2011 AMC 8

Time limit: 40 minutes

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https://live.poshenloh.com/past-contests/amc8/2011

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1. Margie bought 3 apples at a cost of 50 cents per apple. She paid with a 5-dollar bill. How much change did Margie receive?

A $\$1.50$

B $\$2.00$

C $\$2.50$

D $\$3.00$

E $\$3.50$

2. Karl's rectangular vegetable garden is 20 feet by 45 feet, and Makenna's is 25 feet by 40 feet. Whose garden is larger in area?

A Karl's garden is larger by 100 square feet.

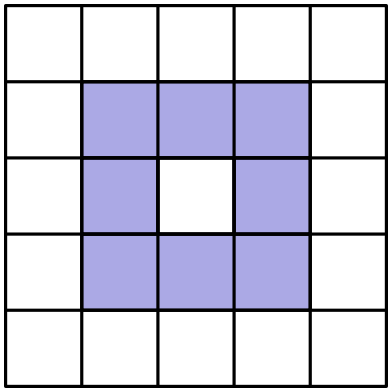
B Karl's garden is larger by 25 square feet.

C The gardens are the same size.

D Makenna's garden is larger by 25 square feet.

E Makenna's garden is larger by 100 square feet.

3. Extend the square pattern of 8 shaded and 17 unshaded square tiles by attaching a border of shaded tiles around the square. What is the ratio of shaded tiles to unshaded tiles in the extended pattern?



A $8 : 17$

B $25 : 49$

C $36 : 25$

D $32 : 17$

E $36 : 17$

4. Here is a list of the numbers of fish that Tyler caught in nine outings last summer:

$$2, 0, 1, 3, 0, 3, 3, 1, 2.$$

Which statement about the mean, median, and mode is true?

A median < mean < mode

B mean < mode < median

C mean < median < mode

D median < mode < mean

E mode < median < mean

5. What time was it 2011 minutes after the beginning of January $1, 2011$?

A January 1 at $9:31$ PM

B January 1 at $11:51$ PM

C January 2 at $3:11$ AM

D January 2 at $9:31$ AM

E January 2 at $6:01$ PM

6. In a town of 351 adults, every adult owns a car, a motorcycle, or both. If 331 adults own cars and 45 adults own motorcycles, how many of the car owners do not own a motorcycle?

A 20

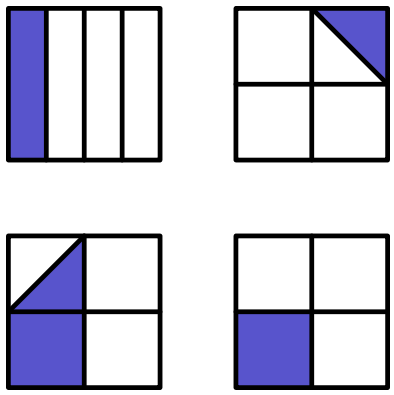
B 25

C 45

D 306

E 351

7. Each of the following four large congruent squares is subdivided into combinations of congruent triangles or rectangles and is shaded. What percent of the total area is shaded?



A $12\frac{1}{2}$

B 20

C 25

D $33\frac{1}{3}$

E $37\frac{1}{2}$

8. Bag A contains three chips labeled $1, 3,$ and $5.$ Bag B contains three chips labeled $2, 4,$ and $6.$ If one chip is drawn from each bag, how many different values are possible for the sum of the two numbers on the chips?

A 4

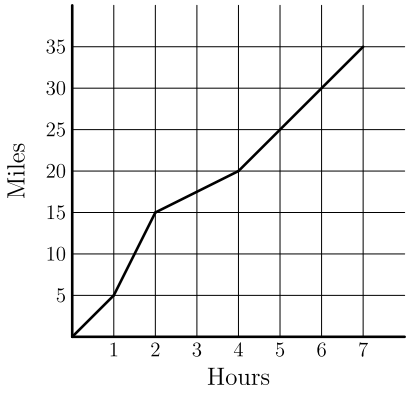
B 5

C 6

D 7

E 9

9. Carmen takes a long bike ride on a hilly highway. The graph indicates the miles traveled during the time of her ride. What is Carmen's average speed for her entire ride in miles per hour?



A 2

B 2.5

C 4

D 4.5

E 5

10. The taxi fare in Gotham City is $\$2.40$ for the first $\frac{1}{2}$ mile and additional mileage charged at the rate $\$0.20$ for each additional 0.1 mile. You plan to give the driver a $\$2$ tip. How many miles can you ride for $\$10$?

A 3.0

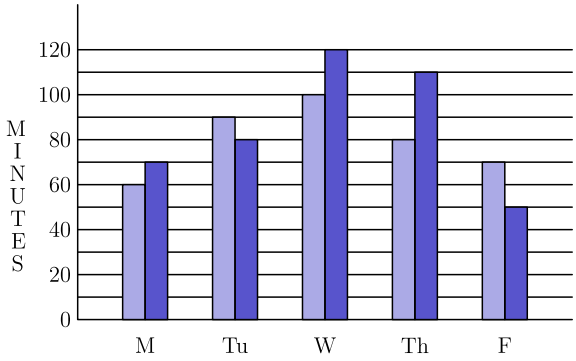
B 3.25

C 3.3

D 3.5

E 3.75

11. The graph shows the number of minutes studied by both Asha (left bar) and Sasha (right bar) in one week. On the average, how many more minutes per day did Sasha study than Asha?



A 6

B 8

C 9

D 10

E 12

12. Angie, Bridget, Carlos, and Diego are seated at random around a square table, one person to a side. What is the probability that Angie and Carlos are seated opposite each other?

A $\frac{1}{4}$

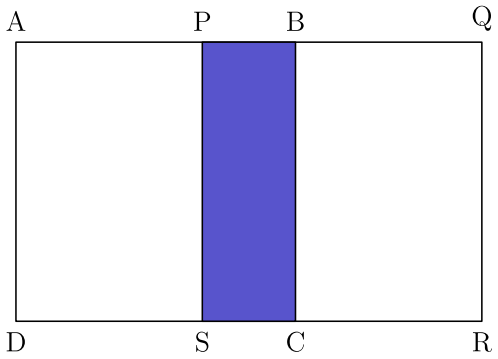
B $\frac{1}{3}$

C $\frac{1}{2}$

D $\frac{2}{3}$

E $\frac{3}{4}$

13. Two congruent squares, $ABCD$ and $PQRS$, have side length 15. They overlap to form the 15 by 25 rectangle $AQRD$ shown. What percent of the area of rectangle $AQRD$ is shaded?



A 15

B 18

C 20

D 24

E 25

14. There are 270 students at Colfax Middle School, where the ratio of boys to girls is $5:4$. There are 180 students at Winthrop Middle School, where the ratio of boys to girls is $4:5$. The two schools hold a dance and all students from both schools attend. What fraction of the students at the dance are girls?

A $\frac{7}{18}$

B $\frac{7}{15}$

C $\frac{22}{45}$

D $\frac{1}{2}$

E $\frac{23}{45}$

15. How many digits are in the product $4^5 \cdot 5^{10}$?

A 8

B 9

C 10

D 11

E 15

16. Let A be the area of the triangle with sides of length $25, 25$, and 30. Let B be the area of the triangle with sides of length $25, 25$, and 40. What is the relationship between A and B?

A $A = \frac{9}{16}B$

B $A = \frac{3}{4}B$

C $A = B$

D $A = \frac{4}{3}B$

E $A = \frac{16}{9}B$

17. Let w, x, y, and z be whole numbers. If

$$2^w \cdot 3^x \cdot 5^y \cdot 7^z = 588,$$

then what does

$$2w + 3x + 5y + 7z$$

equal?

A 21

B 25

C 27

D 35

E 56

18. A fair six-sided die is rolled twice. What is the probability that the first number that comes up is greater than or equal to the second number?

A $\frac{1}{6}$

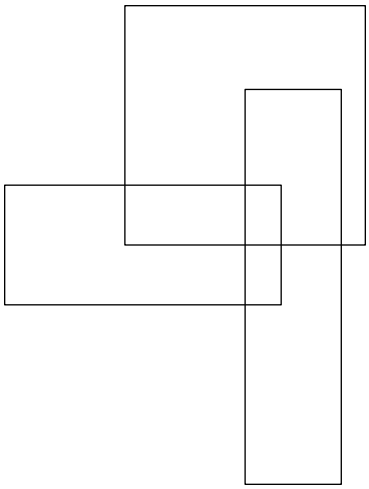
B $\frac{5}{12}$

C $\frac{1}{2}$

D $\frac{7}{12}$

E $\frac{5}{6}$

19. How many rectangles are in this figure?



A 8

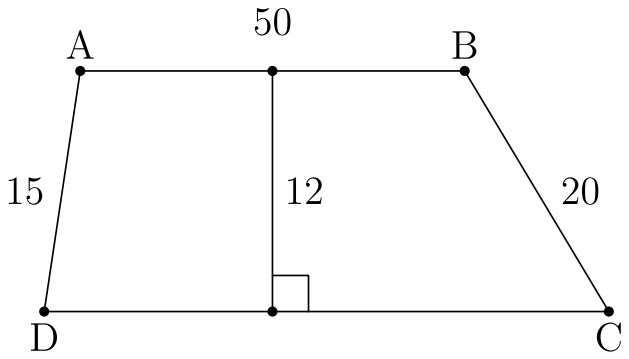
B 9

C 10

D 11

E 12

20. Quadrilateral $ABCD$ is a trapezoid, $AD = 15, AB = 50, BC = 20,$ and the altitude is $12.$ What is the area of the trapezoid?



A 600

B 650

C 700

D 750

E 800

21. Students guess that Norb's age is $24, 28, 30, 32, 36, 38, 41, 44, 47,$ and $49.$ Norb says, "At least half of you guessed too low, two of you are off by one, and my age is a prime number." How old is Norb?

A 29

B 31

C 37

D 43

E 48

22. What is the tens digit of 7^{2011}?

A 0

B 1

C 3

D 4

E 7

23. How many 4-digit positive integers have four different digits, where the leading digit is not zero, the integer is a multiple of 5, and 5 is the largest digit?

A 24

B 48

C 60

D 84

E 108

24. In how many ways can 10001 be written as the sum of two primes?

A 0

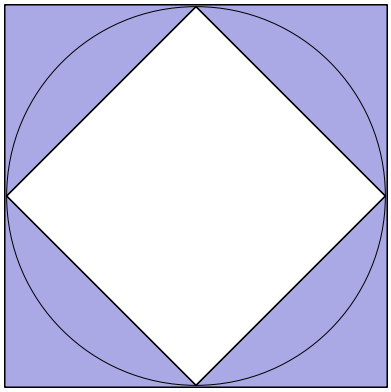
B 1

C 2

D 3

E 4

25. A circle with radius 1 is inscribed in a square and circumscribed about another square as shown. Which fraction is closest to the ratio of the circle's shaded area to the shaded area between the two squares?



A $\frac{1}{2}$

B 1

C $\frac{3}{2}$

D 2

E $\frac{5}{2}$

Solutions: https://live.poshenloh.com/past-contests/amc8/2011/solutions