






## 2019 6th Grade Math Contest

- If the ratio  $a : b$  is  $1 : 4$  and the ratio  $b : c = 3 : 2$ , find the ratio  $(a + c) : c$ .
  - $6 : 5$
  - $9 : 7$
  - $3 : 2$
  - $7 : 4$
  - $11 : 8$
- It takes 1 hour to fill a swimming pool  $\frac{2}{5}$  full. How many hours does it take to fill the rest of the pool?
  - $\frac{3}{5}$
  - $\frac{3}{2}$
  - 1
  - $\frac{2}{3}$
  - $\frac{5}{3}$
- It takes a runner 9 seconds to run 35 yards. How fast is the runner going in miles per hour? Round your answer to the nearest integer. (Hint: 1 mile = 1760 yards.)
  - 8
  - 9
  - 10
  - 11
  - 12
- A home owner wants to put in a new concrete patio. The patio will be 20 feet long, 12 feet wide, and 3 inches thick ( $\frac{1}{4}$  ft). Concrete is measured by the cubic yard ( $27 \text{ ft}^3$ ). One sack of dry cement mix costs \$7.30 and it takes four sacks to mix up 1 cubic yard of concrete. *If the home owner can only buy full sacks of cement*, how much will the cement cost to do the job?
  - \$61.48
  - \$64.89
  - \$69.42
  - \$65.70
  - \$57.42

5. Which visual model best represents the quotient  $\frac{5}{6} \div \frac{7}{8}$ ?

- (a) 
- (b) 
- (c) 
- (d) 
- (e) 

6. The greatest common factor (GCF) and least common multiple of 36 and 168 are:

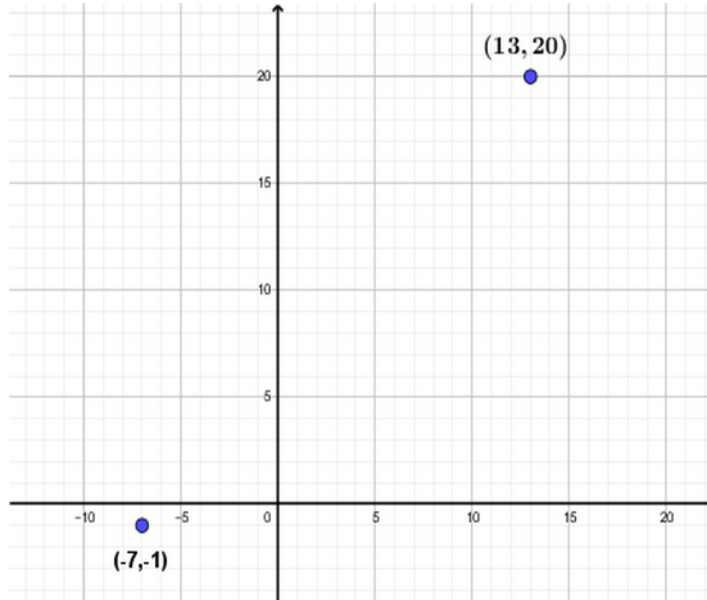
- (a) GCF = 4; LCM = 504  
 (b) GCF = 6; LCM = 3024  
 (c) GCF = 9; LCM = 6048  
 (d) GCF = 12; LCM = 336  
 (e) GCF = 12; LCM = 504

7. The deepest part of the Mariana Trench in the Pacific Ocean is 36,201 ft below sea level. The peak of the tallest mountain in Chile, Acamarachi, is 19,836 ft above sea level. If the base of the mountain were placed at the deepest part of the trench, where would we find its peak?

- (a) 56,037 ft above sea level  
 (b) sea level  
 (c) 16,365 ft above sea level  
 (d) 56,037 feet below sea level  
 (e) 16,365 ft below sea level

8. In a “taxi cab geometry” we can only travel from point to point in the coordinate plane along horizontal and vertical lines. In taxi cab geometry, how far away from each other are the following points?

- (a) 25
- (b) 27
- (c) 29
- (d) 40
- (e) 41

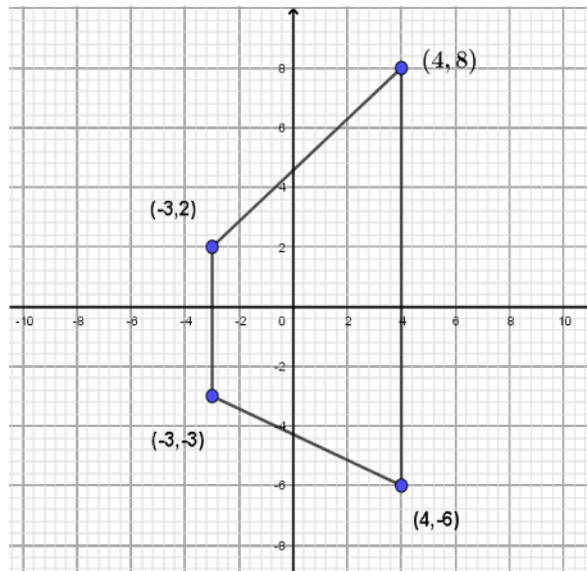


9. Which of these numbers is furthest from 0 on the number line?

- (a) 3.5
- (b)  $3.\bar{5}$
- (c)  $-3.5\bar{6}$
- (d)  $-3.565$
- (e)  $3.\bar{56}$

10. A landscaper needs to fertilize a trapezoidal field and needs to know the area. The field has been mapped onto the coordinate axes in the following way. Assume the distances are in meters. What is the area of the field?

- (a)  $26\frac{1}{2} \text{ m}^2$
- (b)  $36 \text{ m}^2$
- (c)  $66\frac{1}{2} \text{ m}^2$
- (d)  $77 \text{ m}^2$
- (e)  $98 \text{ m}^2$



11. Which of the following are equal to  $2^4 \cdot 3^4 \cdot 9^4$ ?

- I.  $14^{12}$
- II.  $2^4 \cdot 3^{12}$
- III.  $54^4$

- (a) I only
- (b) II only
- (c) III only
- (d) I and II only
- (e) II and III only

12. Find the area of the circle whose diameter is  $\pi$ .

- (a)  $\pi^2$
- (b)  $2\pi^2$
- (c)  $\pi^3/2$
- (d)  $\pi^3/4$
- (e)  $\pi^3$

13. If  $x = 0$ , for which value of  $y$  is the following equation true:

$$6x^4 + 8x^3 - (5y - 15)x - 7y + 15 = 0$$

- (a)  $-15/7$
- (b)  $0$
- (c)  $15/7$
- (d)  $15/11$
- (e)  $22/7$

14. Let  $a$ ,  $b$ ,  $c$ , and  $d$  be real numbers. Which of the following is *not* equal to  $a(b + c + d)$ ?

- (a)  $ab + ac + ad$
- (b)  $(a + b + c)d$
- (c)  $ab + a(c + d)$
- (d)  $(b + c + d)a$
- (e)  $a(b + c) + ad$

15. Simplify the following:  $2(x + 7) - 3(x - 2) + x - 1$ .

- (a) 19
- (b) 0
- (c) 7
- (d) 6
- (e)  $6x$

16. If  $3m = 5$  and  $4n - 3m = 3$ , what is  $n$ ?

- (a) 0
- (b) 1
- (c) 2
- (d) 3
- (e) 4

17. If  $x$  is a positive integer, which of the following must also be a positive integer?

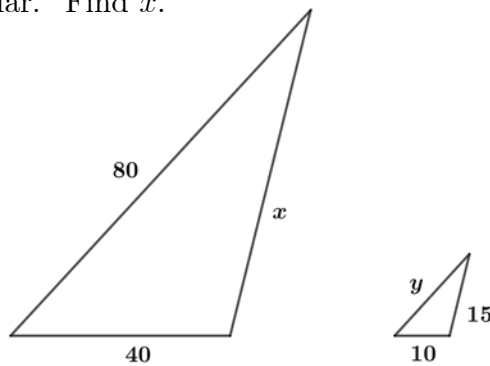
- (a)  $x^2 - 1$
- (b)  $x - 2$
- (c)  $x^2 + 1$
- (d)  $2x - 3$
- (e)  $x^3 - \frac{1}{2}$

18. One-tenth is what part of three-fourths?

- (a)  $40/3$
- (b)  $3/40$
- (c)  $15/2$
- (d)  $1/8$
- (e)  $2/15$

19. The following triangles are similar. Find  $x$ .

- (a) 120
- (b) 60
- (c) 30
- (d) 20
- (e) 10



20. If  $3 < x < 6$  and  $4 < y < 7$ , then

- (a)  $1 < x + y < 7$
- (b)  $1 < x + y < 13$
- (c)  $3 < x + y < 7$
- (d)  $4 < x + y < 6$
- (e)  $7 < x + y < 13$

21. Boxes of candy,  $b$ , are sold at a band fundraiser. The dollars raised,  $d$ , is given by the following table.

Boxes of Candy ( $b$ )	Dollars Raised ( $d$ )
1	4
2	8
3	12
4	16

Which equation represents the total amount of money raised?

- (a)  $d = 4b$
- (b)  $d = b + 4$
- (c)  $d = \frac{b}{4}$
- (d)  $b = 4d$
- (e)  $b = 4 - d$

22. The area of a 2 ft wide walk around a garden that is 30 ft long and 20 ft wide is

- (a)  $104 \text{ ft}^2$
- (b)  $216 \text{ ft}^2$
- (c)  $680 \text{ ft}^2$
- (d)  $704 \text{ ft}^2$
- (e)  $1416 \text{ ft}^2$

23. Bricks are stacked into a rectangular prism that is 4 ft long, 3 ft wide, and 2 ft high. Each individual brick has dimensions  $8'' \times 4'' \times 2''$ . How many bricks are in the pile?

- (a) 54
- (b) 320
- (c) 324
- (d) 648
- (e) 848

24. A regular hexagon in the coordinate plane has vertices

$$(-2, 0), (-2, 4\sqrt{3}), (-4, 2\sqrt{3}), (2, 0), (2, 4\sqrt{3}), \text{ and } (4, 2\sqrt{3}).$$

Find the length of one of its sides.

- (a)  $\sqrt{3}$
- (b) 2
- (c)  $2\sqrt{3}$
- (d) 4
- (e)  $4\sqrt{3}$

25. Two cubes – one smaller and one larger – have edges that are in the proportion 2 : 3. What is the ratio of their surface areas?

- (a)  $\frac{2}{3}$
- (b)  $\frac{\sqrt{2}}{\sqrt{3}}$
- (c)  $\frac{\sqrt{3}}{\sqrt{2}}$
- (d)  $\frac{4}{9}$
- (e)  $\frac{9}{4}$

26. Of all the employees at a small company, the proportion earning certain hourly wages are as follows:

wages	\$7.50	\$10.00	\$12.50	\$18.00	\$22.00
proportion	18%	26%	42%	11%	3%

What is the average hourly wage to the nearest cent?

- (a) \$11.34
- (b) \$11.84
- (c) \$12.00
- (d) \$12.23
- (e) \$12.56

27. The salaries of new faculty at a local community college are given below:

Salary	# of faculty
\$33,000	6
\$35,000	12
\$38,000	8
\$41,000	6
\$45,000	3

Find the median salary.

- (a) \$45,000
  - (b) \$33,000 and \$41,000
  - (c) \$38,000
  - (d) \$35,000
  - (e) \$36,500
28. If the average of eight numbers is 6 and the average of six other numbers is 8, find the average of all fourteen numbers.
- (a) 6
  - (b)  $48/7$
  - (c) 7
  - (d)  $51/7$
  - (e)  $57/7$
29. Three kids jump up and down on a trampoline. Each kid jumps at a different regular speed: one takes 6 seconds, one takes 8 seconds, and one takes 10 seconds to complete each jump. If they all start at the same time, how many seconds later will all of them land on the trampoline at the same time?
- (a) 48
  - (b) 60
  - (c) 80
  - (d) 120
  - (e) 480



30. The following table shows the range of time that it took a sample of people to wash their cars at a self-service car wash.

$x =$ minutes	Carwashers
$1 \leq x < 2$	2
$2 \leq x < 3$	6
$3 \leq x < 4$	18
$4 \leq x < 5$	12
$5 \leq x < 6$	4

Determine the percentage of people, to the nearest tenth of a percent, that took at least 4 but less than 6 minutes.

- (a) 38.1%
- (b) 42.9%
- (c) 53.6%
- (d) 60.5%
- (e) 61.9%