

آمار:

میانگین
Average - mean

$$\frac{\sum x_i}{n_t}$$

میانه \rightarrow اگر بزرگتر از میانگین باشد بزرگ باشیم، عدد دو

median

میان
1 3 7
1 3 5 10
4
اگر هم از دو جای بانده میانگین دو عدد وسط

واریانس \rightarrow معیار میانگینیست که از میانگین است. هر چهار را که بیشتر بالاتر واریانس بیشتر

$$\begin{array}{c} 1 \xrightarrow{2} 3 \rightarrow V_1 \\ 0 \xrightarrow{2} 4 \rightarrow V_2 \end{array}$$

$$\rightarrow V_2 > V_1$$

هر چهار عدد از میانگین خسته باشد واریانس بیشتر است

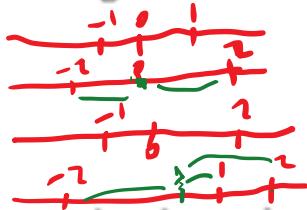
Among the four following data sets

~~$S = \{-1, 0, 1\}$~~ ,

~~$T = \{-2, 0, 2\}$~~ ,

~~$X = \{-1, 0, 2\}$~~ ,

$Y = \{-2, 1, 2\}$



which one has the greatest variance?

A. X and Y

B. Y

C. T

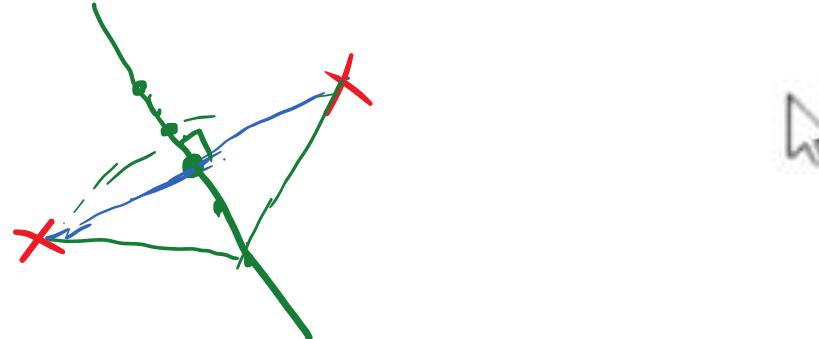
D. S

E. X



In the plane, the locus of points with the same distance from two given distinct points is

مکان مخصوص



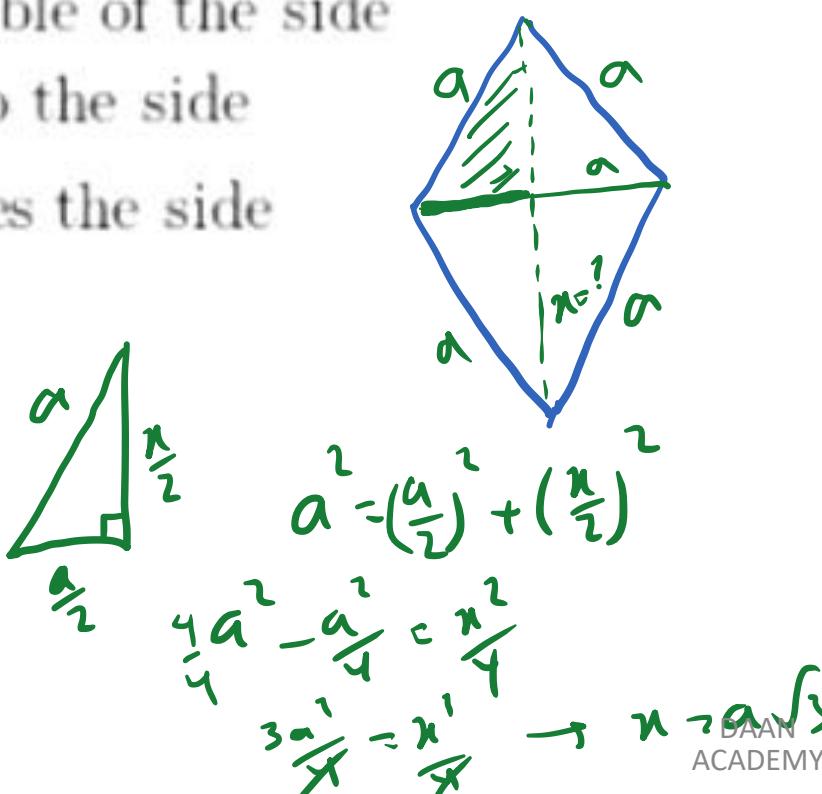
- A. two perpendicular lines
- B. an oval
- C. one or two lines, depending on the position of the two points
- D. a line
- E. an ellipse

If a rhombus has a diagonal equal to the side, the other diagonal is

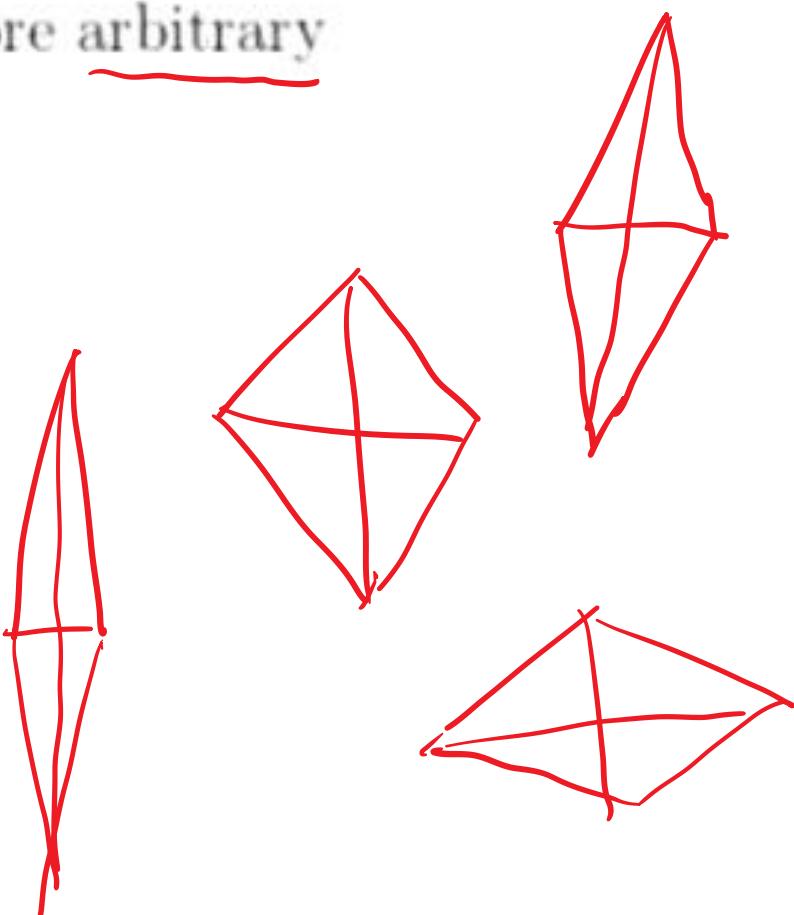
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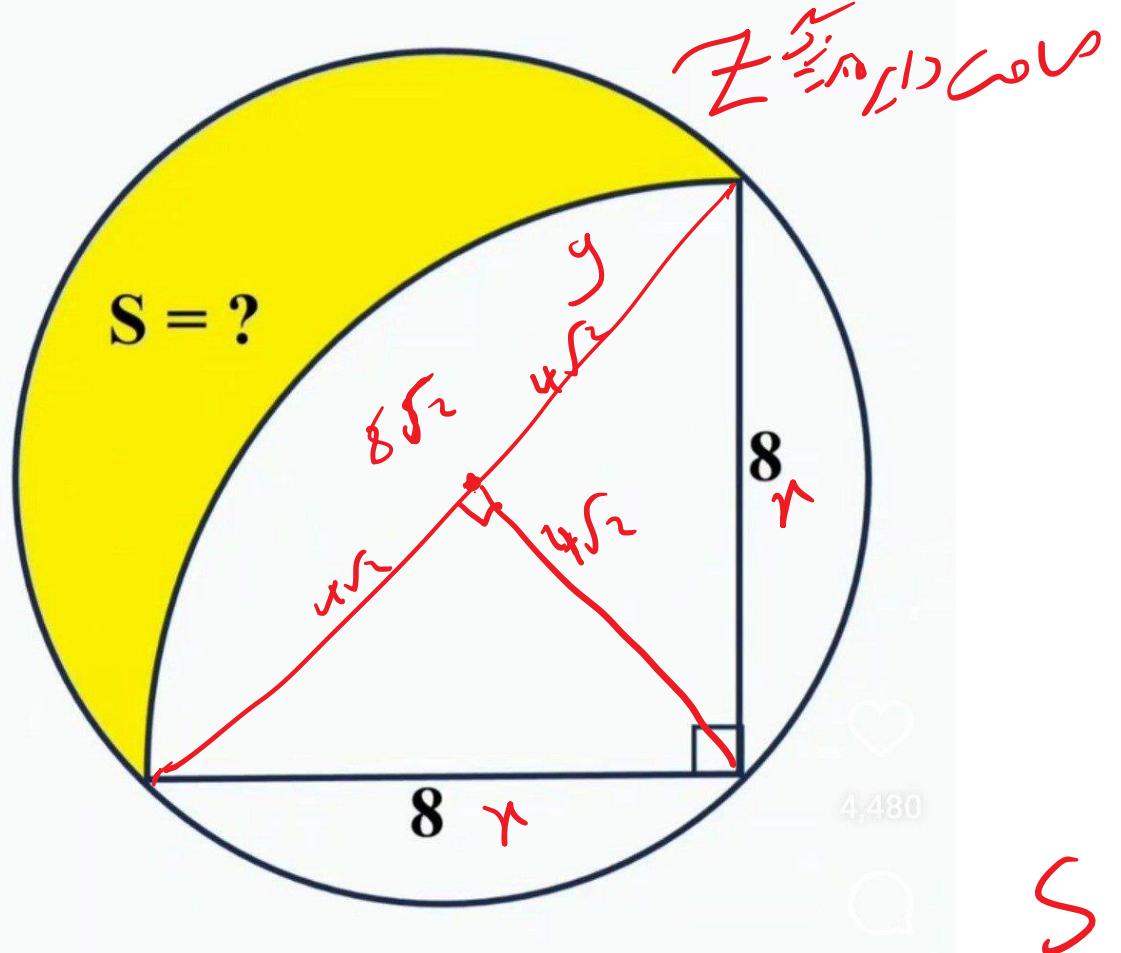
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- A. independent of the previous data and therefore arbitrary
- B. $\sqrt{2}$ times the side
- C. the double of the side
- D. equal to the side
- E. $\sqrt{3}$ times the side



16





$$Z = \pi(4\sqrt{2})^2 = 32\pi$$

$$y = \frac{1}{4}\pi \times 8^2 = 16\pi$$

$$x = \frac{Z}{4} - \frac{4\sqrt{2} \times 4\sqrt{2}}{4} = 8\pi - 16$$

$$S = Z - y - \cancel{x - r} = 32\pi - 16\pi - 2(8\pi - 16)$$

$$S = 16\pi - 16\pi + 32 = \textcircled{32}$$

$$\sqrt{\sqrt{9} - \sqrt{8}}$$

$$1) \sqrt{3} - \sqrt{2}$$

$$\checkmark 2) \sqrt{2} - 1$$

$$3) 2 - \sqrt{2}$$

$$4) \sqrt{5} - \sqrt{3}$$

$$5) 2\sqrt{5} - 3\sqrt{2}$$

$$\sqrt{\sqrt{9} - \sqrt{8}} = \sqrt{3 - 2\sqrt{2}} = \sqrt{2 + 1 - 2\sqrt{2}} = \sqrt{(\sqrt{2})^2 - 2\sqrt{2} + 1^2} = \sqrt{(\sqrt{2} - 1)^2} = |\sqrt{2} - 1| \\ = \sqrt{2} - 1$$

The numbers ($k = 0, \pm 1, \pm 2, \dots$)

$$x = \pm \frac{\pi}{2} + 2k\pi$$

are solutions of one of the following equations. Which one?

$$x = \frac{\pi}{2}$$

- A. $\cos x + \cos 2x = 0$
- B. $\tan 2x = 3 \tan x$
- C. $\sin x + \sin 2x = 0$
- D. $\cot 2x = 1 + \cot x$
- E. $\sin 2x - \cos x = 0$

$$\begin{aligned} \cos \frac{\pi}{2} + \cos \pi &= 0 - 1 = -1 \\ \tan \pi &= 3 \tan \frac{\pi}{2} \rightarrow \infty \\ \sin \frac{\pi}{2} + \sin \pi &= 1 \\ \cot \pi &\rightarrow \infty \end{aligned}$$

The average daily sales of drinks in a certain bar are shown in the following table.

Type	Average number of sales
Coffee	60
the re cappuccino	25
soft drinks	30
juice	40
sodas	20

$$\cancel{60} = 200 \xrightarrow{0.25} \underline{\underline{50}}$$



The bar manager decides to increase the price of drinks whose average daily sales exceed 25% of the total. Which drinks increase in price?

- A. No drink
- B. All drinks, but for juices
- C. Coffee, cappuccino, soft drinks
- D. Coffee only
- E. All drinks

If a real number x , with $0 \leq x \leq 2\pi$, satisfies the inequality

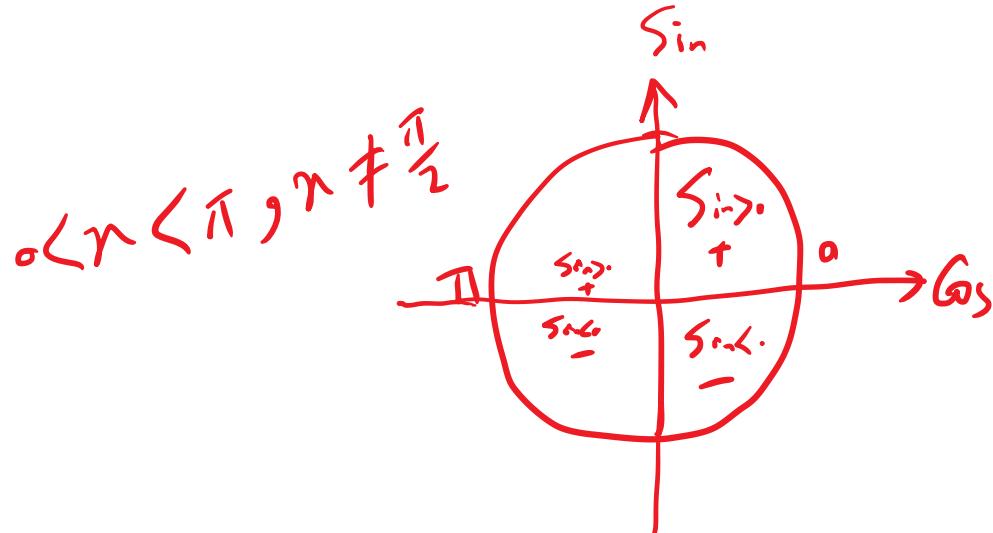
$$(1 - \sin x) \sin x > 0$$

then

$$\sin x < 1 \rightarrow 1 - \sin x > 0$$

$$x = \frac{\pi}{2}$$

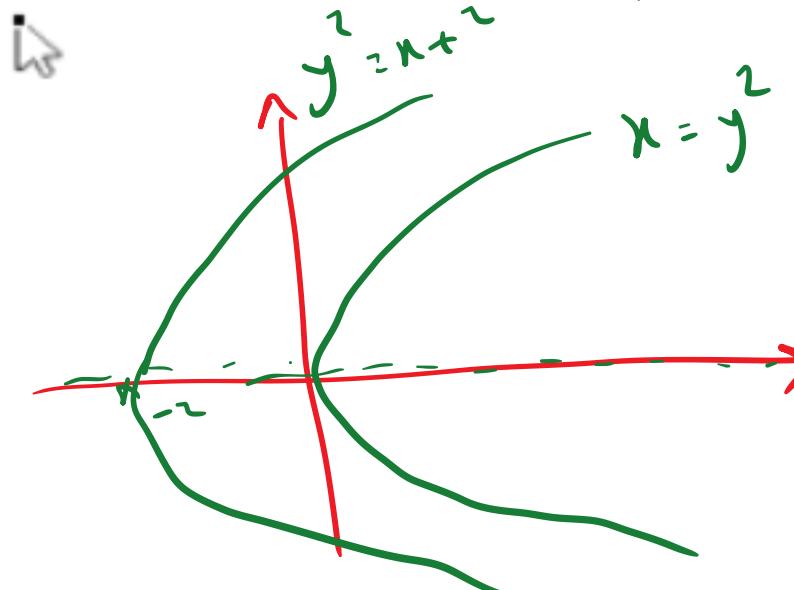
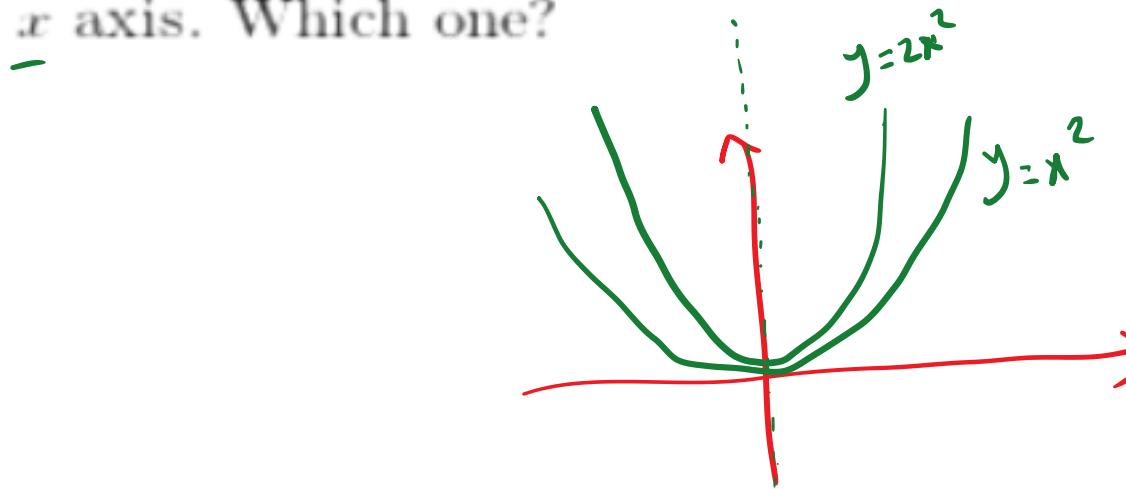
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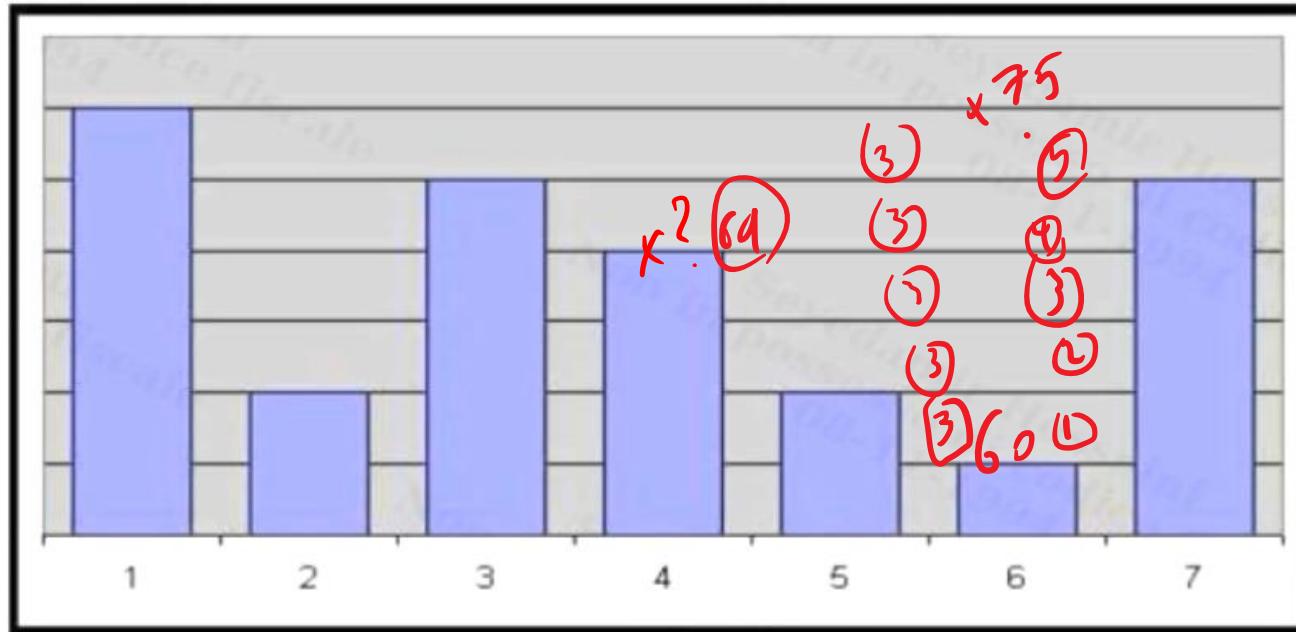
- A. $x = \pi/2$
- B. $0 < x < \pi$
- C. $0 \leq x \leq \pi$
- D. $0 < x < \pi/2$
- E. $0 < x < \pi, x \neq \pi/2$

In the Cartesian plane, only one of the following equations represents a parabola with the axis parallel to the x axis. Which one?

- A. $x^2 + 2xy + y^2 - x = 1$
- B. $x^2 - 2xy = 1$
- C. $y^2 = x + 2$
- D. $y = 3x - 1$
- E. $y = 2x^2$



In the histogram in the figure the minimum value is 60 units and the maximum value is 75 units. How much is the value number 4?



$$\frac{75 - 60}{5} = \frac{15}{5} = 3$$

- A. 69 units
- B. 66 units
- C. 72 units
- D. 71 units
- E. 70 units

Let α be the measure in radians of an angle, with $\pi/2 < \alpha < \pi$. If

$$\cos \alpha = -\frac{1}{4}$$

then

is equal to

- A. $\frac{-1 - \sqrt{15}}{4\sqrt{2}}$
- B. $-\frac{3}{4}$
- C. $\frac{1 - \sqrt{15}}{4\sqrt{2}}$
- D. $\frac{1 + \sqrt{15}}{4\sqrt{2}}$
- E. $\frac{-1 + \sqrt{15}}{4\sqrt{2}}$

$$\sin\left(\alpha + \frac{\pi}{4}\right) = \sin\alpha \cos\frac{\pi}{4} + \sin\frac{\pi}{4} \cos\alpha$$

$$= \frac{\sqrt{15}}{4} \cdot \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} \left(-\frac{1}{4}\right)$$

$$\Rightarrow \frac{\sqrt{15}}{4} \times \frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2}} \times \frac{1}{4}$$

$$\frac{\sqrt{15} - 1}{4\sqrt{2}}$$

$$\sin(\alpha + \beta) = \sin\alpha \cos\beta + \sin\beta \cos\alpha$$

$$\sin^2\alpha + \cos^2\alpha = 1$$

$$\sin^2\alpha + \left(-\frac{1}{4}\right)^2 = 1$$

$$\sin^2\alpha + \frac{1}{16} = 1 \rightarrow \sin^2\alpha = 1 - \frac{1}{16} = \frac{15}{16}$$

$$\boxed{\sin\alpha = \frac{\sqrt{15}}{4}}$$

$$\sin\alpha = -\frac{\sqrt{15}}{4} \times$$

$$\frac{\pi}{2} < \alpha < \pi \quad \sin > 0$$