1. The following sequence continues indefinitely.

$$\frac{64}{27}, \frac{16}{9}, \frac{4}{3}, 1, \frac{3}{4}, \ldots$$

What is the sum of all the terms in the sequence?

A) $\frac{64}{27}$

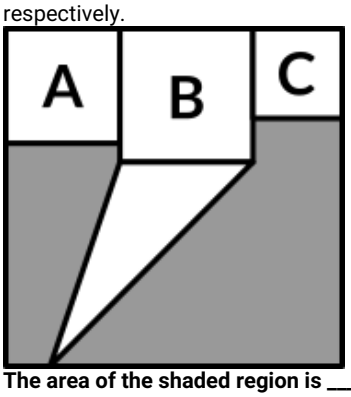
B) $\frac{256}{27}$

C) $\frac{256}{81}$

D) $\frac{64}{81}$

(Correct +3, Wrong 0, Blank 0)

2. The following figure is a square with 3 other squares, A, B, and C inside. The areas of A, B, and C are 16, 49, and 9 units, respectively.



The area of the shaded region is _____ square units.

A) 100

B) 169

C) 56,5

D) 97,5

(Correct +3, Wrong 0, Blank 0)

3. Given that the 37th term of an arithmetic sequence is 290 and the common difference is 8.

Find the sum of the first 4 terms of this progression.

A) 64

B) 56

C) 120

D) 82

(Correct +3, Wrong 0, Blank 0)

4. A prime number is a positive integer larger than 1 with only two positive factors: 1 and itself.

If p and q are two consecutive primes (for example, 2 and 3; 11 and 13; 61 and 67; etc.), what is the largest possible value for $q - p$?

A) 8

B) 2

C) no maximum

D) 4

(Correct +3, Wrong 0, Blank 0)

5. The following are the points earned by five competitors in the first stage of a local mathematical competition.

Name	**Points**
Anne	143
Bernard	127
Chynthia	138
Dean	114
Elle	168
Average	**138**

In the second stage, Anne and Bernard got the same points as they did in the first stage. Cynthia got 10 more points than she did in the first stage. Dean and Elle gained 15 more points than they did in the first stage.
What is the average points gained in the second stage?

A) 140
B) 146
C) 124
D) 138
(Correct +3, Wrong 0, Blank 0)

6. Find the roots of this equation.
$4x^2 + 17x - 15 = 0$

A) $x = -3, x = 0.8$
B) $x = 0.75, x = 5$
C) $x = 3, x = -0.8$
D) $x = 0.75, x = -5$
(Correct +3, Wrong 0, Blank 0)

7. On Holiday Island, there are only four towns, A, B, C, and D, and there are roads connecting any two of them.
How many different ways are there to move from A to D if we are allowed to pass through a maximum of two cities between A and D?

A) 2
B) 5
C) 3
D) 4
(Correct +3, Wrong 0, Blank 0)

8. Mr. Daniel owns 4 pairs of pants, 7 shirts, and 3 sweaters.
In how many ways may he choose 2 of the pairs of pants, 3 of the shirts, and 1 of the sweaters to pack for a trip?

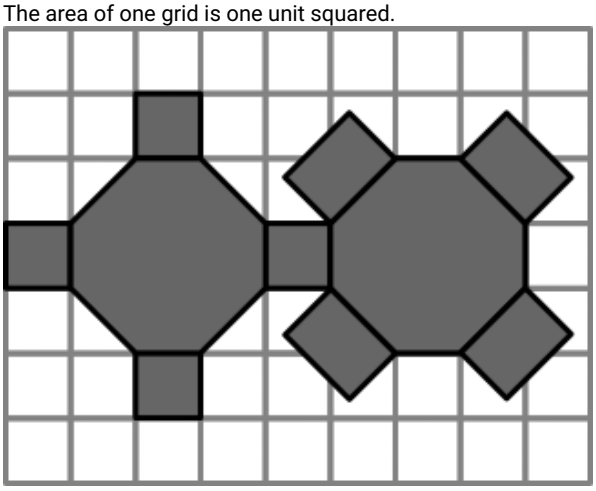
A) 630
B) 4840
C) 530
D) 7560
(Correct +3, Wrong 0, Blank 0)

9. If $x = -2$ is one root of $x^3 - x^2 - 17x = 22$, then find the other roots of the equation.

A) $x = \frac{-3+\sqrt{53}}{2}, x = \frac{-3-\sqrt{53}}{2}$
B) $x = 2 + 2\sqrt{22}, x = 2 - 2\sqrt{22}$
C) $x = \frac{3+\sqrt{53}}{2}, x = \frac{3-\sqrt{53}}{2}$
D) $x = -2 + 2\sqrt{22}, x = -2 - 2\sqrt{22}$

(Correct +3, Wrong 0, Blank 0)

10. The following shaded figure will be folded to create a prism. The area of one grid is one unit squared.

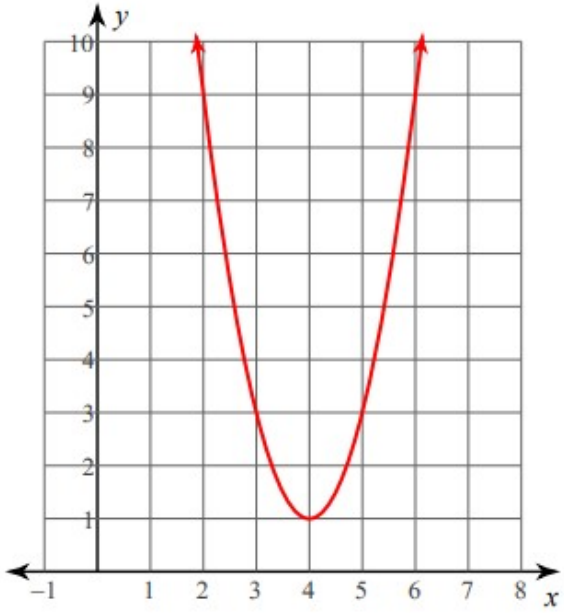


The volume of the prism is _____ units cubed.

A) 7
B) 6
C) 8
D) 9

(Correct +3, Wrong 0, Blank 0)

11. Choose the following functions that correspond to the given graph:



A) $2x^2 + 16x + 33 = y$
B) $x^2 - 16x + 33 = y$
C) $2x^2 - 16x + 33 = y$
D) $2x^2 - 16x - 33 = y$

(Correct +3, Wrong 0, Blank 0)

12. What is the sum of all numbers z that satisfies the following equation?

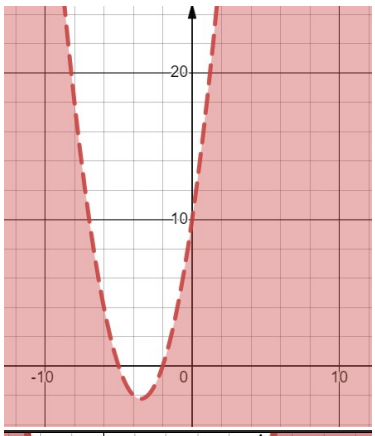
$$|z-1| + |z-2| + |z-3| = 15$$

A) 3
B) 4
C) 1
D) 7

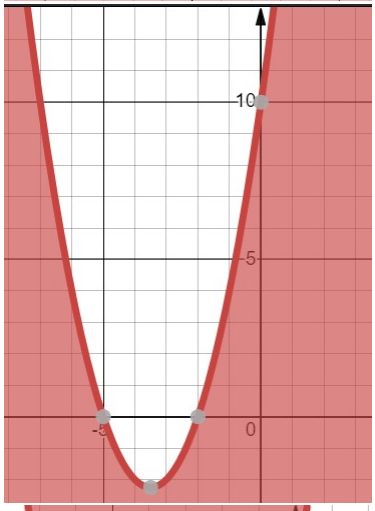
(Correct +3, Wrong 0, Blank 0)

13. Which of the following graphs represents the solution to the inequality $x^2 + 7x + 10 \geq y$.

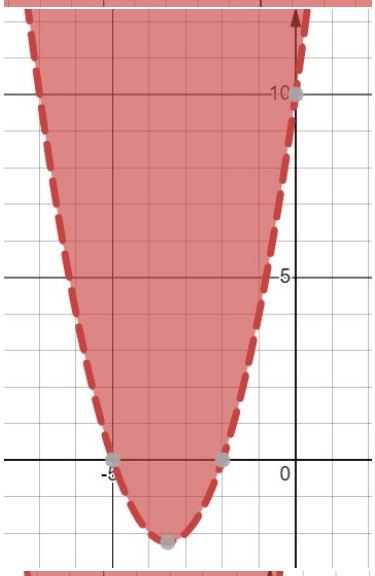
A)



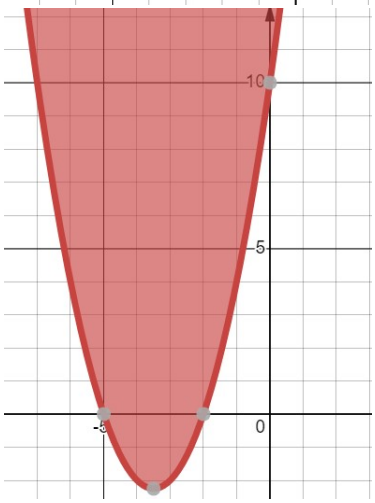
B)



C)



D)



(Correct +3, Wrong 0, Blank 0)

15. Three numbers, a, b, and c, satisfy the following equations:

$$a + b + \frac{1}{c} = 3$$

$$a + \frac{1}{b} + c = \frac{4}{3}$$

$$\frac{1}{a} + b + c = \frac{2}{3}$$

What is $\dfrac{ab + ac + bc}{abc} + 2(a + b + c)$**?**

A) $\dfrac{5}{6}$

B) 4

C) 5

D) $\dfrac{1}{3}$

(Correct +3, Wrong 0, Blank 0)

16. A two-digit number $\overline{BA}$ divides $\overline{AB}$ without remainder.

What is $\dfrac{A}{B}$**?**

A) 1

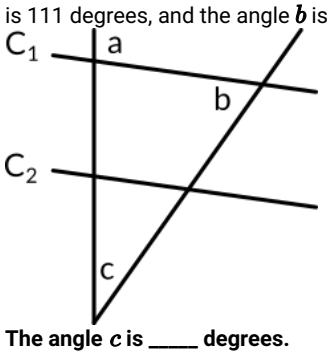
B) $\dfrac{3}{4}$

C) $\dfrac{1}{2}$

D) 2

(Correct +3, Wrong 0, Blank 0)

14. In the following figure, C_1 and C_2 are parallel. The angle a is 111 degrees, and the angle b is 61 degrees.



The angle c is _____ degrees.

A) 60
B) 50
C) 70
D) 40

(Correct +3, Wrong 0, Blank 0)

17. How many two-digit positive integers $\overline{AB}$ are there such that $\frac{\overline{AB}}{\overline{BA}} = \frac{7}{4}$?

A) 2
B) 4
C) 1
D) 3
(Correct +3, Wrong 0, Blank 0)

18. Three best friends, Andy, Brody, and Cindy, volunteer in a zoo as caretakers. Andy comes to volunteer at the zoo every 8 days, Brody every 5 days, and Cindy every 6 days. They start at the same time on a Monday.
What day of the week will it be when the three best friends volunteer at the same time again?

A) Monday
B) Tuesday
C) Friday
D) Sunday
(Correct +3, Wrong 0, Blank 0)

19. The probability that a sequence of five letters is a palindrome is $\frac{x}{26 \cdot 26 \cdot 26 \cdot 26 \cdot 26}$.
What is the value of x?

A) $26 \cdot 26 \cdot 26 \cdot 26$
B) 26
C) $26 \cdot 26 \cdot 26$
D) $26 \cdot 26$
(Correct +3, Wrong 0, Blank 0)

20. Calculate $cos^2 20^o + cos^2 30^o + cos^2 40^o + cos^2 50^o + cos^2 60^o + co$.

A) 2
B) 1
C) 0
D) 3
(Correct +3, Wrong 0, Blank 0)

21. Sam took a math examination and got 7 correct answers out of a total of 10 questions, but he doesn't know which questions he got right.
How many different possible sets of questions that Sam answered correctly are there? (Write your answer only in numbers.)
(Correct +4, Wrong 0, Blank 0)

22. Five people participated in a chess tournament. No match ends in a draw.
At most, how many sets $\{a, b, c\}$ of three players have the property that a defeats b, b defeats c, and c defeats a?
(Correct +4, Wrong 0, Blank 0)

23. If $a, b \in [-1, 1]$, what is the maximum value of $ab + \sqrt{(1-a^2)(1-b^2)}$? (Write your answer only in numbers.)
(Correct +4, Wrong 0, Blank 0)

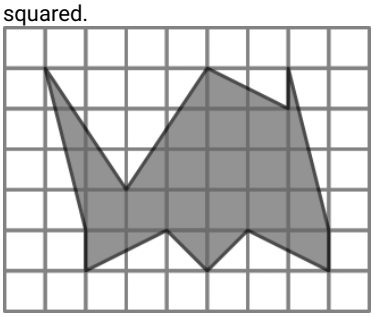
24. Let x be a number such that $x^2 + \dfrac{1}{x^2} = 14$.

What is $x + \dfrac{1}{x}$? (Write your answer only in numbers.)

(Correct +4, Wrong 0, Blank 0)

25. A rectangular pyramid with a height of 4 meters has a total surface area of 96 meters squared.
The volume of the pyramid is _____ meters cubed. (Write your answer only in numbers.)
(Correct +4, Wrong 0, Blank 0)

26. In the following figure, one grid has an area of 1 unit squared.



The area of the gray figure is _____ units squared. (Write your answer only in numbers.)
(Correct +4, Wrong 0, Blank 0)

27. An exam consists of 20 multiple-choice questions, and each question has 4 options. The participant will get 4 points for correct answers, -1 points for wrong answer, and 0 points for unanswered questions. Andy took the exam, but he answered all the questions randomly.
What is the most probable point that Andy can get? (Write your answer only in numbers.)
(Correct +4, Wrong 0, Blank 0)