

## 数学第一个 section

Quantity A

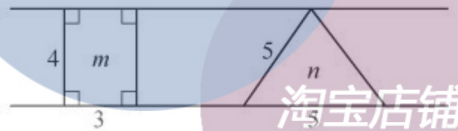
$$\frac{2}{\sqrt[3]{6}} + \frac{3}{\sqrt[3]{6}}$$

Quantity B

$$\frac{\sqrt[3]{6}}{2} + \frac{\sqrt[3]{6}}{3}$$

- ☐ Quantity A is greater.
- ☐ Quantity B is greater.
- ☐ The two quantities are equal.
- ☐ The relationship cannot be determined from the information given.

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The regions enclosed by the rectangle and the triangle have areas of  $m$  and  $n$ , respectively.

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Quantity A

$m$

Quantity B

$n$

- ☐ Quantity A is greater.
- ☐ Quantity B is greater.
- ☐ The two quantities are equal.
- ☐ The relationship cannot be determined from the information given.

Click on your choice.

$$n = 2k = 3m$$

Quantity A

$$n^2$$

Quantity B

$$6km$$

- ☐ Quantity A is greater.
- ☐ Quantity B is greater.
- ☐ The two quantities are equal.
- ☐ The relationship cannot be determined from the information given.

A certain brand of chewing gum can be purchased in only two ways:

1 piece at a time at 7 cents a piece  
5 pieces at a time at 30 cents for the 5 pieces

Quantity A

The greatest number of pieces of this gum that can be purchased with 87 cents

Quantity B

The greatest number of pieces of this gum that can be purchased with 82 cents

- ☐ Quantity A is greater.
- ☐ Quantity B is greater.
- ☐ The two quantities are equal.



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- ☐ The relationship cannot be determined from the information given.

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$$n > 10,000$$

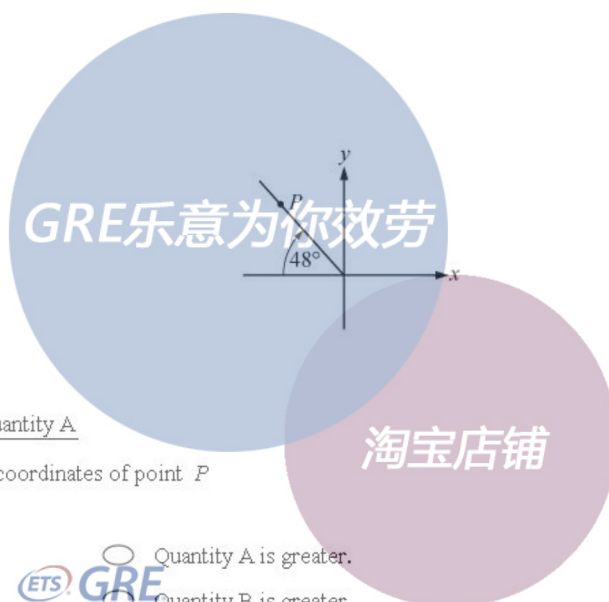
Quantity A

The thousands digit of  $\frac{n}{8}$

Quantity B

7

- ☐ Quantity A is greater.
- ☐ Quantity B is greater.
- ☐ The two quantities are equal.
- ☐ The relationship cannot be determined from the information given.



Quantity A

The sum of the coordinates of point  $P$

Quantity B

0

- ☐ Quantity A is greater.
- ☐ Quantity B is greater.
- ☐ The two quantities are equal.
- ☐ The relationship cannot be determined from the information given.

The function  $f$  is defined for all numbers  $x$  by  $f(2x) = x^2 - 2x + 8$ .

Quantity A

$f(6)$

Quantity B

12

- ☐ Quantity A is greater.
- ☐ Quantity B is greater.
- ☐ The two quantities are equal.
- ☐ The relationship cannot be determined from the information given.

$$a < b < c < d < e$$

List  $S$ :  $a, b, c, d, e$

List  $T$ :  $a - 2, b - 1, c, d + 1, e + 2$

Quantity A

The standard deviation of the numbers in list  $S$

Quantity B

The standard deviation of the numbers in list  $T$

- ☐ Quantity A is greater.
- ☐ Quantity B is greater.
- ☐ The two quantities are equal.
- ☐ The relationship cannot be determined from the information given.

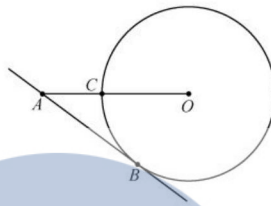


The average (arithmetic mean) of the body weights of John, Jack, Bill, Mark, and Tom is at least 170 pounds. John, Jack, and Bill weigh 140, 160, and 180 pounds, respectively. If Mark weighs between 160 and 180 pounds, inclusive, what is the least possible weight, in pounds, of Tom?

- ☐ 180
- ☐ 190
- ☐ 200
- ☐ 210
- ☐ 220

Of the 312 employees of Company  $X$ ,  $\frac{1}{3}$  are in division  $A$  and the rest are in division  $B$ . Women account for  $\frac{2}{3}$  of all employees. If  $\frac{5}{8}$  of the women are in division  $B$ , how many men are in division  $A$ ?

- ☐ 26
- ☐ 35
- ☐ 78
- ☐ 104
- ☐ 130



In the figure shown, the line through points  $A$  and  $B$  is tangent to the circle with center  $O$  at point  $B$ . If the diameter of the circle is 60 and the length of line segment  $AB$  is 40, what is the length of the line segment  $AC$ ?

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5, 8, 3, 7

How many different numbers  $k$  are there such that the sum of  $k$  and 3 of the 4 numbers shown equals 24?

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- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 8
- ☐ Infinitely many

$\left(\frac{3}{5}\right)^2 + \left(\frac{5}{3}\right)^{-2} =$

☐ 0

☐  $2\left(\frac{3}{5}\right)^2$

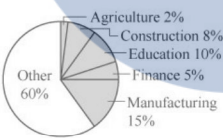
☐  $\left(\frac{3}{5} + \frac{5}{3}\right)^2$

☐  $\left(\frac{3}{5} + \frac{3}{5}\right)^2$

☐ 1

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EMPLOYMENT IN REGION X BY SECTOR OF THE ECONOMY  
Percent Distribution of People Currently Employed



Predicted Changes in Number of People Employed According to Projection A and Projection B

Sector of Economy	Projection A	Projection B
Agriculture	+10,000	+5,000
Construction	+20,000	+10,000
Education	+5,000	+5,000
Finance	+5,000	+20,000
Manufacturing	+15,000	-5,000



The number of people currently employed in agriculture is what percent of the total number of people currently employed in the five sectors shaded in the graph?

☐ 2%

☐ 2.5%

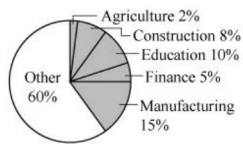
☐ 5%

☐ 10%

☐ 40%

EMPLOYMENT IN REGION X BY SECTOR OF THE ECONOMY

Percent Distribution of People Currently Employed



Predicted Changes in Number of People Employed According to Projection A and Projection B

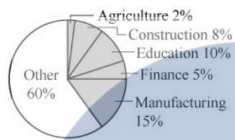
Sector of Economy	Projection A	Projection B
Agriculture	+10,000	+5,000
Construction	+20,000	+10,000
Education	-5,000	+15,000
Finance	+5,000	+20,000
Manufacturing	+15,000	-5,000

If 187,500 people are currently employed in manufacturing, how many more people are currently employed in finance than in agriculture?

people

EMPLOYMENT IN REGION X BY SECTOR OF THE ECONOMY

Percent Distribution of People Currently Employed



Predicted Changes in Number of People Employed According to Projection A and Projection B

Sector of Economy	Projection A	Projection B
Agriculture	+10,000	+5,000
Construction	+20,000	+10,000
Education	-5,000	+15,000
Finance	+5,000	+20,000
Manufacturing	+15,000	-5,000

If the average (arithmetic mean) annual salary of the people currently employed in agriculture is \$35,000 and if the average annual salary of the people currently employed in construction is \$45,000, what is the average annual salary of the people currently employed in agriculture and construction combined?

- ☐ \$37,500  
 ☐ \$40,000  
 ☐ \$40,500  
 ☐ \$42,500  
 ☐ \$43,000

The length of an edge of cube  $Y$  is  $\frac{2}{3}$  the length of an edge of cube  $X$ . What is the ratio of the volume of cube  $Y$  to the volume of cube  $X$ ?

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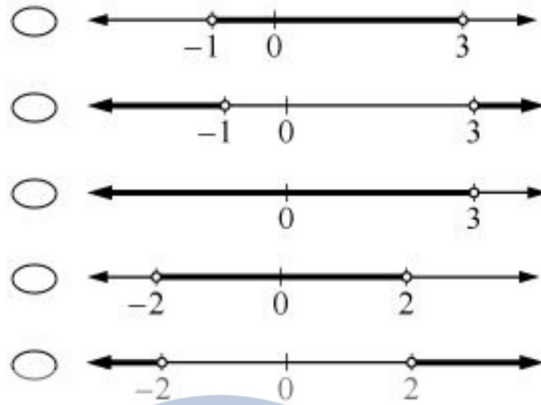
- ☐ 1 to 3  
☐ 1 to 9  
☐ 1 to 27  
☐ 2 to 3  
☐ 8 to 27

A furniture store purchased sofas for a wholesale price of \$400 each and sold most of them for a retail price of \$560 each. In a summer sale, the retail price of the last few sofas was reduced by  $x$  dollars, and they were sold at this reduced price. The store's profit from selling the last sofa was more than 15 percent of its wholesale price. Which of the following could be the value of  $x$ ?

Indicate all such values.

- ☐ 50  
☐ 75  
☐ 100  
☐ 125

Which of the following represents the solution of  $|x - 1| < 2$  ?



A certain band will perform 15 different songs in random order, and no song will be performed twice. If 9 of the songs are new, what is the probability that the first 2 songs that the band performs will both be new?

Give your answer as a fraction.


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1.1

2.1

3.3

4.3

5.4

6.1

7.2

8.2

9.2

10.1

11.20

12.1

13.2

14.3

15.37,500

16.5

17.5

18.(12)

19.1

20.12/35

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## Hard math

The sum of  $n$  integers,  $n \neq 0$ , is  $R$ .

Quantity A

The average (arithmetic mean) of the  $n$  integers

Quantity B

$$\frac{R}{n}$$

- ☐ Quantity A is greater.
- ☐ Quantity B is greater.
- ☐ The two quantities are equal.
- ☐ The relationship cannot be determined from the information given.

Quantity A

$$\frac{|x|}{x}$$

Quantity B

1

- ☐ Quantity A is greater.
- ☐ Quantity B is greater.
- ☐ The two quantities are equal.



The relationship cannot be determined from the information given.

In 1998 the yearly expenses to run a certain small business were  $x$  dollars. In 1999 the yearly expenses to run the business increased by 10 percent of the 1998 yearly expenses. In 2000 the yearly expenses decreased by 5 percent of the 1999 yearly expenses.

Quantity A

The percent increase from 1998 to 2000 in the yearly expenses to run the business

Quantity B

5%

- ☐ Quantity A is greater.
- ☐ Quantity B is greater.
- ☐ The two quantities are equal.
- ☐ The relationship cannot be determined from the information given.

$n$  is an integer greater than or equal to 5.

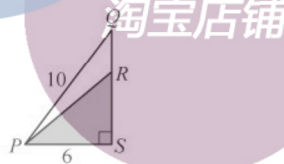
Quantity A

The number of positive factors of  $n$

Quantity B

The number of positive factors of  $n + 2$

- ☐ Quantity A is greater.
- ☐ Quantity B is greater.
- ☐ The two quantities are equal.
- ☐ The relationship cannot be determined from the information given.



The area of region  $PQR$  is 15.

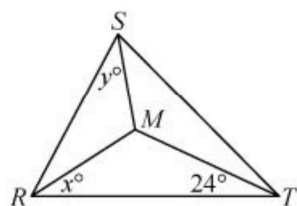
Quantity A

The area of shaded region  $PRS$

Quantity B

9

- ☐ Quantity A is greater.
- ☐ Quantity B is greater.
- ☐ The two quantities are equal.
- ☐ The relationship cannot be determined from the information given.



In the figure, line segments  $RM$ ,  $SM$ , and  $TM$  bisect the angles of  $\triangle RST$ .

Quantity A

$$\frac{x + y}{2}$$

Quantity B

33

- ☐ Quantity A is greater.
- ☐ Quantity B is greater.
- ☐ The two quantities are equal.
- ☐ The relationship cannot be determined from the information given.

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$$4 < x < y < 8$$

The ratio of  $x$  to  $y$  is 4 to 7.

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Quantity A

$$y - x$$



Quantity B

3

- ☐ Quantity A is greater.
- ☐ Quantity B is greater.
- ☐ The two quantities are equal.
- ☐ The relationship cannot be determined from the information given.

Stride Rate (strides per second)	Speed Index
2.75	4
3.00	5
3.25	6
3.50	7

The table shows the linear relationship between the stride rate of a runner, in number of strides per second, and the speed index. This linear relationship holds for stride rates from 2.00 strides per second to 5.00 strides per second. According to this linear relationship, what is the speed index when the runner is running with a stride rate of 3.80 strides per second?

Speed Index:

The operation  $\otimes$  is defined by  $x \otimes y = \frac{x^2}{y} + \frac{x}{y}$  for all numbers  $x$  and  $y$ , where  $y \neq 0$ . What is the value of  $(9 \otimes (-9)) + ((-9) \otimes 9)$ ?

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The arithmetic mean of the five numbers  $x + 6$ ,  $2x - 3$ ,  $2x + 2$ ,  $3x - 5$ , and  $4x - 4$  is 4. What is the range of the five numbers?

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- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7

The weekly sales commission at Company  $X$  is 2 percent of the first \$2,000 of weekly sales plus 15 percent of the weekly sales in excess of the first \$2,000. The weekly sales commission at Company  $Y$  is 5 percent of the first \$2,000 of weekly sales plus 10 percent of the weekly sales in excess of the first \$2,000. In a given week, what is the amount of weekly sales at Company  $Y$  that would earn the same weekly sales commission as \$5,000 in weekly sales at Company  $X$ ?

- ☐ \$5,900
- ☐ \$5,300
- ☐ \$4,900
- ☐ \$4,800
- ☐ \$4,500

$$P = 23^{25} - 23$$

What is the units digit of  $P$ ?

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- ☐ 0
- ☐ 1
- ☐ 3
- ☐ 7
- ☐ 9



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In a group of 10 people, the median height is 70 inches, the average (arithmetic mean) height is 70.5 inches, and the range of the heights is 12 inches. If an additional person who is 74 inches tall joins the group, which of the three statistics must change?

- ☐ Average only
- ☐ Median only
- ☐ Range only
- ☐ Average and median
- ☐ Average and range

ACTIONS THAT AFFECT COMPUTER SECURITY:  
A SURVEY OF 250 COMPANIES

Action Cited	Percent That Cited the Action	Total Amount of Losses Due to the Action Cited (in millions)
Financial fraud	14%	\$19.2
Insider abuse of Internet access	82%	\$10.6
Laptop theft	56%	\$6.5
Sabotage	24%	\$4.8
Theft of proprietary information	20%	\$48.1
Unauthorized access	40%	\$50.2
Virus attack	66%	\$16.6
Total	—	\$156.0

For the seven actions listed in the table, what is the range of the numbers of companies that cited the actions?

- ☐ 130   
 ☐ 140   
 ☐ 150   
 ☐ 160   
 ☐ 170

ACTIONS THAT AFFECT COMPUTER SECURITY:  
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Theft of proprietary information	20%	\$48.1
Unauthorized access	40%	\$50.2
Virus attack	66%	\$16.6
Total	—	\$156.0

Which of the following is closest to the amount by which the average (arithmetic mean) dollar amount of losses due to the actions cited exceeds the median dollar amount of the losses?

- ☐ \$5,400,000   
 ☐ \$5,700,000   
 ☐ \$6,000,000   
 ☐ \$6,200,000   
 ☐ \$6,600,000

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Theft of proprietary information	20%	\$48.1
Unauthorized access	40%	\$50.2
Virus attack	66%	\$16.6
Total	—	\$156.0

The dollar amount of losses due to financial fraud was what percent greater, to the nearest whole percent, than the dollar amount of losses due to virus attack?

- ☐ 5%   
 ☐ 6%   
 ☐ 11%   
 ☐ 16%   
 ☐ 21%

The average (arithmetic mean) of the weights of a father and mother is twice the average of the weights of their 4 children. If the average weight of the 6 family members is 128 pounds, what is the average weight, in pounds, of the 4 children?

- ☐ 64
- ☐ 91
- ☐ 92
- ☐ 94
- ☐ 96

What is the remainder when  $3^{35}$  is divided by 5?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4

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The sequence  $a_1, a_2, \dots, a_n, \dots$  is defined by  $a_1 = 1$ ,  $a_2 = 1$ , and  $a_n = a_{n-1} + a_{n-2}$  for all integers  $n \geq 3$ . Which of the following values are terms of the sequence?

Indicate all such values.

☐ 8

☐ 15

☐ 21

☐ 24

☐ 34

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If the perimeter of the isosceles right triangle shown is  $1 + \sqrt{2}$ , what is the area of the triangular region?

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☐  $\frac{1}{4}$

☐  $\frac{1}{2}$

☐ 1

☐  $\frac{\sqrt{2}}{4}$

☐  $\frac{1 + \sqrt{2}}{4}$

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1.3

2.4

3.2

4.4

5.3

6.3

7.1

8.8.2

9.-2

10.5 (7)

11.1 (\$5900)

12.1 (0)

13.1 (average)

14.1 (130)

15.2 (\$5700000)

16.4 (16%)

17.5 (96)

18.3 (2)

19.(135) (8,21,34)

20.1 (1/4)

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