

## Math:

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Q1:

A student's average (arithmetic mean) test score on 4 tests is 78. What must be the student's score on a 5th test for the student's average score on the 5 tests to be 80?

- A. 80
- B. 82
- C. 84
- D. 86
- E. 88

Answer:

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Q2:

From a group of 3 boys and 3 girls, 4 children are to be randomly selected. What is the probability that equal numbers of boys and girls will be selected?

- A.  $\frac{1}{10}$
- B.  $\frac{4}{9}$
- C.  $\frac{1}{2}$
- D.  $\frac{3}{5}$
- E.  $\frac{2}{3}$

Answer:

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Q3:

If  $x$  and  $y$  are positive integers and  $1 + x + y + xy = 15$ , what is the value of  $x + y$ ?

- A. 3
- B. 5
- C. 6
- D. 8
- E. 9

Answer:

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Q4:

If Ann saves  $x$  dollars each week and Beth saves  $y$  dollars each week, what is the total amount that they save per week?

- (1) Beth saves \$5 more per week than Ann saves per week.  
 (2) It takes Ann 6 weeks to save the same amount that Beth saves in 5 weeks.

- A. Statement (1) **ALONE** is sufficient, but statement (2) alone is not sufficient.  
 B. Statement (2) **ALONE** is sufficient, but statement (1) alone is not sufficient.  
 C. **BOTH** statements **TOGETHER** are sufficient, but **NEITHER** statement **ALONE** is sufficient.  
 D. **EACH** statement **ALONE** is sufficient.  
 E. Statements (1) and (2) **TOGETHER** are **NOT** sufficient.

Answer:

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 Q5:

If  $x$  is a positive integer, is the remainder 0 when  $3^x + 1$  is divided by 10?

- (1)  $x = 4n + 2$ , where  $n$  is a positive integer.  
 (2)  $x > 4$

- A. Statement (1) **ALONE** is sufficient, but statement (2) alone is not sufficient.  
 B. Statement (2) **ALONE** is sufficient, but statement (1) alone is not sufficient.  
 C. **BOTH** statements **TOGETHER** are sufficient, but **NEITHER** statement **ALONE** is sufficient.  
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 E. Statements (1) and (2) **TOGETHER** are **NOT** sufficient.

Answer:

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 Q6:

If  $r$ ,  $s$ , and  $w$  are positive numbers such that  $w = 60r + 80s$  and  $r + s = 1$ , is  $w < 70$ ?

- (1)  $r > 0.5$   
 (2)  $r > s$

- A. Statement (1) **ALONE** is sufficient, but statement (2) alone is not sufficient.  
 B. Statement (2) **ALONE** is sufficient, but statement (1) alone is not sufficient.  
 C. **BOTH** statements **TOGETHER** are sufficient, but **NEITHER** statement **ALONE** is sufficient.  
 D. **EACH** statement **ALONE** is sufficient.  
 E. Statements (1) and (2) **TOGETHER** are **NOT** sufficient.

Answer:

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 Q7:

If a code word is defined to be a sequence of different letters chosen from the 10 letters  $A, B, C, D, E, F, G, H, I$ , and  $J$ , what is the ratio of the number of 5-letter code words to the number of 4-letter code words?

- A. 5 to 4  
 B. 3 to 2

- C. 2 to 1
- D. 5 to 1
- E. 6 to 1

Answer:

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Q8:

Which of the following fractions has a decimal equivalent that is a terminating decimal?

- A.  $\frac{10}{189}$
- B.  $\frac{15}{196}$
- C.  $\frac{16}{225}$
- D.  $\frac{25}{144}$
- E.  $\frac{39}{128}$

Answer:

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Q9:

Company  $S$  produces two kinds of stereos: basic and deluxe. Of the stereos produced by Company  $S$  last month,  $\frac{2}{3}$  were basic and the rest were deluxe. If it takes  $\frac{7}{5}$  as many hours to produce a deluxe stereo as it does to produce a basic stereo, then the number of hours it took to produce the deluxe stereos last month was what fraction of the total number of hours it took to produce all the stereos?

- A.  $\frac{7}{17}$
- B.  $\frac{14}{31}$
- C.  $\frac{7}{15}$
- D.  $\frac{17}{35}$
- E.  $\frac{1}{2}$

Answer:

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Q10:

A certain machine produces 1,000 units of product  $P$  per hour. Working continuously at this constant rate, this machine will produce how many units of product  $P$  in 7 days?

- A. 7,000
- B. 24,000
- C. 40,000
- D. 100,000
- E. 168,000

Answer:

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Q11:

If  $5^x - 5^{x-3} = (124)(5^y)$ , what is  $y$  in terms of  $x$ ?

- A.  $x$
- B.  $x - 6$
- C.  $x - 3$
- D.  $2x + 3$
- E.  $2x + 6$

Answer:

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Q12:

Lines  $k$  and  $m$  are parallel to each other. Is the slope of line  $k$  positive?

- (1) Line  $k$  passes through the point  $(3, 2)$ .
- (2) Line  $m$  passes through the point  $(-3, 2)$ .

- A. Statement (1) **ALONE** is sufficient, but statement (2) alone is not sufficient.
- B. Statement (2) **ALONE** is sufficient, but statement (1) alone is not sufficient.
- C. **BOTH** statements **TOGETHER** are sufficient, but **NEITHER** statement **ALONE** is sufficient.
- D. **EACH** statement **ALONE** is sufficient.
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Q13:

Theater  $M$  has 25 rows with 27 seats in each row. How many of the seats were occupied during a certain show?

- (1) During the show, there was an average (arithmetic mean) of 10 unoccupied seats per row for the front 20 rows.
- (2) During the show, there was an average (arithmetic mean) of 20 unoccupied seats per row for the back 15 rows.

- A. Statement (1) **ALONE** is sufficient, but statement (2) alone is not sufficient.
- B. Statement (2) **ALONE** is sufficient, but statement (1) alone is not sufficient.
- C. **BOTH** statements **TOGETHER** are sufficient, but **NEITHER** statement **ALONE** is sufficient.
- D. **EACH** statement **ALONE** is sufficient.

E. Statements (1) and (2) **TOGETHER** are **NOT** sufficient.

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Q14:

The number of defects in the first five cars to come through a new production line are 9, 7, 10, 4, and 6, respectively. If the sixth car through the production line has either 3, 7, or 12 defects, for which of these values does the mean number of defects per car for the first six cars equal the median?

- I. 3
- II. 7
- III. 12

- A. I only
- B. II only
- C. III only
- D. I and III only
- E. I, II, and III

Answer:

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Q15:

| +   | $x$ | $y$ | $z$ |  |
|-----|-----|-----|-----|--|
| $d$ |     |     | $m$ |  |
| $e$ |     | $n$ |     |  |
| $f$ |     |     |     |  |
|     |     |     |     |  |

The figure above shows two entries, indicated by  $m$  and  $n$ , in an addition table. What is the value of  $n + m$ ?

- (1)  $d + y = -3$
- (2)  $e + z = 12$

- A. Statement (1) **ALONE** is sufficient, but statement (2) alone is not sufficient.
- B. Statement (2) **ALONE** is sufficient, but statement (1) alone is not sufficient.
- C. **BOTH** statements **TOGETHER** are sufficient, but **NEITHER** statement **ALONE** is sufficient.
- D. **EACH** statement **ALONE** is sufficient.
- E. Statements (1) and (2) **TOGETHER** are **NOT** sufficient.

Answer:

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Q16:

On a map Town  $G$  is 10 centimeters due east of Town  $H$  and 8 centimeters due south of Town  $J$ . Which of the following is closest to the straight-line distance, in centimeters, between Town  $H$  and Town  $J$  on the map?

- A. 6
- B. 13
- C. 18
- D. 20
- E. 24

Answer:

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Q17:

If  $x$  is the product of the positive integers from 1 to 8, inclusive, and if  $i$ ,  $k$ ,  $m$ , and  $p$  are positive integers such that  $x = 2^i 3^k 5^m 7^p$ , then  $i + k + m + p =$

- F. 4
- G. 7
- H. 8
- I. 11
- J. 12

Answer:

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Q18:

In the  $xy$ -plane, the line with equation  $ax + by + c = 0$ , where  $abc \neq 0$ , has slope  $\frac{2}{3}$ . What is the value of  $b$ ?

- (1)  $a = 4$
- (2)  $c = -6$

- A. Statement (1) **ALONE** is sufficient, but statement (2) alone is not sufficient.
- B. Statement (2) **ALONE** is sufficient, but statement (1) alone is not sufficient.
- C. **BOTH** statements **TOGETHER** are sufficient, but **NEITHER** statement **ALONE** is sufficient.
- D. **EACH** statement **ALONE** is sufficient.
- E. Statements (1) and (2) **TOGETHER** are **NOT** sufficient.

Answer:

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Q19:

This year Henry will save a certain amount of his income, and he will spend the rest. Next year Henry will have no income, but for each dollar that he saves this year, he will have  $1 + r$  dollars available to spend. In terms of  $r$ , what fraction of his income should Henry save this year so that next year the amount he was available to spend will be equal to half the amount that he spends this year?

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

Answer:

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Q20:

Leo can buy a certain computer for  $p_1$  dollars in State A, where the sales tax is  $t_1$  percent, or he can buy the same computer for  $p_2$  dollars in State B, where the sales tax is  $t_2$  percent. Is the total cost of the computer greater in State A than in State B?

- (1)  $t_1 > t_2$
- (2)  $p_1 t_1 > p_2 t_2$

- A. Statement (1) **ALONE** is sufficient, but statement (2) alone is not sufficient.
- B. Statement (2) **ALONE** is sufficient, but statement (1) alone is not sufficient.
- C. **BOTH** statements **TOGETHER** are sufficient, but **NEITHER** statement **ALONE** is sufficient.
- D. **EACH** statement **ALONE** is sufficient.
- E. Statements (1) and (2) **TOGETHER** are **NOT** sufficient.

Answer:

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Q21:

Is  $x$  an odd integer?

- (1)  $x + 3$  is an even integer.
- (2)  $\frac{x}{3}$  is an odd integer.

- A. Statement (1) **ALONE** is sufficient, but statement (2) alone is not sufficient.
- B. Statement (2) **ALONE** is sufficient, but statement (1) alone is not sufficient.
- C. **BOTH** statements **TOGETHER** are sufficient, but **NEITHER** statement **ALONE** is sufficient.
- D. **EACH** statement **ALONE** is sufficient.
- E. Statements (1) and (2) **TOGETHER** are **NOT** sufficient.

Answer:

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Q22:

The surface of a certain planet reflects 80 percent of the light that strikes it. The clouds around the planet then absorb 40 percent of the reflected light. What percent of the light that strikes the planet is reflected from the surface and passes through the clouds without being absorbed?

- A. 32%
- B. 40%
- C. 48%
- D. 60%
- E. 88%

Answer:

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Q23:

The selling price of an article is equal to the cost of the article plus the markup. The markup on a certain television set is what percent of the selling price?

- (1) The markup on the television set is 25 percent of the cost.
- (2) The selling price of the television set is \$250.

- A. Statement (1) **ALONE** is sufficient, but statement (2) alone is not sufficient.
- B. Statement (2) **ALONE** is sufficient, but statement (1) alone is not sufficient.
- C. **BOTH** statements **TOGETHER** are sufficient, but **NEITHER** statement **ALONE** is sufficient.
- D. **EACH** statement **ALONE** is sufficient.
- E. Statements (1) and (2) **TOGETHER** are **NOT** sufficient.

Answer:

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Q24:

If  $\frac{7x}{3} + a = 8$  and  $a > 8$ , then, in terms of  $a$ ,  $\frac{3x}{7} =$

- A.  $\frac{1}{a} + \frac{1}{8}$
- B.  $\frac{1}{8} - \frac{1}{a}$
- C.  $\frac{1}{8 - a}$
- D.  $\frac{3}{7}(8 - a)$
- E.  $\frac{9}{49}(8 - a)$

Answer:

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Q25:

What is the sum of a certain pair of consecutive odd integers?

- (1) At least one of the integers is negative.

(2) At least one of the integers is positive.

- A. Statement (1) **ALONE** is sufficient, but statement (2) alone is not sufficient.
- B. Statement (2) **ALONE** is sufficient, but statement (1) alone is not sufficient.
- C. **BOTH** statements **TOGETHER** are sufficient, but **NEITHER** statement **ALONE** is sufficient.
- D. **EACH** statement **ALONE** is sufficient.
- E. Statements (1) and (2) **TOGETHER** are **NOT** sufficient.

Answer:

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Q26:

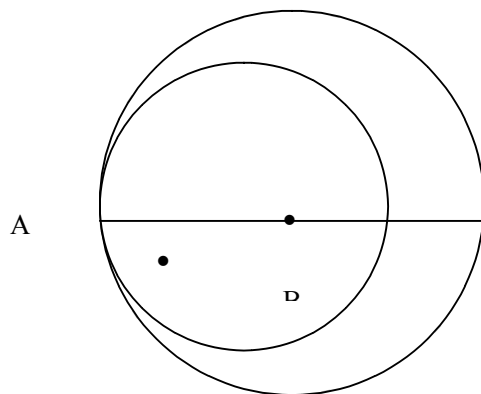
If an automobile averaged 22.5 miles per gallon of gasoline, approximately how many kilometers per liter of gasoline did the automobile average? (1 mile = 1.6 kilometers and 1 gallon = 3.8 liters, both rounded to the nearest tenth.)

- A. 3.7
- B. 9.5
- C. 31.4
- D. 53.4
- E. 136.8

Answer:

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Q27:



In the figure, points A, B, C, D, and E lie on a line. A is on both circles, B is the center of the smaller circle, C is the center of the larger circle, D is on the smaller circle, and E is on the larger circle. What is the area of the region inside the larger circle and outside the smaller circle?

- (1)  $AB = 3$  and  $BC = 2$
- (2)  $CD = 1$  and  $DE = 4$

- A. Statement (1) **ALONE** is sufficient, but statement (2) alone is not sufficient.
- B. Statement (2) **ALONE** is sufficient, but statement (1) alone is not sufficient.

C. **BOTH** statements **TOGETHER** are sufficient, but **NEITHER** statement **ALONE** is sufficient.

D. **EACH** statement **ALONE** is sufficient.

E. Statements (1) and (2) **TOGETHER** are **NOT** sufficient.

Answer:

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Q28:

A certain company assigns employees to offices in such a way that some of the offices can be empty and more than one employee can be assigned to an office. In how many ways can the company assign 3 employees to 2 different offices?

- A. 5
- B. 6
- C. 7
- D. 8
- E. 9

Answer:

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Q29:

If the sequence  $x_1, x_2, x_3, \dots, x_n, \dots$  is such that  $x_1 = 3$  and  $x_{n+1} = 2x_n - 1$  for  $n \geq 1$ , then  $x_{20} - x_{19} =$

- A.  $2^{19}$
- B.  $2^{20}$
- C.  $2^{21}$
- D.  $2^{20} - 1$
- E.  $2^{21} - 1$

Answer:

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Q30:

If  $y$  is the smallest positive integer such that 3,150 multiplied by  $y$  is the square of an integer, then  $y$  must be

- A. 2
- B. 5
- C. 6
- D. 7
- E. 14

Answer:

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Q31:

A certain quantity is measured on two different scales, the  $R$ -scale and the  $S$ -scale, that are related linearly. Measurements on the  $R$ -scale of 6 and 24 correspond to measurements on the  $S$ -scale of 30 and 60, respectively. What measurement on the  $R$ -scale corresponds to a measurement of 100 on the  $S$ -scale?

- A. 20
- B. 36
- C. 48
- D. 60
- E. 84

Answer:

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Q32:

If  $x^3y^4 = 5,000$ , is  $y = 5$ ?

- (1)  $y$  is a positive integer.
- (2)  $x$  is an integer.

- A. Statement (1) **ALONE** is sufficient, but statement (2) alone is not sufficient.
- B. Statement (2) **ALONE** is sufficient, but statement (1) alone is not sufficient.
- C. **BOTH** statements **TOGETHER** are sufficient, but **NEITHER** statement **ALONE** is sufficient.
- D. **EACH** statement **ALONE** is sufficient.
- E. Statements (1) and (2) **TOGETHER** are **NOT** sufficient.

Answer:

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Q33:

|                    | Favorable | Unfavorable | Not Sure |
|--------------------|-----------|-------------|----------|
| Candidate <i>M</i> | 40        | 20          | 40       |
| Candidate <i>N</i> | 30        | 35          | 35       |

The table above shows the results of a survey of 100 voters each responded “favorable” or “unfavorable” or “not sure” when asked about their impressions of candidate *M* and of candidate *N*. What was the number of voters who responded “favorable” for both candidates?

- (1) The number of voters who did not respond “favorable” for either candidate was 40.
- (2) The number of voters who responded “unfavorable” for both candidates was 10.

- A. Statement (1) **ALONE** is sufficient, but statement (2) alone is not sufficient.
- B. Statement (2) **ALONE** is sufficient, but statement (1) alone is not sufficient.
- C. **BOTH** statements **TOGETHER** are sufficient, but **NEITHER** statement **ALONE** is sufficient.
- D. **EACH** statement **ALONE** is sufficient.
- E. Statements (1) and (2) **TOGETHER** are **NOT** sufficient.

Answer:

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Q34:

If  $n$  is a positive integer, what is the remainder when  $3^{8n+3} + 2$  is divided by 5?

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

Answer:

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Q35:

The interior of a rectangular carton is designed by a certain manufacturer to have a volume of  $x$  cubic feet and a ratio of length to width to height of 3 : 2 : 2. In terms of  $x$ , which of the following equals the height of the carton, in feet?

- A.  $\sqrt[3]{x}$
- B.  $\sqrt[3]{\frac{2x}{3}}$
- C.  $\sqrt[3]{\frac{3x}{2}}$
- D.  $\frac{2}{3}\sqrt[3]{x}$
- E.  $\frac{3}{2}\sqrt[3]{x}$

Answer:

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Q36:

How many integers from 0 to 50, inclusive, have a remainder of 1 when divided by 3 ?

- A. 15
- B. 16
- C. 17
- D. 18
- E. 19

Answer:

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Q37:

How many different factors does the integer  $n$  have?

- (1)  $n = a^4b^3$ , where  $a$  and  $b$  are different positive prime numbers.
- (2) The only positive prime numbers that are factors of  $n$  are 5 and 7.

- A. Statement (1) **ALONE** is sufficient, but statement (2) alone is not sufficient.
- B. Statement (2) **ALONE** is sufficient, but statement (1) alone is not sufficient.
- C. **BOTH** statements **TOGETHER** are sufficient, but **NEITHER** statement **ALONE** is sufficient.
- D. **EACH** statement **ALONE** is sufficient.
- E. Statements (1) and (2) **TOGETHER** are **NOT** sufficient.

Answer:

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Answer:

EDCCA, DEEAE, CEEDC, BDAEE, DCAEC, BADAEC, CCAAB, CA