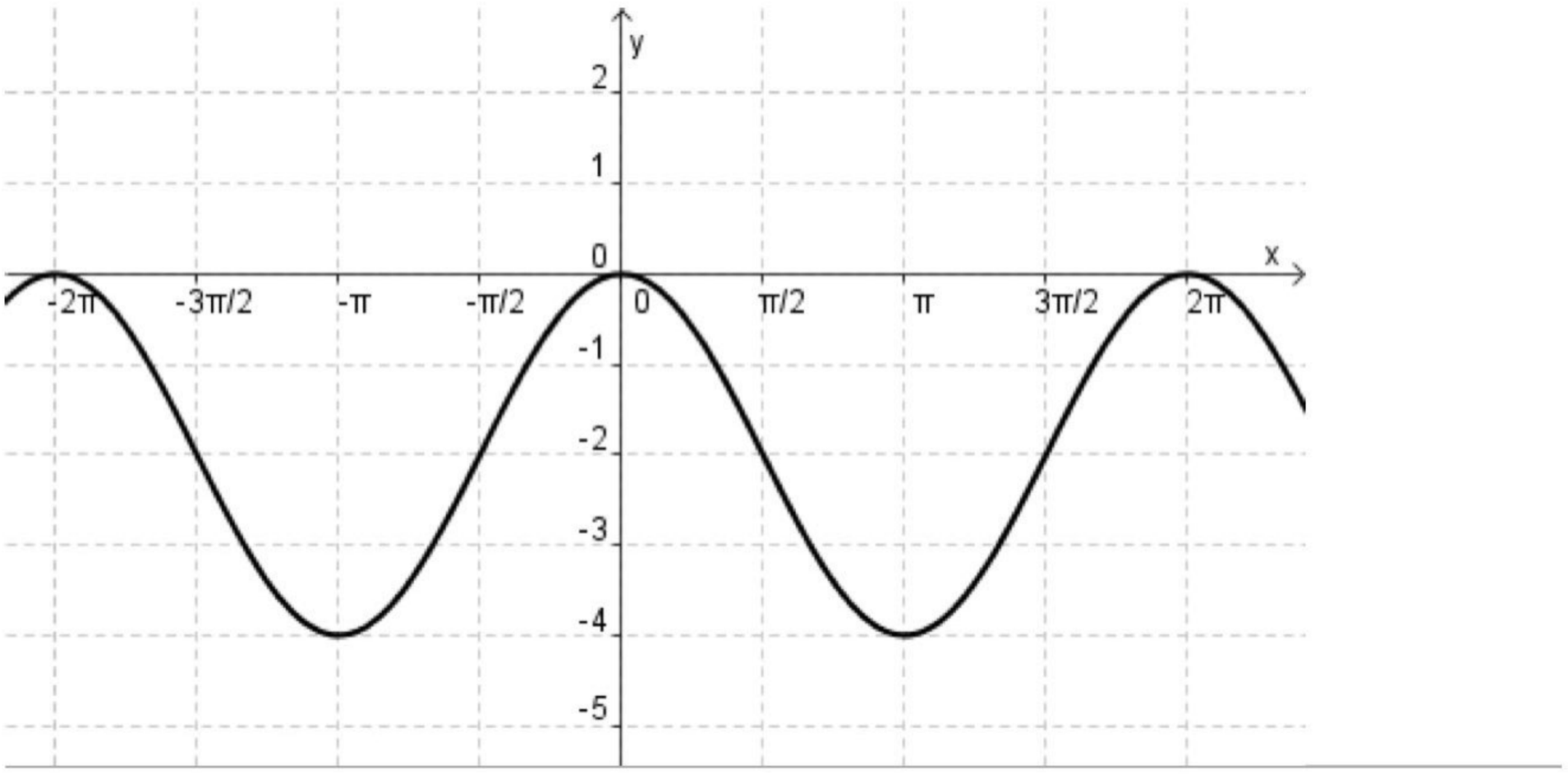
The correct answer is: $2^4 3^4 5^2$

**Question 13**

correct

Mark 100.00 out of 100.00

The figure shows the graph of the function




- (TO) $y = 2\cos x$
- (B) $y = \cos x - 1$
- (C) $y = 2\sin x - 2$
- (D) $y = \cos x - 2$
- (IS) $y = 2\cos x - 2$ ✓

The correct answer is: $y = 2\cos x - 2$

**Question 14**

correct

Mark 100.00 out of 100.00

The real number $x = \dfrac{\sqrt{2}}{\sqrt{2}+1}$ checks the condition

- (TO) $x = 2 + \sqrt{2}$
- (B) $x = 2 - \sqrt{2}$ ✓
- (C) $x = \dfrac{\sqrt{2}+1}{2}$
- (D) $x$ is whole
- (IS) $x > 2$

The correct answer is: $x = 2 - \sqrt{2}$

**Question 15**

correct

Mark 100.00 out of 100.00

The expression $\cos^2 \frac{9\pi}{8} - \sin^2 \frac{9\pi}{8}$ is equal to:

- (TO) $\frac{\sqrt{3}}{2}$
- (B) $\frac{\sqrt{2}}{2}$ ✓
- (C) $\left(\frac{\sqrt{2}}{2}\right)^2$
- (D) $\cos \frac{9\pi}{16}$
- (IS) $1$

The correct answer is: $\frac{\sqrt{2}}{2}$

**Question 16**

correct

Mark 100.00 out of 100.00

The equation $x^4 - 3x^2 - 10 = 0$

- (A) has no real solutions
- (B) has four distinct real solutions
- (C) has two (and only two) distinct real solutions ✓
- (D) has only negative solutions
- (E) has at least two solutions of the same sign

The correct answer is: it has two (and only two) distinct real solutions

**Question 17**

correct

Mark 100.00 out of 100.00

Only one of the following statements is correct; identify which one.

- (A) Two parallelograms with the same area are necessarily congruent
- (B) Two right-angled triangles that have an acute angle and the hypotenuse neatly congruent are necessarily congruent ✓
- (C) Two equiangular triangles are necessarily congruent
- (D) Two rectangles with the same perimeter are necessarily congruent
- (E) Two isosceles triangles with the same perimeter are necessarily congruent

The correct answer is: Two right-angled triangles that have an acute angle and the hypotenuse neatly congruent are necessarily congruent

**Question 18**

correct

Mark 100.00 out of 100.00

By simplifying and factorizing the expression $[b^3 \times (2b)^4 : b^2]^2 : [(-2b)^2 : (-b)^6 \times (-b)^5]^5$, where there $b$is a non-zero real number, we obtain

- (TO) $\frac{1}{4}b^5$
- (B) $\frac{1}{8b}$
- (C) $-\frac{1}{2}b^2$
- (D) $-\frac{1}{8b}$
- (IS) $-\frac{1}{4}b^5$ ✓

The correct answer is: $-\frac{1}{4}b^5$

# Training test

| | |
|---|---|
| **Started on** | Tuesday, March 31 2020, 11:46 am |
| **State** | finished |
| **Completed on** | Tuesday, March 31 2020, 12:08 PM |
| **Time taken** | 22 mins 2 secs |
| **Marks** | 1550.00 / 1800.00 |
| **Grade** | **15.50** out of 18.00 ( **86** %) |

**Question 1**

correct

Mark 100.00 out of 100.00

The prime factorization of the number $(4^4 - 4^2)^2 3^3$ is:

- (TO) $2^8 3^4 5$
- (B) $2^6 3^5 5^2$
- (C) $2^8 3^5 5^3$
- (D) $2^4 3^5 5^2$
- (IS) $2^8 3^5 5^2$ ✓

The correct answer is: $2^8 3^5 5^2$

**Question 2**

correct

Mark 100.00 out of 100.00

The expression $2 \sin \frac{7\pi}{12} \cos \frac{7\pi}{12}$ is equal to:

- (TO) $1/2$
- (B) $\sin \frac{7\pi}{24}$
- (C) $\sqrt{3}/2$
- (D) $2$
- (IS) $-1/2$ ✓

The correct answer is: $-1/2$

**Question 3**

correct

Mark 100.00 out of 100.00

The real number

$$x = \sqrt{75} + 3\sqrt{18} - 2\sqrt{12} - 2\sqrt{50}$$

It's equal to

- (TO) $9\sqrt{3} + 19\sqrt{2}$
- (B) $\sqrt{3} - \sqrt{2}$ ✓
- (C) $\sqrt{3} + \sqrt{2}$
- (D) $\sqrt{2} - \sqrt{3}$
- (IS) $2\sqrt{6}$

The correct answer is: $\sqrt{3} - \sqrt{2}$

**Question 4**

correct

Mark 100.00 out of 100.00

The data below refer to a survey carried out among 150 graduates in the last academic year in the two Turin universities and concerning their working position within six months of graduation:

| | ha trovato lavoro | non ha trovato lavoro |
|---|---|---|
| laurea in ingegneria | 42 | 14 |
| altra laurea | 44 | 50 |

Calculate the percentage of engineering graduates who found a job.

- (A) 86%
- (B) about 57%
- (C) 75% ✓
- (D) about 43%
- (E) 90%

The correct answer is: 75%

**Question 5**

incorrect

Mark -25.00 out of 100.00

The equation $x^2 + y^2 - 2xy = 0$ defines in the Cartesian plane

- (A) a point ✗
- (B) a pair of distinct parallel lines
- (C) the empty set
- (D) a straight line
- (E) a pair of straight accidents

The correct answer is: a straight line

**Question 6**

correct

Mark 100.00 out of 100.00

A woman has two children, Anna and Martino. The age of the woman plus that of Anna exceeds that of Martino of 60 years. The age of the woman plus that of Martino exceeds that of Anna aged 70. How old is the woman?

- (A) 70 years old
- (B) 68 years old
- (C) 65 years old ✓
- (D) 45 years old
- (E) 54 years old

The correct answer is: 65 years

**Question 7**

correct

Mark 100.00 out of 100.00

A common divisor of monomials $48x^5y^3z, 60x^4y^4z^2, 18x^3y^5$ and '

- (TO) $x^4y^3$
- (B) $6xy^4z^2$
- (C) $4x^4y^2$
- (D) $4x^2y^2z$
- (IS) $6x^3y^3$ ✓

The correct answer is: $6x^3y^3$

**Question 8**

correct

Mark 100.00 out of 100.00

For $x > 0$, the expression

$$5^{2\log_5 x}$$

It's equal to:

- (TO) $5x^2$
- (B) $5^2 + x$
- (C) $2x$
- (D) $x^2$ ✓
- (IS) $5^2 x$

The correct answer is: $x^2$

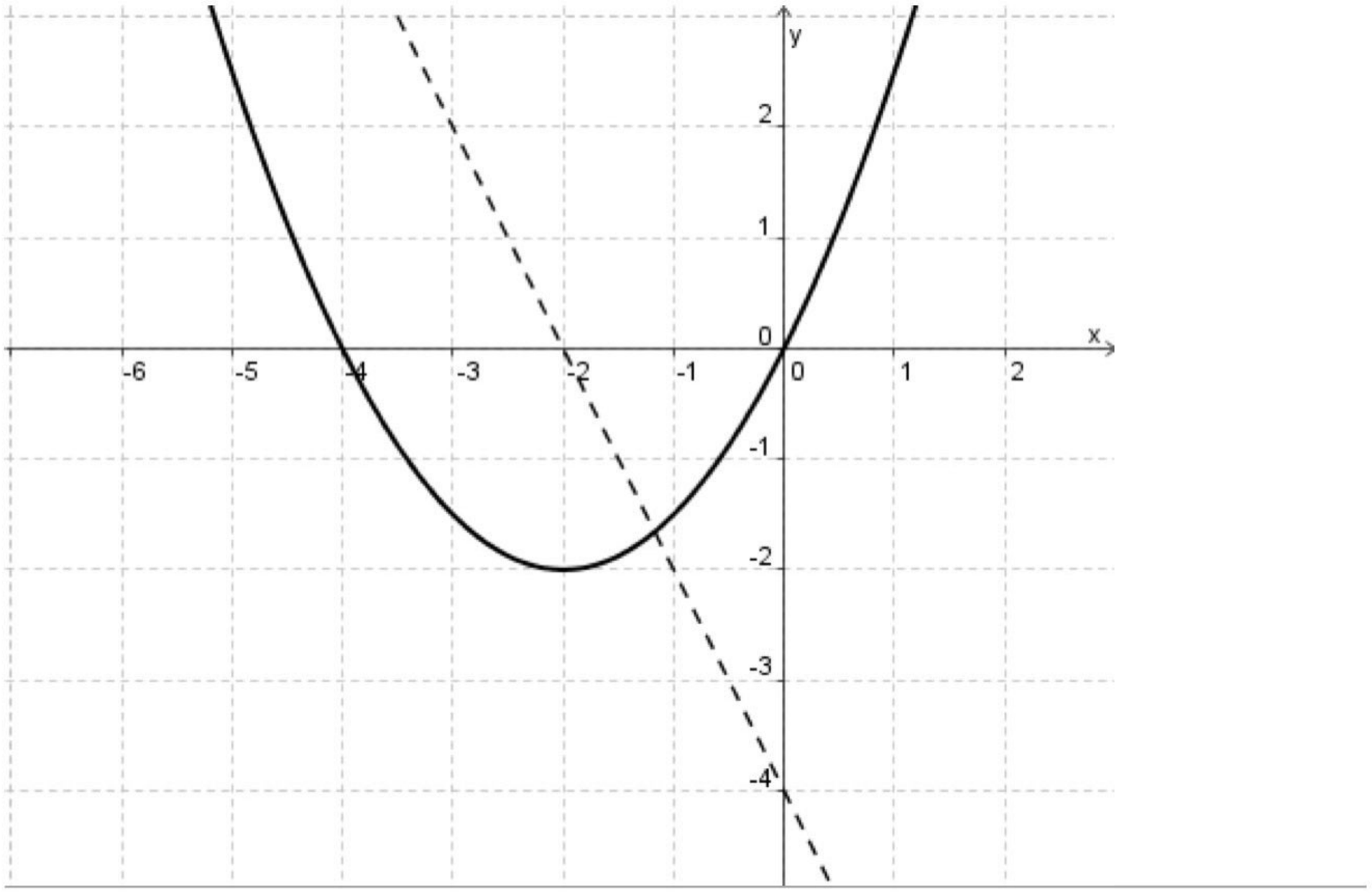
 

**Question 9**

correct

Mark 100.00 out of 100.00

The figure shows a straight line and a parabola, which are the graph of the functions




(A) $f(x) = -2x - 4, g(x) = x^2 + 4x$

(B) $f(x) = -2x - 4, g(x) = \frac{1}{2}x^2 + 2x - 1$

(C) $f(x) = -2x - 4, g(x) = \frac{1}{2}x(x + 4)$ ✓

(D) $f(x) = -2x - 2, g(x) = \frac{1}{2}x(x + 4)$

(E) $f(x) = -x - 2, g(x) = x^2 + 4x$

The correct answer is: $f(x) = -2x - 4, g(x) = \frac{1}{2}x(x + 4)$

**Question 10**

correct

Mark 100.00 out of 100.00

The equation $x^6 - 7x^3 = 8$

(A) cannot be resolved, because it is too high

(B) has two (and only two) distinct real solutions ✓

(C) has two distinct solutions, both positive

(D) has six distinct real solutions

(E) has one and only one real solution

The correct answer is: it has two (and only two) distinct real solutions

**Question 11**

correct

Mark 100.00 out of 100.00

In $\left[\frac{\pi}{2}, \frac{3}{2}\pi\right]$ the interval the equation $\cos^2 x = \frac{1}{5}$

- (A) has infinite solutions
- (B) has four distinct solutions
- (C) has two distinct solutions ✓
- (D) has no solutions
- (E) has only one solution

The correct answer is: it has two distinct solutions

**Question 12**

incorrect

Mark -25.00 out of 100.00

A cube $Q$ is inscribed in a sphere $S$ of radius 5. We can say that

- (A) it is impossible for a cube to be inscribed in a sphere
- (B) one side of the cube measures $10/\sqrt{3}$
- (C) one side of the cube measures $10/\sqrt{2}$
- (D) one side of the cube measures $5\sqrt{2}$ ✗
- (E) one side of the cube measures $5\sqrt{3}$

The correct answer is: one side of the measure cube $10/\sqrt{3}$

**Question 13**

correct

Mark 100.00 out of 100.00

Which of these equations represents a straight line parallel to the straight line passing through the points $(0, -1)$ and $(2, 3)$?

- (TO) $x - 3y - 2 = 0$
- (B) $2x - y - 2 = 0$ ✓
- (C) $2x + y - 1 = 0$
- (D) $2x + y = 0$
- (IS) $x - 2y + 3 = 0$

The correct answer is: $2x - y - 2 = 0$

**Question 14**

correct

Mark 100.00 out of 100.00

Only one of the following statements is correct; identify which one.

- (A) Two triangles with two neatly congruent sides are always congruent
- (B) Two isosceles triangles with the same area are always congruent
- (C) Two right triangles with the hypotenuse of the same length are always congruent
- (D) Two isosceles triangles with the same height are always congruent
- (E) Two equilateral triangles with the same perimeter are always congruent ✓

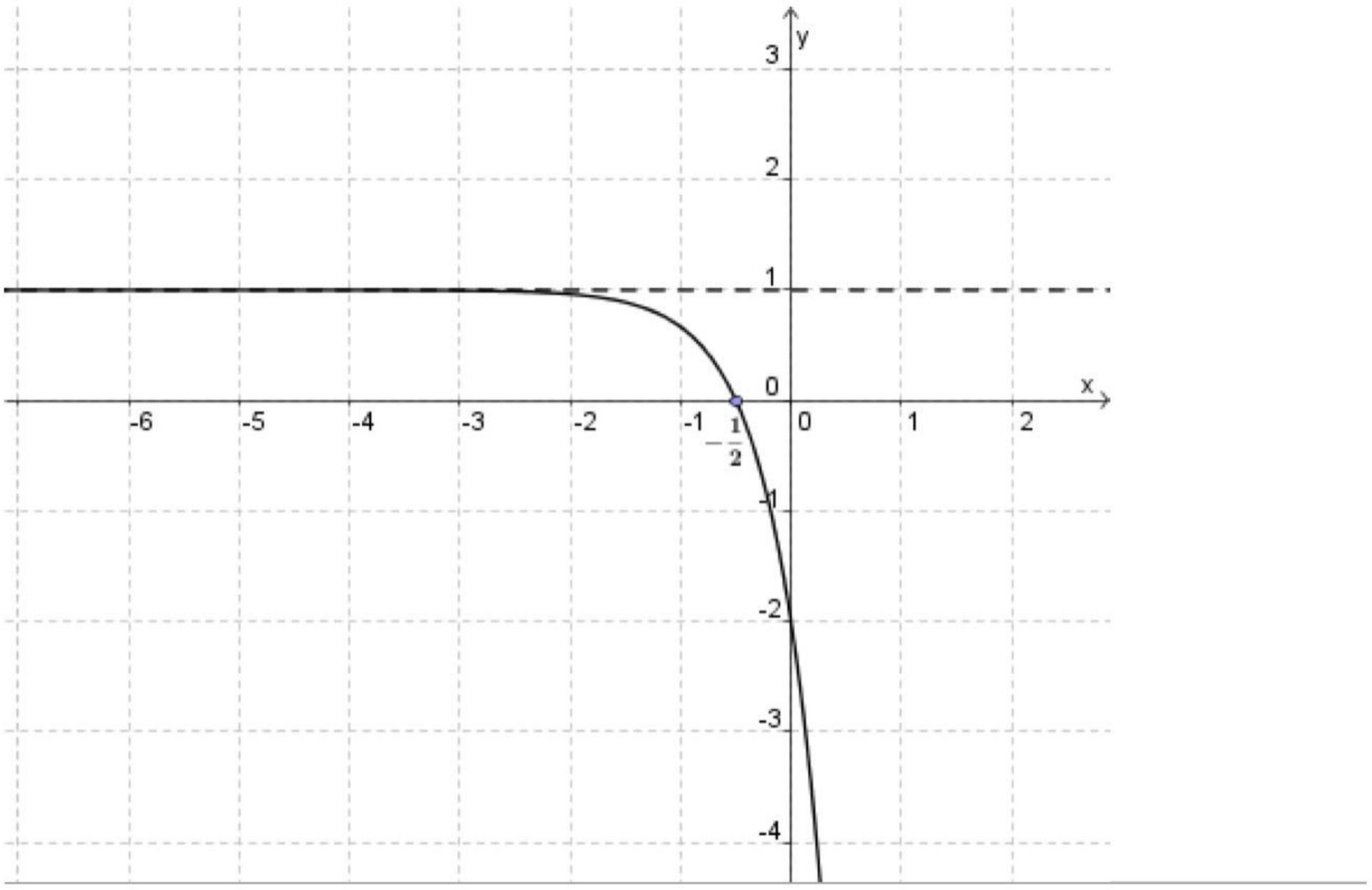
The correct answer is: Two equilateral triangles with the same perimeter are always congruent

**Question 15**

correct

Mark 100.00 out of 100.00

The figure shows the graph of the function




- (TO) $y = 1 - 3 \cdot 3^x$
- (B) $y = 1 - 3 \cdot 9^x$ ✓
- (C) $y = 1 - 2^x$
- (D) $y = 1 - 2 \cdot 4^x$
- (IS) $y = 1 - 3^x$

The correct answer is: $y = 1 - 3 \cdot 9^x$

**Question 16**

correct

Mark 100.00 out of 100.00

To cover the 120 km that separate Turin from Milan, a truck takes 2 and a half hours. A car, which leaves Turin for Milan 1 hour after the truck, travels at an average speed twice that of the truck. Then

- (A) the car and the truck arrive together in Milan
- (B) the car arrives in Milan 35 minutes after the truck
- (C) the car arrives in Milan 35 minutes before the truck
- (D) the car arrives in Milan 15 minutes before the truck ✓
- (E) the car arrives in Milan 15 minutes after the truck

The correct answer is: the car arrives in Milan 15 minutes before the truck

**Question 17**

correct

Mark 100.00 out of 100.00

By simplifying and factorizing the expression $[b^3 \times (2b)^4 : b^2]^2 : [(-2b)^2 : (-b)^6 \times (-b)^5]^5$, where there $b$is a non-zero real number, we obtain

- (TO) $\frac{1}{8b}$
- (B) $-\frac{1}{2}b^2$
- (C) $-\frac{1}{4}b^5$ ✓
- (D) $-\frac{1}{8b}$
- (IS) $\frac{1}{4}b^5$

The correct answer is: $-\frac{1}{4}b^5$

**Question 18**

correct

Mark 100.00 out of 100.00

Consider the inequalities

$$A)\ P(x) > 0, \qquad B)\ \frac{P(x)}{x^2+1} > 0, \qquad C)\ \frac{P(x)}{x^2-1} > 0,$$

where $P(x)$ is a second degree polynomial. Which of the following statements is correct?

- (A) you can't answer because you don't know the polynomial $P(x)$
- (B) inequalities A) and C) have the same set of solutions
- (C) the three inequalities have the same set of solutions
- (D) inequalities B) and C) have the same set of solutions
- (E) inequalities A) and B) have the same set of solutions ✓

The correct answer is: inequalities A) and B) have the same set of solutions

# Training test

| | |
|---|---|
| **Started on** | Tuesday, March 31 2020, 5:17 PM |
| **State** | finished |
| **Completed on** | Tuesday, March 31 2020, 5:36 PM |
| **Time taken** | 18 mins 57 secs |
| **Marks** | 1800.00 / 1800.00 |
| **Grade** | **18.00** out of 18.00 ( **100** %) |

**Question 1**

correct

Mark 100.00 out of 100.00

To cover the 400 km that separate Turin from Venice, a truck takes 6 hours and 20 minutes. A car, which leaves Turin for Venice 4 hours after the truck, travels at an average speed twice that of the truck. Then

- (A) the car arrives in Venice 50 minutes before the truck
- (B) the car and the truck arrive together in Venice
- (C) the car arrives in Venice 50 minutes after the truck ✓
- (D) the car arrives in Venice 30 minutes before the truck
- (E) the car arrives in Venice 45 minutes after the truck

The correct answer is: the car arrives in Venice 50 minutes after the truck

**Question 2**

correct

Mark 100.00 out of 100.00

The equation $x^4 - 9x^2 + 14 = 0$

- (A) has four distinct real solutions ✓
- (B) has only negative solutions
- (C) has no real solutions
- (D) has only positive solutions
- (E) has two (and only two) distinct real solutions

The correct answer is: it has four distinct real solutions

**Question 3**

correct

Mark 100.00 out of 100.00

The least common multiple of the monomials $3a^2b^4, 4a^3b^3x^5, a^2b^4x^6$ and '

- (TO) $12a^3b^3x^4$
- (B) $a^2b^4$
- (C) $12a^2b^3x^4$
- (D) $12a^3b^4x^6$ ✓
- (IS) $abx$

The correct answer is: $12a^3b^4x^6$

**Question 4**

correct

Mark 100.00 out of 100.00

By simplifying and factorizing the expression $[(-a)^2 \times (-a)^3 : (-a)^4]^2 + 5(a^6 : a^4 - 6a)$, where there $a$ is a non-zero real number, we obtain

- (TO) $5a(a-6)$
- (B) $a(a-6)$
- (C) $6a(a-5)$ ✓
- (D) $(a-5)(a-6)$
- (IS) $a(a-5)$

The correct answer is: $6a(a-5)$

**Question 5**

correct

Mark 100.00 out of 100.00

Equation circles are given

$$x^2 + y^2 - 4y + 3 = 0, \qquad x^2 + y^2 - 2x - 4y - 4 = 0.$$

We can say that the two circumferences

- (A) are separated and the first is internal to the second ✓
- (B) intersect at two distinct points
- (C) are separated and the second is internal to the first
- (D) intersect at four distinct points
- (E) are bribes

The correct answer is: they are separate and the first is internal to the second

**Question 6**

correct

Mark 100.00 out of 100.00

The real number $x = \dfrac{7}{\sqrt{5}+\sqrt{2}}$ checks the condition

- (TO) $x = \dfrac{7}{3}(\sqrt{5}+\sqrt{2})$
- (B) $x = \dfrac{7}{3}(\sqrt{5}-\sqrt{2})$ ✓
- (C) $x = \sqrt{7}$
- (D) $x = (\sqrt{5}-\sqrt{2})$
- (E) $x$ is whole

The correct answer is: $x = \dfrac{7}{3}(\sqrt{5}-\sqrt{2})$

**Question 7**

correct

Mark 100.00 out of 100.00

The expression $2 \sin \dfrac{7\pi}{12} \cos \dfrac{7\pi}{12}$ is equal to:

- (TO) $-1/2$ ✓
- (B) $1/2$
- (C) $2$
- (D) $\sin \dfrac{7\pi}{24}$
- (IS) $\sqrt{3}/2$

The correct answer is: $-1/2$

**Question 8**

correct

Mark 100.00 out of 100.00

In space, consider a point $Q$ and a plane that is 4 from $Q$. the intersection between this plane and the sphere of center $Q$ and radius 3 is

- (A) an ellipse with different axle shafts
- (B) a point
- (C) the empty set ✓
- (D) a parable
- (E) a circumference

The correct answer is: the empty set

**Question 9**

correct

Mark 100.00 out of 100.00

In $[0, \pi]$ the interval the equation $\cos^2 x = \frac{1}{9}$

- (A) has infinite solutions
- (B) has two distinct solutions ✓
- (C) has only one solution
- (D) has four distinct solutions
- (E) has no solutions

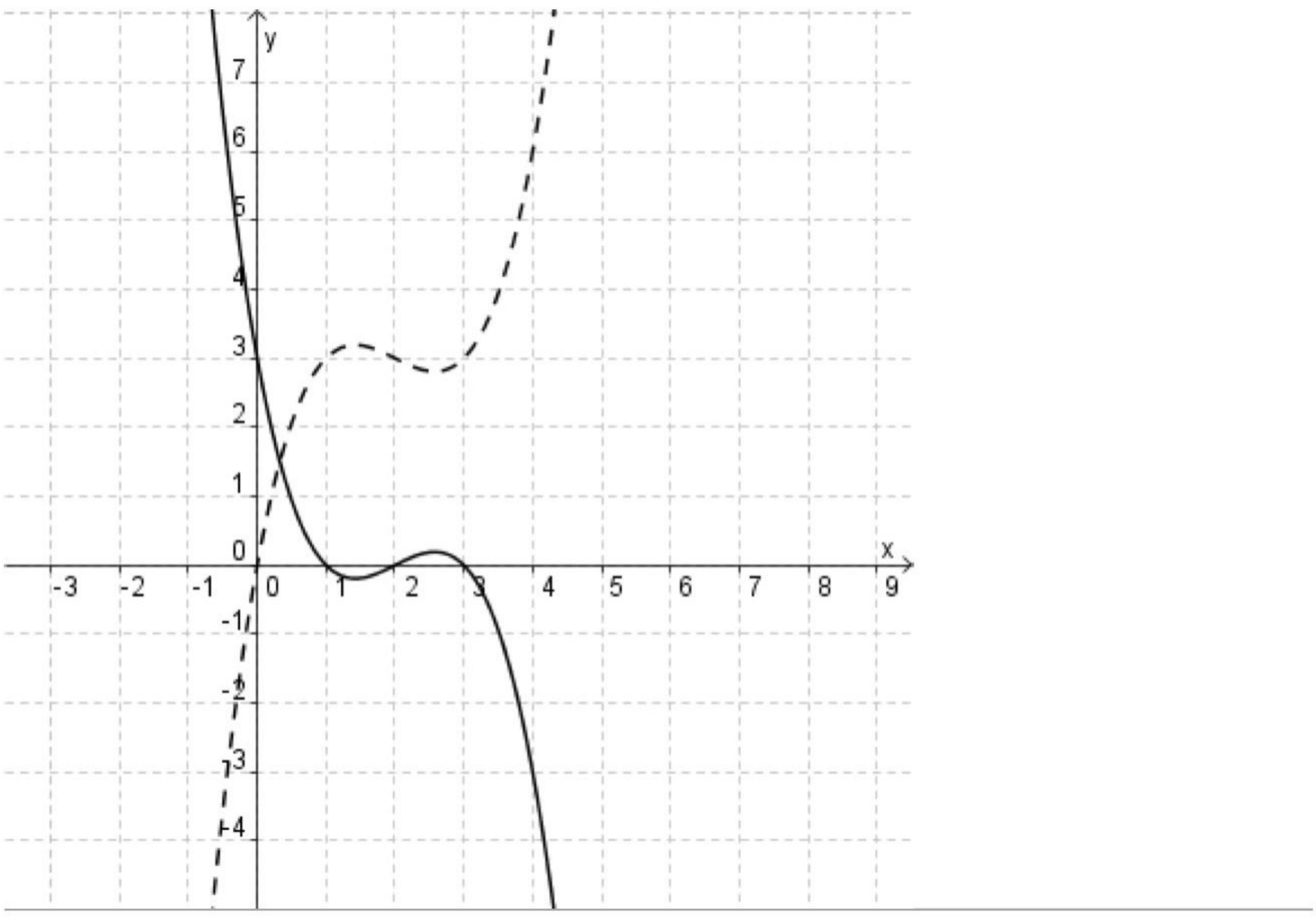
The correct answer is: it has two distinct solutions

**Question 10**

correct

Mark 100.00 out of 100.00

The figure shows the graph of $y = f(x)$ the continuous stroke function . The dotted curve is instead the graph of the function:




- (TO) $y = -3 - f(x)$
- (B) $y = -3f(x)$
- (C) $y = -f(x)$
- (D) $y = -f(x+3)$
- (IS) $y = 3 - f(x)$ ✓

The correct answer is: $y = 3 - f(x)$

**Question 11**

correct

Mark 100.00 out of 100.00

An investor buys shares worth € 100,000. After a month he reads in an economic newspaper that the monthly variation of his titles was + 50%; after another month he reads that the monthly variation of his titles has been -50%. He then decided to sell the securities and from the sale he obtained:

- (A) 50,000 Euros
- (B) 75,000 Euros ✓
- (C) 100,000 Euros
- (D) 150,000 Euros
- (E) 125,000 Euros

The correct answer is: 75,000 Euros

**Question 12**

correct

Mark 100.00 out of 100.00

A father is three times the age of his son. Twelve years from now, you'll have twice that. How old is your son now?

- (12 years old ✓
- (B) 15 years
- (C) 14 years old
- (D) 16 years old
- (E) 13 years old

The correct answer is: 12 years

**Question 13**

correct

Mark 100.00 out of 100.00

Consider the inequalities

$$A)\ P(x) > 0, \qquad B)\ \frac{P(x)}{x^2+1} > 0, \qquad C)\ \frac{P(x)}{x^2-1} > 0,$$

where $P(x)$ is a second degree polynomial. Which of the following statements is correct?

- (A) inequalities A) and C) have the same set of solutions
- (B) inequalities B) and C) have the same set of solutions
- (C) the three inequalities have the same set of solutions
- (D) inequalities A) and B) have the same set of solutions ✓
- (E) you can't answer because you don't know the polynomial $P(x)$

The correct answer is: inequalities A) and B) have the same set of solutions

**Question 14**

correct

Mark 100.00 out of 100.00

Only one of the following statements is correct; identify which one.

- (A) Two rectangular trapezoids with the same perimeter are necessarily similar
- (B) Two rhombuses with the same area are necessarily similar
- (C) Two rectangles with the same area are necessarily similar
- (D) Two scalene triangles with the same perimeter are necessarily similar
- (E) Two isosceles triangles with an angle at the congruent base are necessarily similar ✓

The correct answer is: Two isosceles triangles with an angle at the congruent base are necessarily similar

**Question 15**

correct

Mark 100.00 out of 100.00

For $x > 0$, the expression

$$5^{2\log_5 x}$$

It's equal to:

- (TO) $5^2 + x$
- (B) $2x$
- (C) $x^2$ ✓
- (D) $5^2 x$
- (IS) $5x^2$

The correct answer is: $x^2$

**Question 16**

correct

Mark 100.00 out of 100.00

Which of these equations represents a straight line parallel to the straight line passing through the points $(0, -1)$ and $(2, 3)$?

- (TO) $2x + y - 1 = 0$
- (B) $2x - y - 2 = 0$ ✓
- (C) $x - 3y - 2 = 0$
- (D) $x - 2y + 3 = 0$
- (IS) $2x + y = 0$

The correct answer is: $2x - y - 2 = 0$

**Question 17**

correct

Mark 100.00 out of 100.00

The prime factorization of the number $(2^6 - 2^2)^2 3^2$ is:

- (TO) $2^4 3^6 5^2$
- (B) $2^4 3^4 5^2$ ✓
- (C) $2^4 3^3 5^2$
- (D) $2^3 3^3 5$
- (IS) $2^2 3^4 5^2$

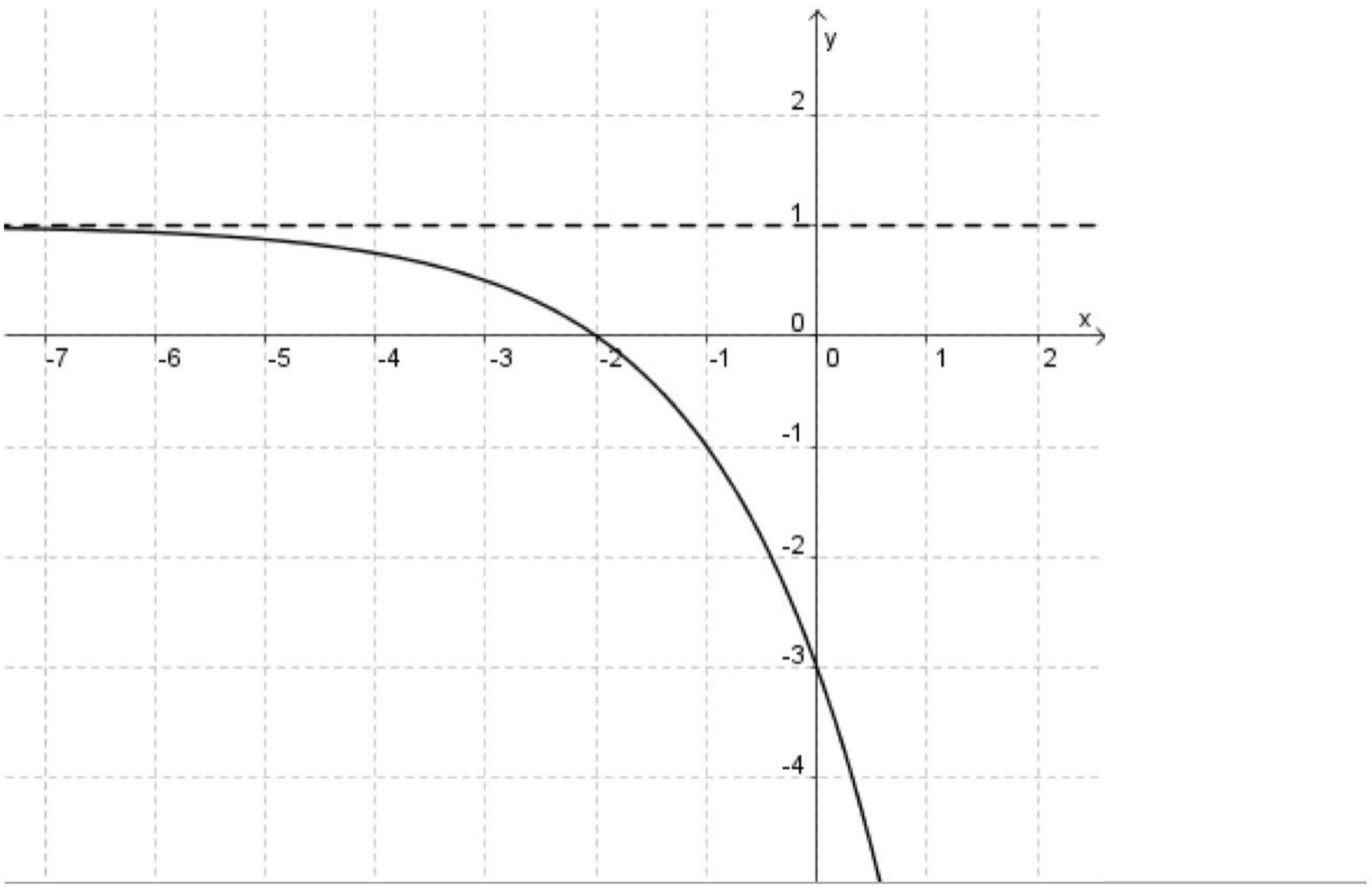
The correct answer is: $2^4 3^4 5^2$

**Question 18**

correct

Mark 100.00 out of 100.00

The figure shows the graph of the function




- (TO) $y = 1 - 2^x$
- (B) $y = 1 - 2 \cdot 2^x$
- (C) $y = 1 - 2 \cdot 4^x$
- (D) $y = 1 - 4^x$
- (IS) $y = 1 - 4 \cdot 2^x$ ✓

The correct answer is: $y = 1 - 4 \cdot 2^x$

# Training test

| | |
|---|---|
| **Started on** | Friday, April 3 2020, 11:14 AM |
| **State** | finished |
| **Completed on** | Friday, April 3 2020, 11:29 AM |
| **Time taken** | 14 mins 50 secs |
| **Marks** | 1800.00 / 1800.00 |
| **Grade** | **18.00** out of 18.00 ( **100** %) |

**Question 1**

correct

Mark 100.00 out of 100.00

Equation circles are given

$$x^2 + y^2 - 4y + 3 = 0, \qquad x^2 + y^2 - 2x - 4y - 4 = 0.$$

We can say that the two circumferences

- (A) intersect at two distinct points
- (B) are separated and the first is internal to the second ✓
- (C) intersect at four distinct points
- (D) are separated and the second is internal to the first
- (E) are bribes

The correct answer is: they are separate and the first is internal to the second

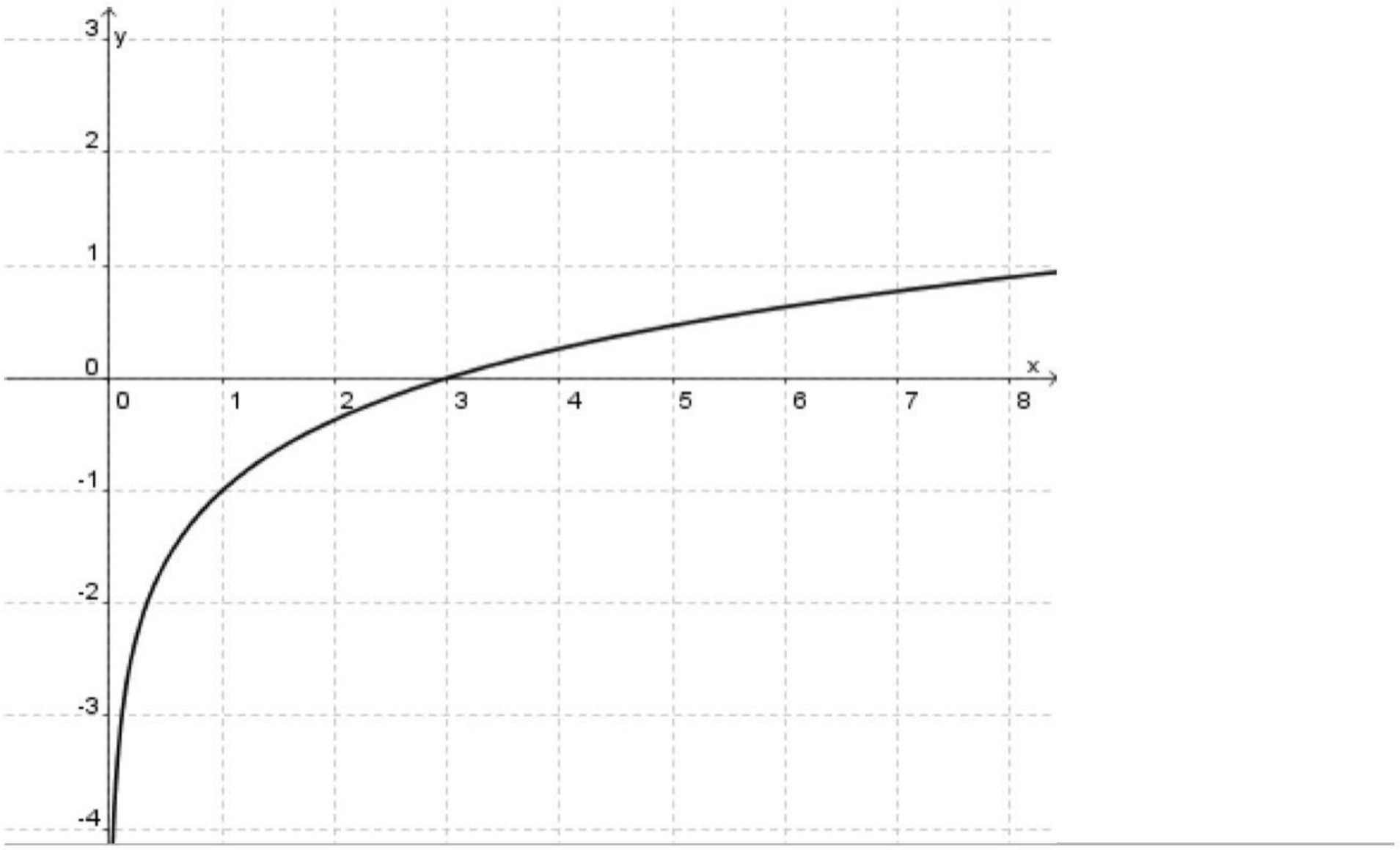
 

**Question 2**

correct

Mark 100.00 out of 100.00

The figure shows the graph of the function




- (TO) $y = -1 + \log_9 x$
- (B) $y = 1 - \log_3 x$
- (C) $y = -\log_3 x$
- (D) $y = -1 - \log_3 x$
- (IS) $y = -1 + \log_3 x$ ✓

The correct answer is: $y = -1 + \log_3 x$

**Question 3**

correct

Mark 100.00 out of 100.00

By simplifying and factorizing the expression $[b^3 \times (2b)^4 : b^2]^2 : [(-2b)^2 : (-b)^6 \times (-b)^5]^5$, where there $b$is a non-zero real number, we obtain

- (TO) $-\frac{1}{2}b^2$
- (B) $-\frac{1}{4}b^5$ ✓
- (C) $\frac{1}{4}b^5$
- (D) $-\frac{1}{8b}$
- (IS) $\frac{1}{8b}$

The correct answer is: $-\frac{1}{4}b^5$

**Question 4**

correct

Mark 100.00 out of 100.00

Consider the equations

$$A)\ \frac{x^2-3x+2}{x^3+27}=0 \quad \text{e} \quad B)\ \frac{x^2-3x+2}{x^3-27}=0\ .$$

Which of the following statements is true?

- (A) the two equations have only one solution in common
- (B) the set of solutions of B) is included in the set of solutions of A)
- (C) the two equations have no common solutions
- (D) the set of solutions of A) is included in the set of solutions of B)
- (E) the two equations have the same set of solutions ✓

The correct answer is: the two equations have the same set of solutions

**Question 5**

correct

Mark 100.00 out of 100.00

The prime factorization of the number $(2^5+2^2)^4 3^2$ is:

- (TO) $2^8 3^{10}$ ✓
- (B) $2^6 3^{10}$
- (C) $2^4 3^6$
- (D) $2^2 3^6$
- (IS) $2^8 3^8$

The correct answer is: $2^8 3^{10}$

**Question 6**

correct

Mark 100.00 out of 100.00

The real number $x=\frac{\sqrt{2}}{\sqrt{2}+1}$ checks the condition

- (TO) $x=2+\sqrt{2}$
- (B) $x$ is whole
- (C) $x=\frac{\sqrt{2}+1}{2}$
- (D) $x>2$
- (IS) $x=2-\sqrt{2}$ ✓

The correct answer is: $x=2-\sqrt{2}$

**Question 7**

correct

Mark 100.00 out of 100.00

Only one of the following statements is correct; identify which one.

- (A) Two isosceles triangles with the same perimeter are necessarily congruent
- (B) Two equiangular triangles are necessarily congruent
- (C) Two rectangles with the same perimeter are necessarily congruent
- (D) Two right-angled triangles that have an acute angle and the hypotenuse neatly congruent are necessarily congruent ✓
- (E) Two parallelograms with the same area are necessarily congruent

The correct answer is: Two right-angled triangles that have an acute angle and the hypotenuse neatly congruent are necessarily congruent

**Question 8**

correct

Mark 100.00 out of 100.00

The equation $\log_3(x+2)^2 = 2$

- (A) has the only solution $x = -5$
- (B) has the only solution $x = 1$
- (C) has the only solution $x = 1 - \log_3 2$
- (D) has the solutions $x = 1$ and $x = -5$ ✓
- (E) has no real solutions

The correct answer is: it has the solutions $x = 1$ and $x = -5$

**Question 9**

correct

Mark 100.00 out of 100.00

The expression $\cos^2 \frac{\pi}{8} - \sin^2 \frac{\pi}{8}$ is equal to:

- (TO) $\frac{\sqrt{2}}{2}$ ✓
- (B) $\cos \frac{\pi}{16}$
- (C) $\frac{\sqrt{3}}{2}$
- (D) $1$
- (IS) $\left(\frac{\sqrt{2}}{2}\right)^2$

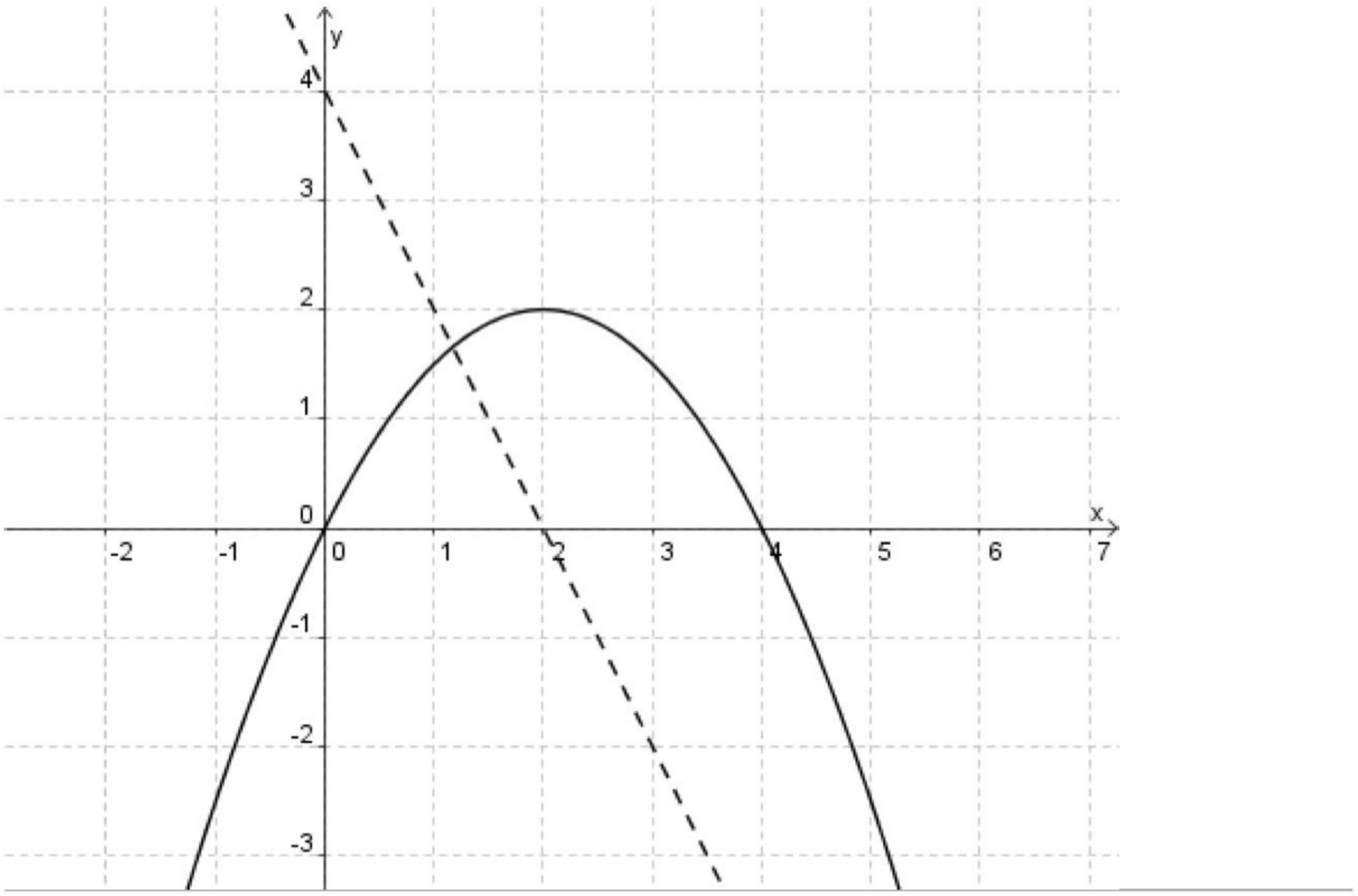
The correct answer is: $\frac{\sqrt{2}}{2}$

**Question 10**

correct

Mark 100.00 out of 100.00

The figure shows a straight line and a parabola, which are the graph of the functions




(A) $f(x) = 2 - x, g(x) = 4x - x^2$

(B) $f(x) = 4 - 2x, g(x) = -\frac{1}{2}x(x-4)$ ✓

(C) $f(x) = 4 - 2x, g(x) = 4x - x^2$

(D) $f(x) = 4 - 2x, g(x) = 2x - \frac{1}{2}x^2 + 1$

(E) $f(x) = 2 - 2x, g(x) = -\frac{1}{2}x(x-4)$

The correct answer is: $f(x) = 4 - 2x, g(x) = -\frac{1}{2}x(x-4)$

**Question 11**

correct

Mark 100.00 out of 100.00

The equation $x^4 - 9x^2 + 14 = 0$

(A) has two (and only two) distinct real solutions

(B) has only positive solutions

(C) has no real solutions

(D) has four distinct real solutions ✓

(E) has only negative solutions

The correct answer is: it has four distinct real solutions

**Question 12**

correct

Mark 100.00 out of 100.00

Consider in the space a cube $Q$ with a side $1$ and a plane $p$ passing through 4 vertices of $Q$ which do not all belong to the same face. Then the intersection of $Q$ con $p$ is:

- (A) a non-square rhombus
- (B) a rectangle of sides $1$ and $\sqrt{2}$ ✓
- (C) a square to the side $\sqrt{2}$
- (D) one of the quadrilaterals mentioned in the other answers according to the choice of $p$
- (E) a square on the side $1$

The correct answer is: a rectangle of sides $1$ and $\sqrt{2}$

**Question 13**

correct

Mark 100.00 out of 100.00

The expression $\log_2 5^{(x^4)}$ is equal to:

- (A) $x^4 \log_2 5$ only for $x > 0$
- (B) $x^4 \log_2 5$ for each $x$ real ✓
- (C) $4 \log_2 5^x$ for each $x$ real
- (D) $(\log_2 5^x)^4$ for each $x$ real
- (E) $x^4 \log_5 2$ for each $x$ real

The correct answer is: $x^4 \log_2 5$ for every $x$ real

**Question 14**

correct

Mark 100.00 out of 100.00

Which of these equations represents a straight line passing through the point $(1, -2)$ and perpendicular to the bisector of the first quadrant?

- (TO) $4x + 3y = 0$
- (B) $x + y - 1 = 0$
- (C) $x - y - 3 = 0$
- (D) $x - 7y - 15 = 0$
- (IS) $3x + 3y + 3 = 0$ ✓

The correct answer is: $3x + 3y + 3 = 0$

**Question 15**

correct

Mark 100.00 out of 100.00

A common divisor of monomials $48x^5y^3z, 60x^4y^4z^2, 18x^3y^5$ and '

- (TO) $4x^2y^2z$
- (B) $6x^3y^3$ ✓
- (C) $6xy^4z^2$
- (D) $4x^4y^2$
- (IS) $x^4y^3$

The correct answer is: $6x^3y^3$

**Question 16**

correct

Mark 100.00 out of 100.00

A population of 1000 voters is thus divided over a referendum question and political location

| | destra | sinistra |
|---|---|---|
| a favore | 350 | 200 |
| contro | 150 | 300 |

Calculate the proportion of the right-wing voters who are in favor of the question.

- (A) 30%
- (B) about 63%
- (C) 350%
- (D) 55%
- (E) 70% ✓

The correct answer is: 70%

**Question 17**

correct

Mark 100.00 out of 100.00

To cover the 120 km that separate Turin from Milan, a truck takes 2 hours and 40 minutes. A car, which leaves Turin for Milan three quarters of an hour after the truck, travels at an average speed twice that of the truck. Then

- (A) the car arrives in Milan 35 minutes after the truck
- (B) the car arrives in Milan 15 minutes before the truck
- (C) the car arrives in Milan 15 minutes after the truck
- (D) the car arrives in Milan 35 minutes before the truck ✓
- (E) the car and the truck arrive together in Milan

The correct answer is: the car arrives in Milan 35 minutes before the truck

**Question 18**

correct

Mark 100.00 out of 100.00

The age of a child is now a ninth of the age of his father. In 30 years the sum of their ages will be 100 years. How old is the child now?

- (A) 4 years ✓
- (B) 5 years
- (C) 7 years
- (D) 6 years
- (E) 3 years

The correct answer is: 4 years

# Training test

| | |
|---|---|
| **Started on** | Wednesday, April 15 2020, 9:07 AM |
| **State** | finished |
| **Completed on** | Wednesday, April 15 2020, 9:30 AM |
| **Time taken** | 22 mins 31 secs |
| **Marks** | 1800.00 / 1800.00 |
| **Grade** | **18.00** out of 18.00 ( **100** %) |

**Question 1**

correct

Mark 100.00 out of 100.00

The equation $x^2 + y^2 + 2xy = 0$ defines in the Cartesian plane

- (A) a pair of straight accidents
- (B) a pair of distinct parallel lines
- (C) a point
- (D) the empty set
- (E) a straight line ✓

The correct answer is: a straight line

**Question 2**

correct

Mark 100.00 out of 100.00

The real number

$$x = \sqrt{18} - 5\sqrt[3]{16} - \sqrt[3]{54} + 2\sqrt{50}$$

It's equal to

- (TO) $13\sqrt{2} - 23\sqrt[3]{2}$
- (B) $23(\sqrt{2} - \sqrt[3]{2})$
- (C) $\sqrt{2} - \sqrt[3]{2}$
- (D) $13(\sqrt[3]{2} - \sqrt{2})$
- (IS) $13(\sqrt{2} - \sqrt[3]{2})$ ✓

The correct answer is: $13(\sqrt{2} - \sqrt[3]{2})$

**Question 3**

correct

Mark 100.00 out of 100.00

The age of a girl is now one tenth of the age of the mother. In 8 years, it will be a quarter. How old is the girl now?

- (A) 7 years
- (B) 5 years
- (C) 3 years
- (D) 6 years
- (E) 4 years ✓

The correct answer is: 4 years

**Question 4**

correct

Mark 100.00 out of 100.00

A common divisor of monomials $8x^3y^6$, $6x^2y^6z^2$, $x^4y^3$and '

- (TO) $x^2y^3z$
- (B) $2x^4y^3$
- (C) $x^2y^3$ ✓
- (D) $x^2z^2$
- (IS) $12x^3y^3$

The correct answer is: $x^2y^3$

**Question 5**

correct

Mark 100.00 out of 100.00

Consider in the space a cube $Q$with a side $1$and a plane $p$passing through 4 vertices of $Q$ which do not all belong to the same face. Then the intersection of $Q$con $p$is:

- (A) a non-square rhombus
- (B) a rectangle of sides $1$and$\sqrt{2}$ ✓
- (C) a square to the side $\sqrt{2}$
- (D) a square on the side $1$
- (E) one of the quadrilaterals mentioned in the other answers according to the choice of $p$

The correct answer is: a rectangle of sides $1$and$\sqrt{2}$

**Question 6**

correct

Mark 100.00 out of 100.00

Consider the inequalities

$$A)\ P(x) > 0, \qquad B)\ \frac{P(x)}{x^4 - 1} > 0, \qquad C)\ \frac{P(x)}{x^4 + 1} > 0,$$

where $P(x)$ is a second degree polynomial. Which of the following statements is correct?

- (A) inequalities A) and B) have the same set of solutions
- (B) you can't answer because you don't know the polynomial $P(x)$
- (C) the three inequalities have the same set of solutions
- (D) inequalities A) and C) have the same set of solutions ✓
- (E) inequalities B) and C) have the same set of solutions

The correct answer is: inequalities A) and C) have the same set of solutions

**Question 7**

correct

Mark 100.00 out of 100.00

Simplifying the expression $\left(1 - \frac{b}{a+b}\right)\left(1 + \frac{b}{a-b}\right)\left(1 - \frac{b^2}{a^2}\right)$, where $a$ and $b$ are two different non-zero real numbers, one obtains

- (TO) $\frac{1}{a}$
- (B) $a(a-b)$
- (C) $1$ ✓
- (D) $a - b$
- (IS) $\frac{a-b}{a+b}$

The correct answer is: $1$

**Question 8**

correct

Mark 100.00 out of 100.00

A solution of the equation $\log_3(2+x)^2 = 6$ is

- (TO) $x = 1$
- (B) $x = \log_3 2$
- (C) $x = 3^{3-\log_3 2}$
- (D) $x = 25$ ✓
- (IS) $x = \log_2 3$

The correct answer is: $x = 25$

**Question 9**

correct

Mark 100.00 out of 100.00

A company has pieces of fabric in three different colors available to prepare jackets. Each of the jackets must be made up of three different colors: one for the interior, one for the exterior and one for the collar. How many types of jackets can be prepared?

- (A) nine
- (B) three
- (C) $3^3$
- (D) you are ✓
- (IS) $2! \cdot 3!$

The correct answer is: you are

**Question 10**

correct

Mark 100.00 out of 100.00

To cover the 120 km that separate Turin from Milan, a truck takes 2 hours and 40 minutes. A car, which leaves Turin for Milan three quarters of an hour after the truck, travels at an average speed twice that of the truck. Then

- (A) the car arrives in Milan 35 minutes after the truck
- (B) the car and the truck arrive together in Milan
- (C) the car arrives in Milan 35 minutes before the truck ✓
- (D) the car arrives in Milan 15 minutes before the truck
- (E) the car arrives in Milan 15 minutes after the truck

The correct answer is: the car arrives in Milan 35 minutes before the truck

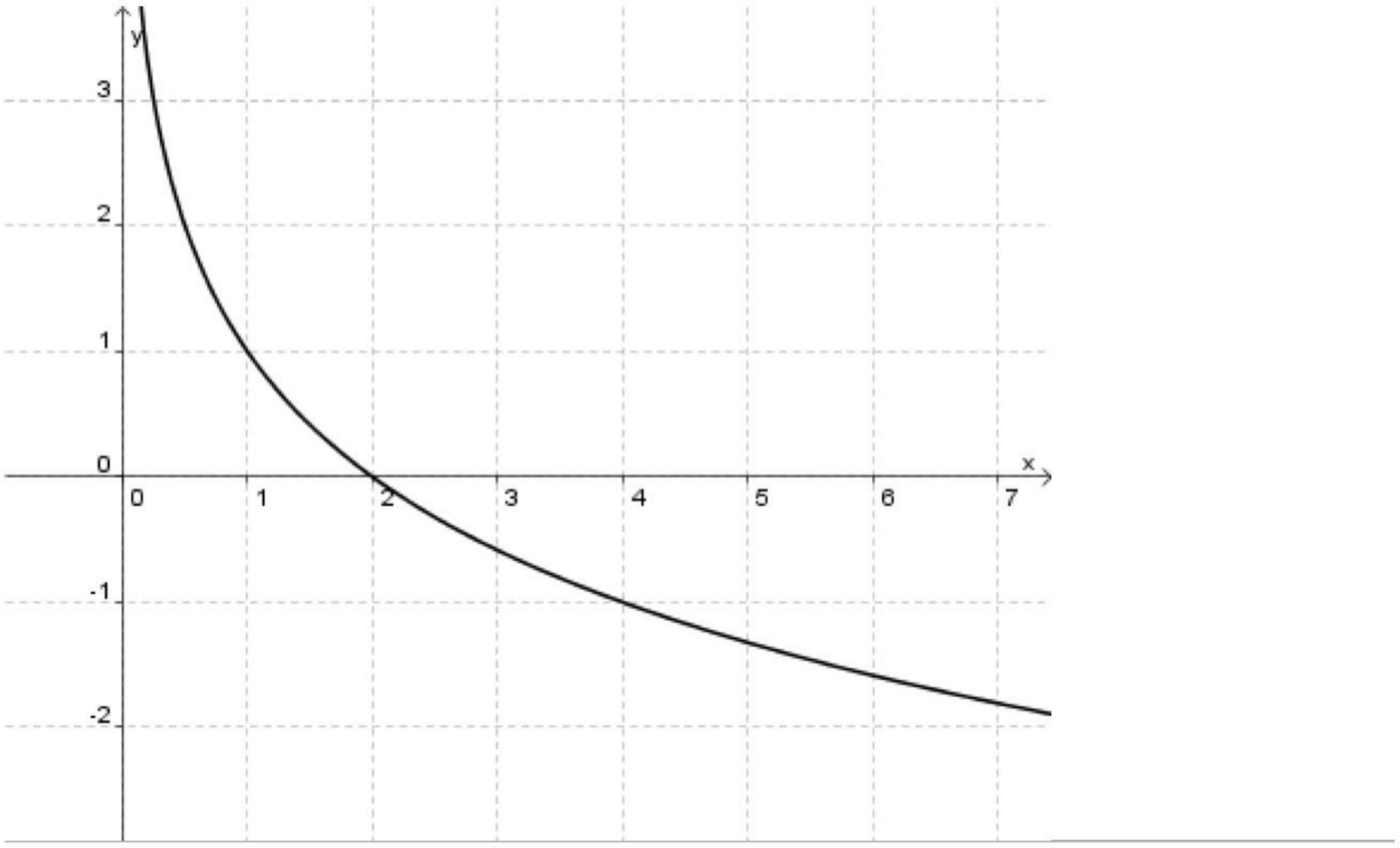
 

**Question 11**

correct

Mark 100.00 out of 100.00

The figure shows the graph of the function




- (TO) $y = 1 - \log_4 x$
- (B) $y = 1 - \log_2 x$ ✓
- (C) $y = -1 - \log_2 x$
- (D) $y = 1 + \log_2 x$
- (IS) $y = -\log_2 x$

The correct answer is: $y = 1 - \log_2 x$

**Question 12**

correct

Mark 100.00 out of 100.00

Only one of the following statements is correct; identify which one.

- (A) Two isosceles triangles with the same vertex angle are necessarily similar ✓
- (B) Two triangles with the same perimeter are necessarily similar
- (C) Two right triangles with the same area are necessarily similar
- (D) Two scalene triangles with the same perimeter are necessarily similar
- (E) Two isosceles triangles with the same height are necessarily similar

The correct answer is: Two isosceles triangles with the same vertex angle are necessarily similar

**Question 13**

correct

Mark 100.00 out of 100.00

Which of these equations represents a straight line parallel to the straight line passing through the points $(1, 2)$ and $(-1, 0)$?

- (TO) $x - 3y - 2 = 0$
- (B) $x + y - 1 = 0$
- (C) $3x + y = 0$
- (D) $3x - 3y + 1 = 0$ ✓
- (IS) $3x - 4y + 3 = 0$

The correct answer is: $3x - 3y + 1 = 0$

**Question 14**

correct

Mark 100.00 out of 100.00

The expression $\cos^2 \frac{9\pi}{8} - \sin^2 \frac{9\pi}{8}$ is equal to:

- (TO) $\cos \frac{9\pi}{16}$
- (B) $\frac{\sqrt{3}}{2}$
- (C) $\left(\frac{\sqrt{2}}{2}\right)^2$
- (D) $\frac{\sqrt{2}}{2}$ ✓
- (IS) $1$

The correct answer is: $\frac{\sqrt{2}}{2}$

**Question 15**

correct

Mark 100.00 out of 100.00

The prime factorization of the number $(4^4 - 4^2)^2 3^3$ is:

- (TO) $2^8 3^5 5^3$
- (B) $2^8 3^5 5^2$ ✓
- (C) $2^8 3^4 5$
- (D) $2^6 3^5 5^2$
- (IS) $2^4 3^5 5^2$

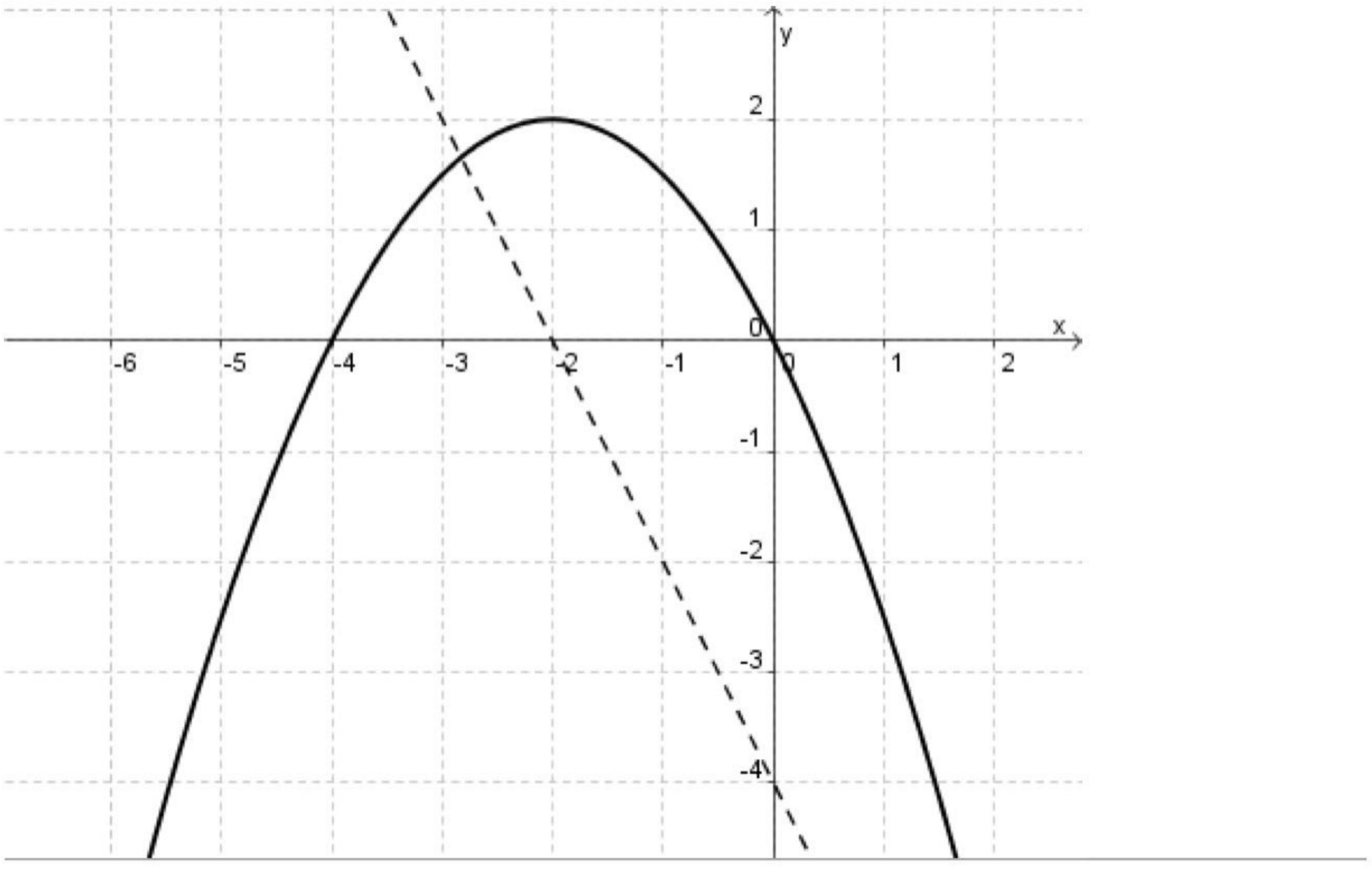
The correct answer is: $2^8 3^5 5^2$

**Question 16**

correct

Mark 100.00 out of 100.00

The figure shows a straight line and a parabola, which are the graph of the functions




(A) $f(x) = -2x - 4, g(x) = -\frac{1}{2}x^2 + 2x - 1$

(B) $f(x) = -2x - 2, g(x) = -\frac{1}{2}x(x+4)$

(C) $f(x) = -x - 2, g(x) = -x^2 - 4x$

(D) $f(x) = -2x - 4, g(x) = -x^2 - 4x$

(E) $f(x) = -2x - 4, g(x) = -\frac{1}{2}x(x+4)$ ✓

The correct answer is: $f(x) = -2x - 4, g(x) = -\frac{1}{2}x(x+4)$

**Question 17**

correct

Mark 100.00 out of 100.00

The real number $x$ tests the relationship $\frac{\sqrt{x}(x+1)}{(x-2)} \leq 0$ if and only if

(TO) $-1 \leq x \leq 0$

(B) $-1 \leq x < 2$

(C) $x < -1 \text{ or } 0 \leq x \leq 2$

(D) $0 \leq x < 2$ ✓

(E) $x \leq -1 \text{ or } x \geq 2$

The correct answer is: $0 \leq x < 2$

**Question 18**

correct

Mark 100.00 out of 100.00

The expression $\log_5 3^{(x^2)}$ is equal to:

- (A) $2 \log_5 3^x$ for each $x$ real
- (B) $(\log_5 3^x)^2$ for each $x$ real
- (C) $x^2 \log_5 3$ only for $x > 0$
- (D) $x^2 \log_3 5$ for each $x$ real
- (E) $x^2 \log_5 3$ for each $x$ real ✓

The correct answer is: $x^2 \log_5 3$ for every $x$ real