Category-kids IMC 2022

1.



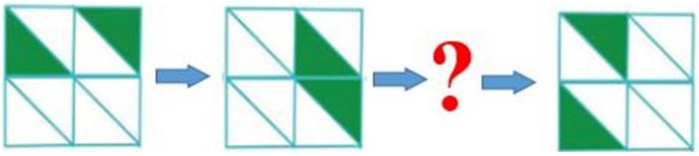
A) 

B) 

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2.



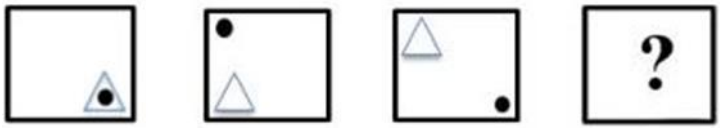
A) 

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3.



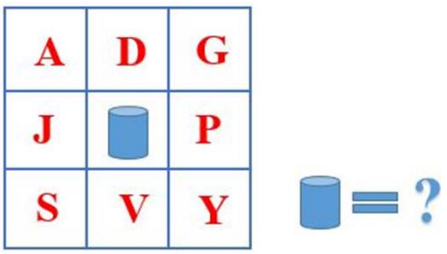
A) 

B) 

C) 

D) 

4.



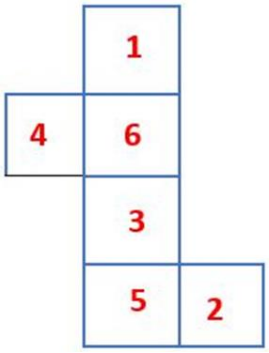
A) N B) I C) Q D) M

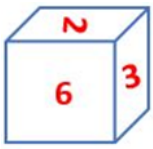
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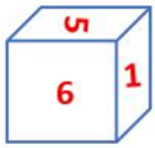


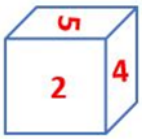
A) **05:09** B) **04:45** C) **05:15** D) **05:45**

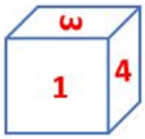
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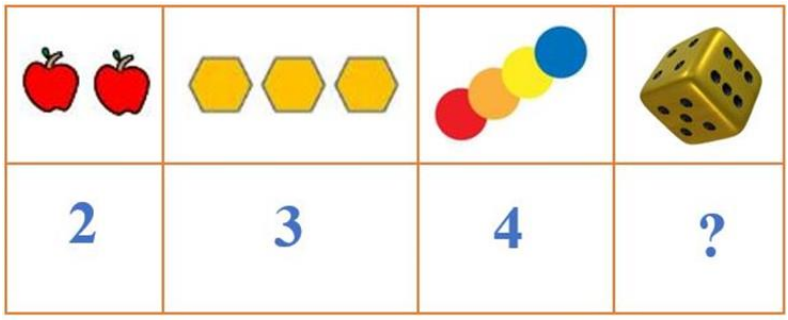
A) 

B) 

C) 

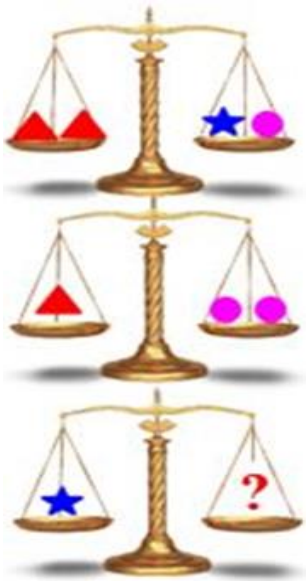
D) 

7.



A) **6** B) **15** C) **1** D) **5**

8.



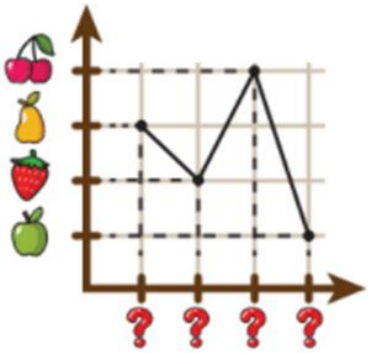
A) 

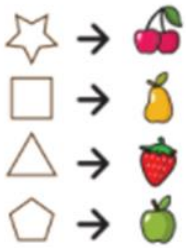
B) 

C) 

D) 

9.





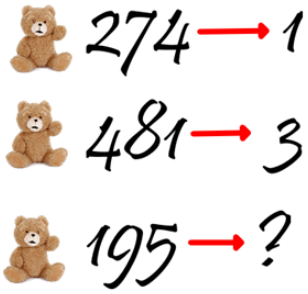
A) 

B) 

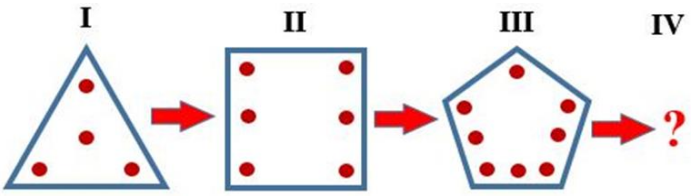
C) 

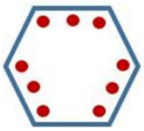
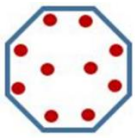
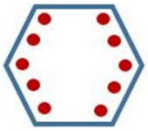
D) 

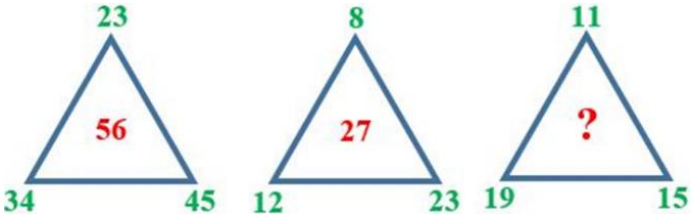
10.



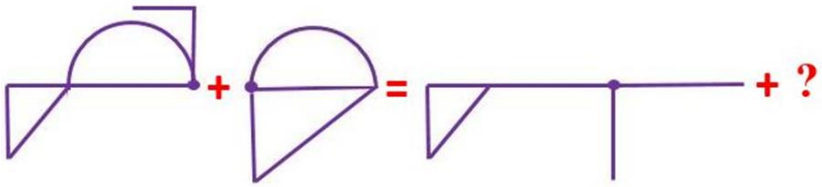
A) 3 B) 8 C) 15 D) 13

11. 

A)  B)  C)  D) 

12. 

A) 13 B) 23 C) 27 D) 32

13. 

A)  B)  C)  D) 

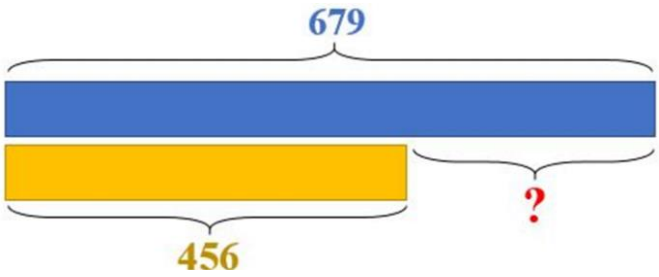
14. $98 - 25 = 80 - \boxed{?}$

A) 5 B) 6 C) 7 D) 8

15. $6 + 15 + 24 = 9 \times \boxed{?}$

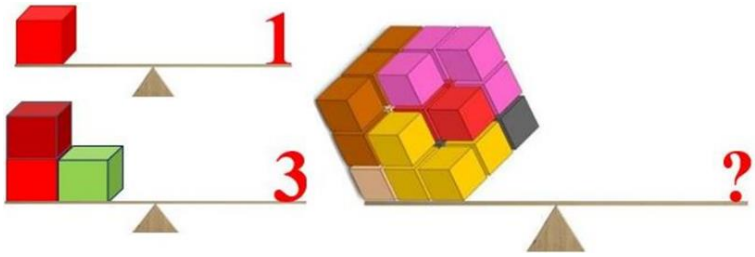
A) 2 B) 3 C) 4 D) 5

16.



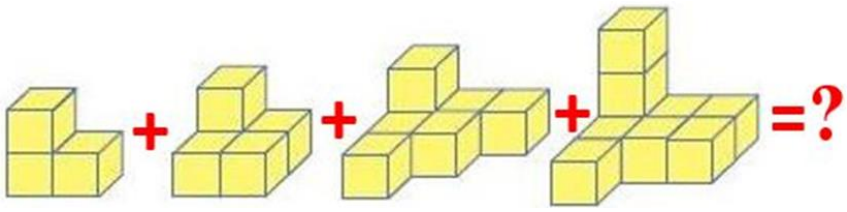
A) 223 B) 333 C) 225 D) 183

17.



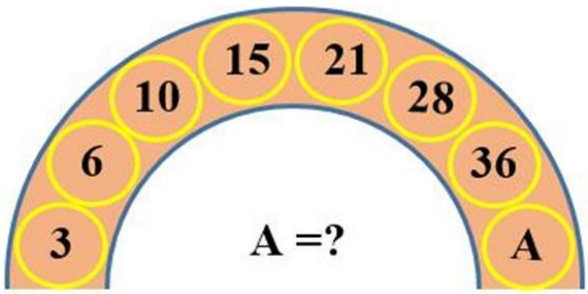
A) 12 B) 4 C) 9 D) 23

18.



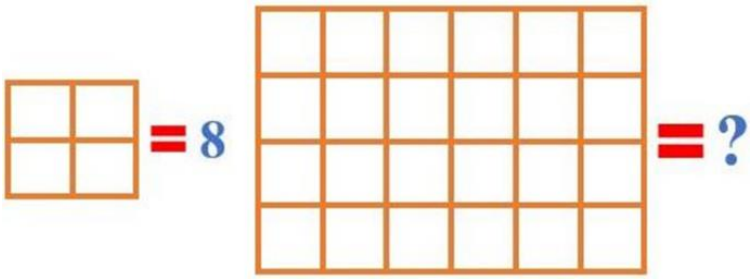
A) 12 B) 24 C) 14 D) 21

19.



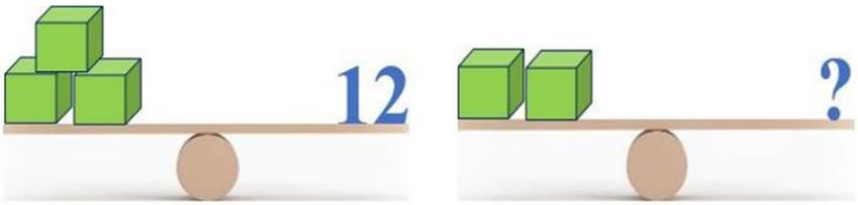
A) 45 B) 40 C) 46 D) 48

20.



A) 40 B) 24 C) 48 D) 16

21.



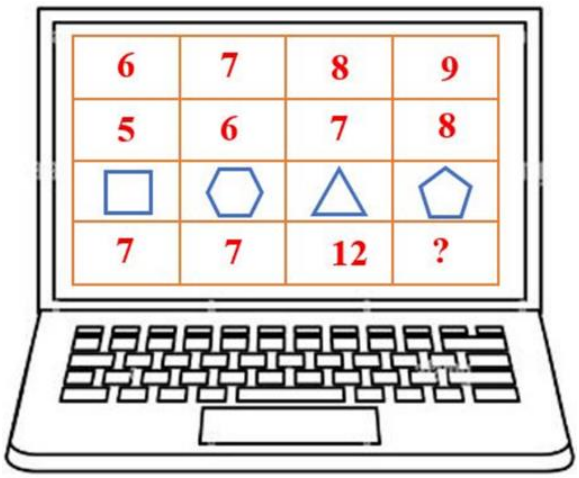
A) 9 B) 24 C) 6 D) 8

22.

3	5			11			?

A) 15 B) 17 C) 13 D) 19

23.

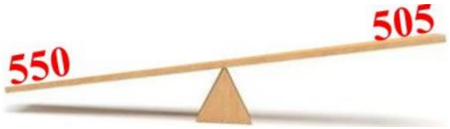


A) 17 B) 12 C) 11 D) 9

24.



A) 

B) 

C) 

D) 

25. 

A) 

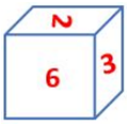
B) 

C) 

D) 

Answer:

1. A)  **2.** B)  **3.** A)  **4.** D) M **5.** B) **04:45**

6. A) 

7. C) 1 **8.** D)  **9.** C)  **10.** A) **3**

11. C)  **12.** B) 23 **13.** B)  **14.** C) 7 **15.** D) 5 **16.** A) 223

17. D) 23 **18.** B) 24 **19.** A) 45 **20.** C) 48 **21.** D) 8 **22.** B) 17

23. B) 12 **24.** B) 

25. A) 

Category-1 IMC 2022

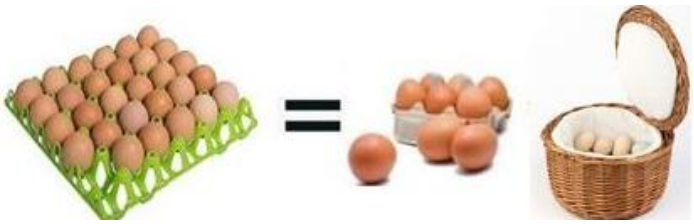
1. Calculate $9 \div 3 \times (2 + 1)$.

A) 9 B) 1 C) 27 D) 3

2. If one year equals 365 days, how many hours are there in a year?

A) 389 B) 8760 C) 36500 D) 365

3. How many eggs are in the egg basket?



A) 20 B) 21 C) 24 D) 23

4. Arrange the following numbers in descending order.

10101, 10110, 10009, 10099, 10990.

A) 10101, 10110, 10009, 10099, 10990
B) 10101, 10009, 10110, 10099, 10990
C) 10101, 10009, 10110, 10990, 10099
D) 10990, 10110, 10101, 10099, 10009

5. What is ★ in the pattern below?

3, 7, 15, 31, 63, ★

A) 127 B) 123 C) 125 D) 94

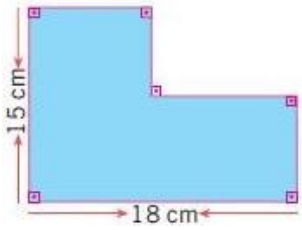
6. Evaluate **A** - **B** + **C**.

A) 7 B) 11 C) 3 D) 21

$$\begin{array}{r} 28A5 \\ + \quad B74C \\ \hline 8642 \end{array}$$

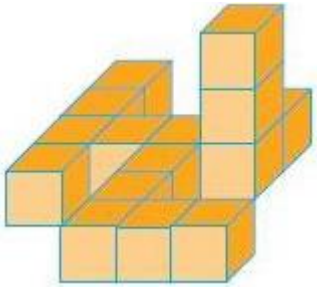
7. Find the perimeter of the shape.

A) 33 B) 16 C) 46 D) 66



8. How many cubes are there in the cube structure?

A) 15 B) 18 C) 19 D) 16



9. If A and B be integers such that A x B = 36, which of the following is an impossible value of A + B?

A) 20 B) 37 C) 12 D) 10

10. A telephone provider costs 25 cents per 10-second phone call. How much does a phone call of 2 minutes cost? (1USD=100 cents, 1minute=60 seconds)

A) 1 USD B) 1.5 USD C) 3 USD D) 2.5 USD

11. According to the following diagram, find the value of the circle.

A) 18 B) 19 C) 20 D) 21

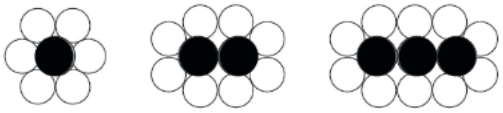
$$\bigstar + 3 = 14$$

$$\bigstar + \Delta = 17$$

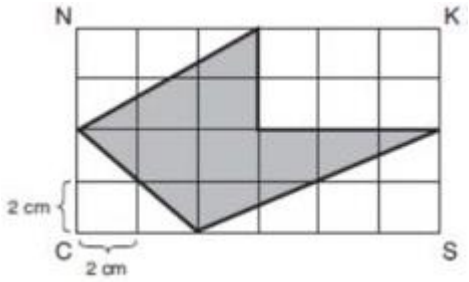
$$\Delta + O = 27$$

12. In the following picture first three steps of the series are given. How many circles are used in the 5th step? (Hint: You should count the black circles as well.)

A) 19 B) 32 C) 14 D) 5



13. The rectangle CSKN below is divided into 24 identical squares having a side length of 2cm each. Find the area of the unshaded region of the following figure.



A) 40 cm^2 B) 50 cm^2

C) 60 cm^2 D) 70 cm^2

14. If $70000 + \bigstar + 40+5=70645$, find the value of $\bigstar$.

.

A) 6000 B) 600 C) 60 D) 6

15. Find the missing number of the following pattern.



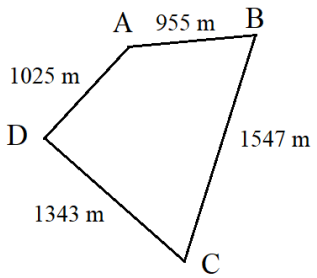
A) 850 B) 825 C) 805 D) 795

16. Find the number that should be filled in the blank.

2 km 5 m 7 cm= ____ cm

A) 2507 B) 20507 C) 200507 D) 205070

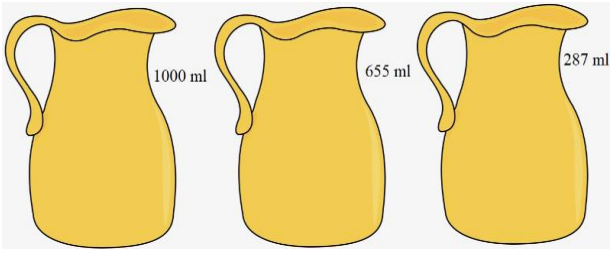
17. Mr. Josh travels from point A to point B, then to point C, and Mr. Carl travels from point A to point D, then to point C. Find the sum of the distance they traveled.



A) 4870 m B) 4087 m

C) 4257 m D) 3970 m

18. Three water jugs are given, and the numbers represent the amount of water in the jugs. How much more water is needed to fill the container with a 2500 ml capacity?

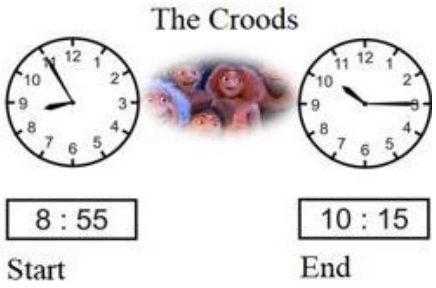


A) 810 ml B) 748 ml

C) 650 ml D) 558 ml

19. The duration of the movie “The Croods” is ___ hours___ minutes.

A) 1 hour 40 minutes
B) 1 hour 30 minutes
C) 1 hour 20 minutes
D) 1 hour 10 minutes

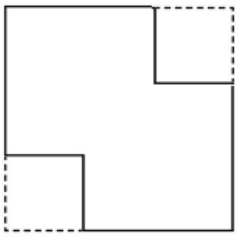


20. Find all the letters with parallel lines. **H, N, W, X, Y, Z**

A) H,N,Z B) N,W,Z C) W,X,Y,Z D) H,N,Z,W

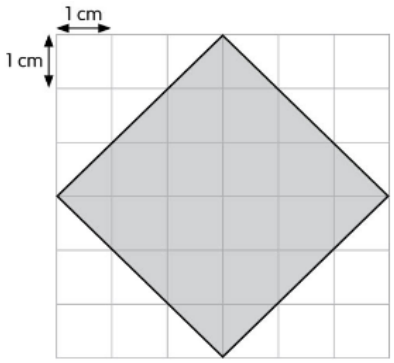
21. A square of side 7 cm is cut out of the corners 2 cm as given below. Find the perimeter of the figure.

A) 20 cm B) 24 cm C) 28 cm D) 32 cm



22. Find the area of the shaded region in the following figure.

A) 9 cm^2 B) 12 cm^2 C) 15 cm^2 D) 18 cm^2



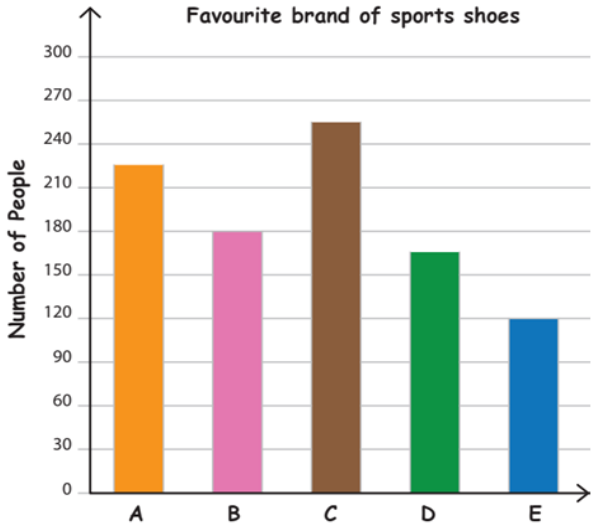
23. Find the smallest decimal.
5.405, 5.450, 5.054, 5.5

A) 5.405 B) 5.450 C) 5.054 D) 5.5

24. Round the number 56873 to the nearest hundred.

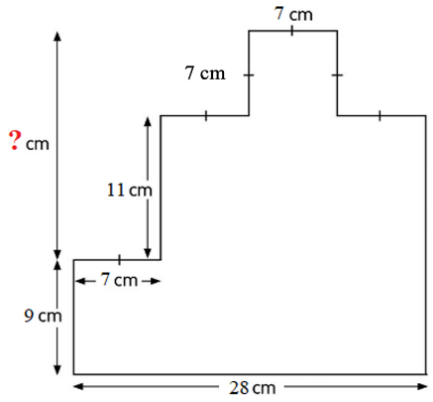
A) 56800 B) 56900 C) 57000 D) 56870

25. The bar graph below shows the number of people who like different brands of sports shoes. How many more people like Brand B than Brand E?



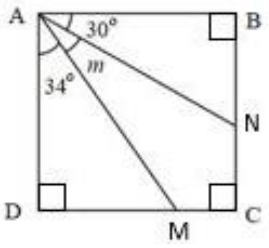
A) 50 B) 60
C) 70 D) 80

26. Which number should replace the question mark in the given figure?



A) 18 B) 27
C) 20 D) 34

27. ABCD is a square. Find the measure of angle ∠MAN.



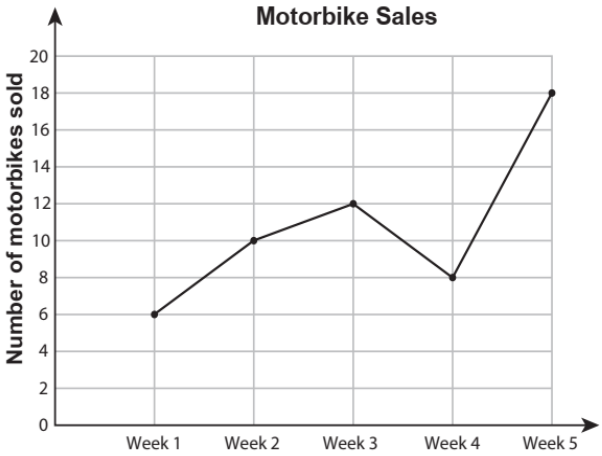
A) 33^0 B) 36^0
C) 25^0 D) 26^0

28. Order the given numbers from the smallest to the greatest.

$5\frac{2}{5}, \frac{25}{4}, 6$.

A) $5\frac{2}{5}, \frac{25}{4}, 6$ B) $\frac{25}{4}, 6, 5\frac{2}{5}$ C) $5\frac{2}{5}, 6, \frac{25}{4}$ D) $6, \frac{25}{4}, 5\frac{2}{5}$

29. The line graph shows the number of motorbikes sold each week. How many motorbikes were sold in the first three weeks?



A) 18 B) 26
C) 28 D) 36

30. Which of the following number is the largest?

A) 8.723 B) 9.216 C) 9.30 D) 8.70

31. Find the missing value of $7 \times \square = 84 - 49$.

A) 5 B) 7 C) 12 D) 18

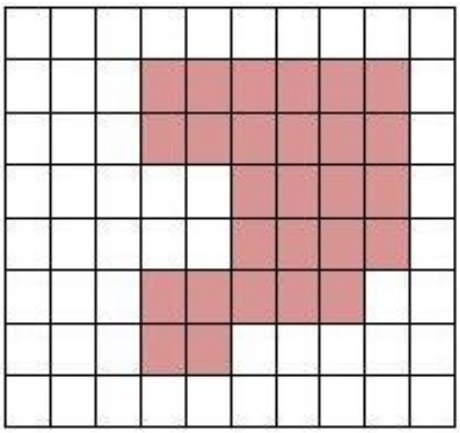
32. Find the missing value of $10 \times 10 \times 10 \times 10 = 10 \times 20 \times \square$.

A) 10 B) 20 C) 50 D) 100

33. Given $24 \times 24 > Y$. What is the largest integer that can replace Y?

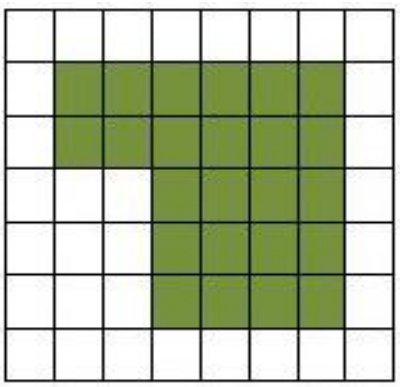
A) 577 B) 576 C) 575 D) 574

34. Each square on the grid is 1 unit square. Find the perimeter of the shaded figure.



A) 24 B) 25
C) 27 D) 28

35. Each square on the grid is 1 unit square. Find the area of the shaded figure.



A) 24 B) 26
C) 28 D) 32

36. The clock shows the time that Mrs. Cara got off of work on Saturday evening. She went to work at 11:00 A.M. How long did she work?



A) 6h B) 6h 30m C) 7h D) 7h 30m

37. If $13, 18, 24, \ldots, 39, 48$. Find the missing number.

A) 28 B) 31 C) 33 D) 36

38. Zeke loves reading. He read four books in January, three books in February, seven books in March, and six books in April. Find the average of books Zeke reads per month.

A) 4 B) 5 C) 6 D) 7

39. What is ●+■+▲ ?

$$\begin{array}{r} 6\bullet 9 \\ +\ \blacksquare 7\blacktriangle \\ \hline 1027 \end{array}$$

A) 12 B) 15 C) 17 D) 19

40. Given the numbers 285, 349, 174, and 444. What is the number we get when we round the numbers to the nearest hundreds and then sum all the rounded ones?

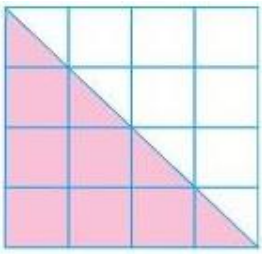
A) 1400 B) 1300 C) 1200 D) 1100

Answers:

1. A) 9 **2.** B) 8760 **3.** A) 20 **4.** D) 10990, 10110, 10101, 10099, 10009 **5.** A) 127
6. B) 11 **7.** D) 66 **8.** A) 15 **9.** D) 10 **10.** C) 3 USD **11.** D) 21 **12.** A) 19
13. C) 60 cm^2 **14.** B) 600 **15.** C) 805 **16.** C) 200507 **17.** A) 4870 m **18.** D) 558 ml
19. C) 1 hour 20 minutes **20.** D) H, N, Z, W **21.** C) 28 cm **22.** D) 18 cm^2
23. C) 5.054 **24.** B) 56900 **25.** B) 60 **26.** A) 18 **27.** D) 26^0 **28.** C) $5\frac{2}{5}$, 6, $\frac{25}{4}$
29. C) 28 **30.** C) 9.30 **31.** A) 5 **32.** C) 50 **33.** C) 575 **34.** D) 28 **35.** A) 24
36. D) 7h 30m **37.** B) 31 **38.** B) 5 **39.** B) 15 **40.** C) 1200

Category-2 IMC 2022

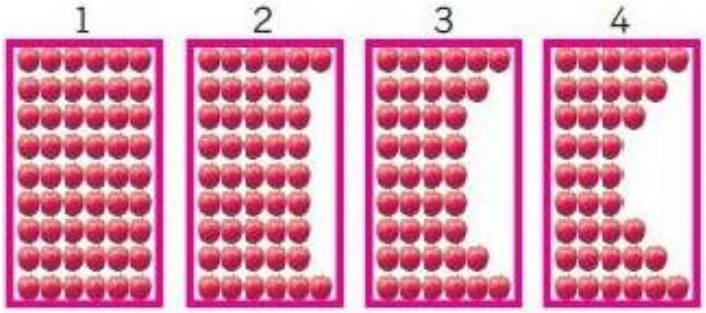
1. Find the area of the shaded triangle, in square units.



A) 8 B) 6

C) 6.5 D) 7.5

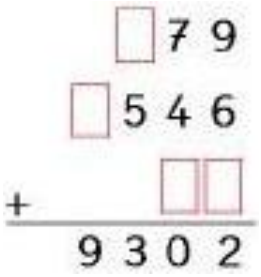
2. The number of apples in each box follows a rule. How many apples are there in the fifth box?



A) 40 B) 37

C) 38 D) 1

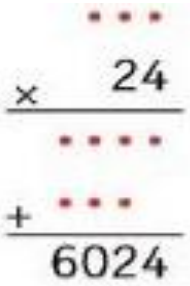
3. Find the sum of missing digits.



A) 21 B) 28

C) 14 D) 22

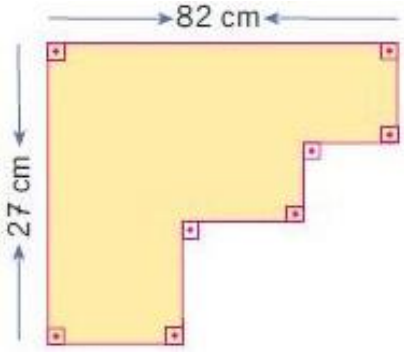
4. Find the sum of the digits of multiplicand.



A) 4 B) 9

C) 7 D) 8

5. Find the perimeter of given figure.



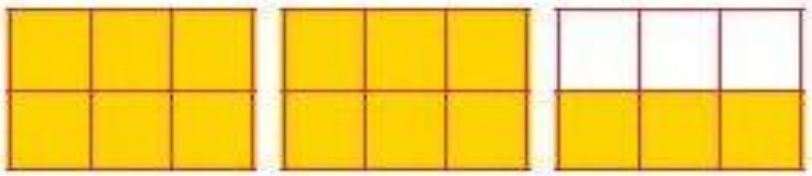
A) 2214 B) 1107

C) 218 D) 109

6. How many pages can Tito read in 12 minutes if he can read 135 pages in an hour and a half?

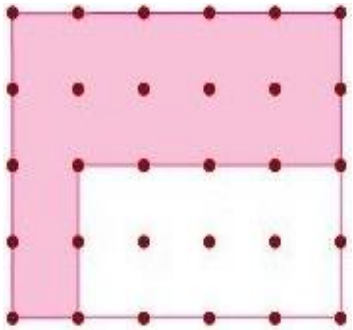
A) 18 B) 15 C) 13.5 D) 27

7. Which fraction does not the figure show?



A) $\frac{5}{2}$ B) $12\frac{1}{3}$ C) $\frac{15}{6}$ D) $2\frac{3}{6}$

8. What percentage of the figure is shaded?



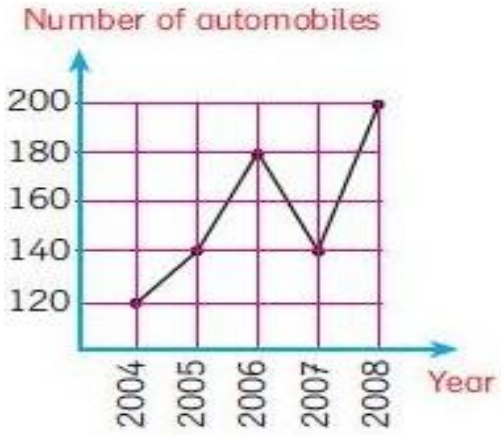
A) 80% B) 8%

C) 12% D) 60 %

9. The line graph shows the number of automobiles sold by a company between the years 2004 and 2008. Find the mean of the number of automobiles sold.

A) 156 B) 160

C) 120 D) 2006



10. A car travels 20 km on 2 liters of gasoline. How many liters of gasoline are needed to drive 35 km?

A) 3.5 B) 3 C) 1.5 D) 0.5

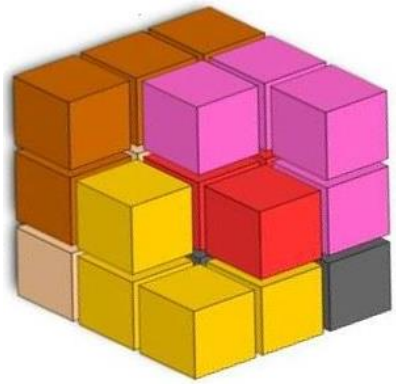
11. Calculate $75 \div 5 \times 5 - 3$.

A) 75 B) 72 C) 0 D) 50

12. If 20% of a number is 12, what is 40% of that number?

A) 40 B) 18 C) 20 D) 24

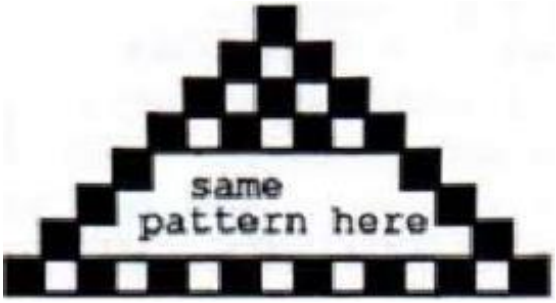
13. How many cubes are needed to complete a cube?



A) 27 B) 23

C) 6 D) 4

14. According to the following figure, what is the difference between the numbers of black and white squares?



A) 8 B) 9

C) 10 D) 12

15. Bhuripat was going to multiply 0.06 by 3.56, but he forgot to input the decimal points and the calculator shows the result as 2136. What would the result be if he input the numbers correctly?

A) 0.2136 B) 2.136 C) 21.36 D) 213.6

16. A and B are whole numbers where A x B = 32. What is the smallest possible value of A + B?

A) 12 B) 18 C) 33 D) 32

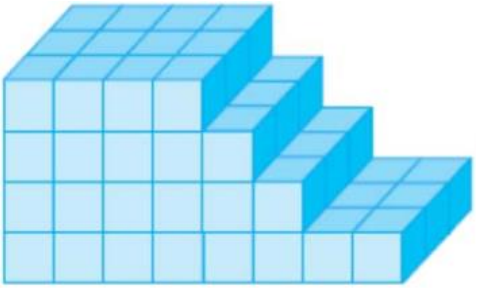
17. On a map, a 9-centimeter length represents 72 kilometers in real life. How many kilometers does a 15- centimeter length represent?

A) 150 km B) 110 km C) 120 km D) 180 km

18. In a school, there are five periods of lessons. After each 45 minutes lesson period, there is a 10 minutes break. If the first lesson starts at 08:35, what time will the school be closed?

A) 13:00 B) 13:30 C) 14:00 D) 15:00

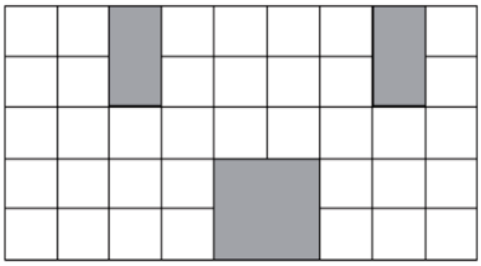
19. Each of the small cubes in the following figure has a dimension of 1cm x 1cm x 1cm. Find the total surface area of the figure.



A) 119 cm^2 B) 118 cm^2

C) 117 cm^2 D) 220 cm^2

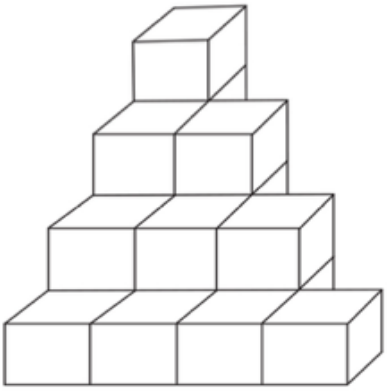
20. The cost of painting each unit square is 5 USD. What is the cost of the following painting, given that the shaded area is the painted part?



A) 20 USD B) 30 USD

C) 40 USD D) 50 USD

21. How many small cubes are there in the following figure?



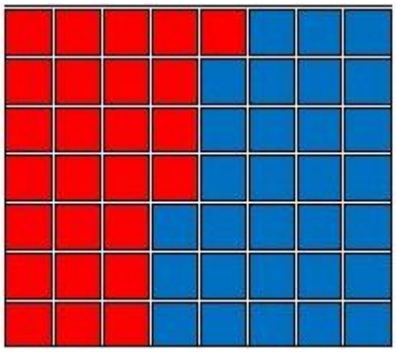
A) 17 B) 18

C) 19 D) 20

22. Given $4(\triangle + 5) = \boxtimes \times 3 + 2 \times 10$. If $\triangle$ and $\boxtimes$ are single digit numbers. Find the greatest value of $\triangle + \boxtimes$.

A) 7 B) 8 C) 12 D) 14

23. According to the figure given below, what is the ratio of red squares to blue squares?



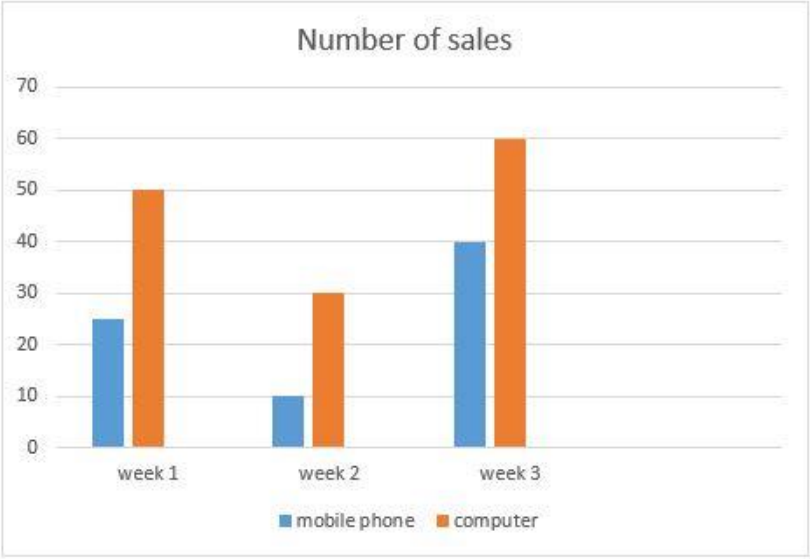
A) 15:14 B) 14:15

C) 13:15 D) 15:13

24. According to the following chart, find the difference between the total number of computers and mobile phones.

A) 65 B) 75

C) 60 D) 50



25. The largest 5-digit odd number written using the numerals 6, 9, 0, 2 and 3 is ★ and the smallest 5-digit even number is ♥. (Without repeating the digits). Find the ★ − ♥.

A) 75807 B) 75933 C) 75951 D) 93834

26. If $[(19+5)\times 2-8]\div 4=$ ☀. Find the value of ☀.

A) 0 B) 10 C) 29 D) 46

27. Jan has a total of 36 kg of walnuts. He sold 50% of his walnuts in the market and 25% online. How much money did he earn in total?



A) 468 USD B) 234 USD

C) 390 USD D) 351 USD

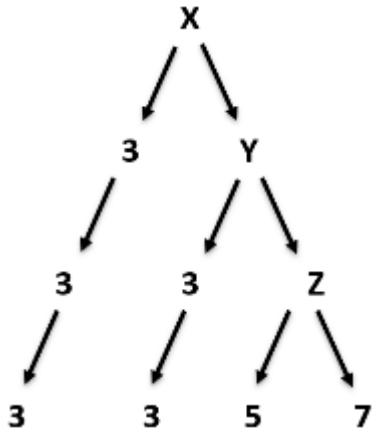
28. If $\frac{4}{7}>\square>\frac{4}{9}$, which of the following can replace the $\square$?

A) $\frac{2}{3}$ B) $\frac{1}{8}$ C) $\frac{1}{2}$ D) $\frac{5}{7}$

29. How many numbers between 71 and 182 are multiple of 16?

A) 7 B) 8 C) 12 D) 13

30. What is X according to the multiplier tree given below?



A) 9 B) 39

C) 105 D) 315

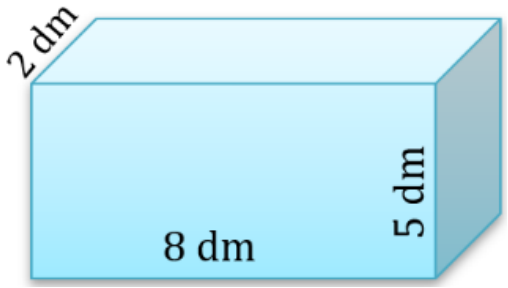
31. Tom and Jerry share the rent of the apartment in a ratio of 5:3. The electricity bill is 1880 USD. How much Tom pays?

A) 1175 USD B) 940 USD C) 880 USD D) 705 USD

32. The side lengths of a rectangle water tank are 8dm, 5dm and 2dm.
How many litres of water can it hold? ($1dm^3$=1litre)

A) 40 liters B) 60 liters

C) 80 liters D) 100 liters



33. How many two-digit numbers are divisible by 4?

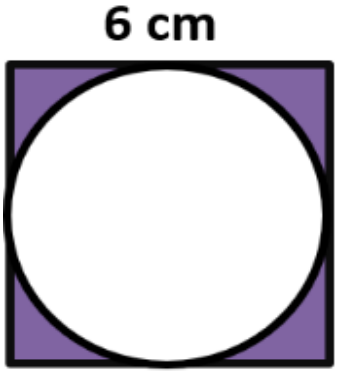
A) 21 B) 22 C) 23 D) 24

34. How many of the largest-size circles can be placed in the following rectangle?



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

35. Find the area of the shaded region. ($\pi = 3$)



A) 18 B) 12

C) 9 D) 6

36. What letter is in the 30^{th} position in the pattern below?

I M C O I M C O I M C O . . .

A) I B) M C) C D) O

37. According to the following multiplication table, what is the **b – a?**

x		7	9
		b	45
a		56	72

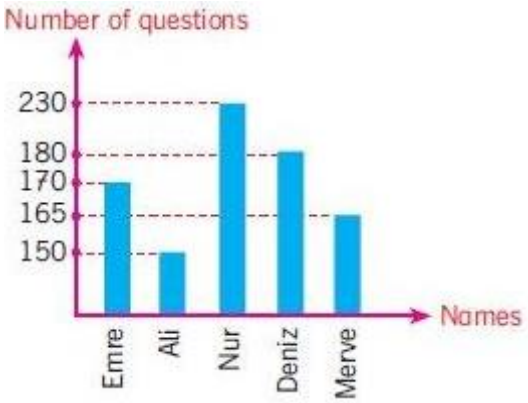
A) 27 B) -3

C) 13 D) -13

38. If twice of a number is 2 less than 4 multiplied by 3, find the number.

A) 3 B) 5 C) 11 D) 15

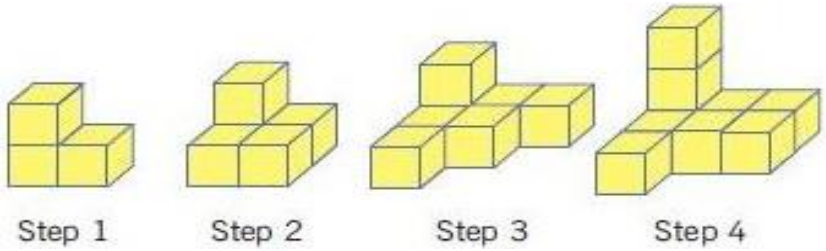
39. The graph below shows the number of questions that five students answered correctly in an exam. Find the arithmetic mean of the five students' scores.



A) 449 B) 169

C) 179 D) 269

40. The number of cubes in each cube structure below is determined by a rule. How many cubes will there be in the seventh structure?



A) 11 B) 13 C) 12 D) 15

Answers:

1. A) 8 **2.** C) 38 **3.** B) 28 **4.** D) 8 **5.** C) 218 **6.** A) 18 **7.** B) $12\frac{1}{3}$ **8.** D) 60 %

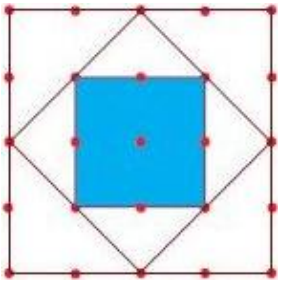
9. A) 156 **10.** A) 3.5 **11.** B) 72 **12.** D) 24 **13.** D) 4 **14.** A) 8 **15.** A) 0.2136
16. A) 12 **17.** C) 120 km **18.** A) 13:00 **19.** B) 118 cm^2 **20.** C) 40 USD **21.** D) 20
22. D) 14 **23.** C) 13:15 **24.** A) 65 **25.** A) 75807 **26.** B) 10 **27.** D) 351 USD

28. C) $\frac{1}{2}$ **29.** A) 7 **30.** D) 315 **31.** A) 1175 USD **32.** C) 80 liters **33.** B) 22

34. D) 6 **35.** C) 9 **36.** B) M **37.** A) 27 **38.** B) 5 **39.** C) 179 **40.** D) 15

Category-3 IMC 2022

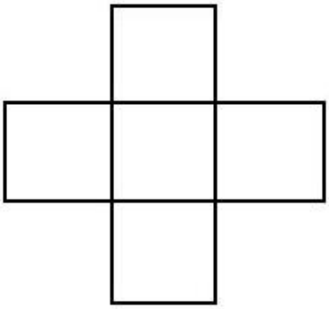
1. What percentage of the figure is white?



A) 75% B) 25%

C) 55% D) 20%

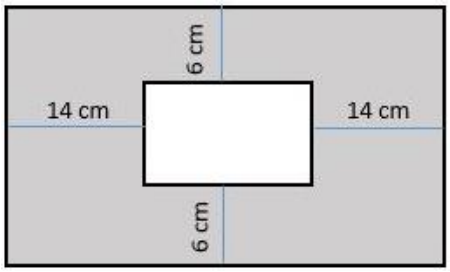
2. In the figure, the perimeter of each small square is 56 cm. Find the perimeter of the whole shape.



A) 280 cm B) 168 cm

C) 300 cm D) 224 cm

3. The figure shows two rectangles. The length of the bigger rectangle is 36 cm, and the perimeter of the smaller rectangle is 22 cm. Find the area of the shaded region.



A) 540 cm^2 B) 564 cm^2

C) 516 cm^2 D) 534 cm^2

4. Yamato owes 780 USD to his VISA credit account. He returns three items costing 43.10 USD, 36.80 USD, and 125.00 USD and receives credit on his account. Next, he makes a payment of 400 USD to his VISA account. He then purchases 82.75 USD. How much does Yamato still owe?

A) 584.90 USD B) 1302.15 USD C) 502.15 USD D) 257.85 USD

5. How many degrees is the smaller angle between the hour hand and the minute hand on a clock that reads eight o'clock?

A) 100^0 B) 120^0 C) 150^0 D) 170^0

6. Faris bought rice, carrots, tomatoes, onions, and oil. The price of 1 kg rice is 3.53 USD, 1 kg carrots are 1.19 USD, 1kg tomatoes are 1.38 USD, 1kg onion is 2.72 USD, and 1lt oil is 2.61 USD. How much did Faris pay according to this receipt?



A) 31.48 USD B) 34.90 USD C) 34.09 USD D) 30.10 USD

7. If $\frac{a}{2} = b$, then find $\frac{5ab}{a^2 + b^2}$.

A) 2 B) $2a$ C) $2b$ D) 10

8. Given that $7x + 17 = 49$, find the value of $\sqrt{7x + 49}$.

A) 7 B) 8 C) 9 D) 10

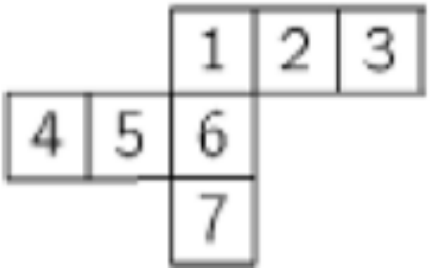
9. If a is 9 more than b, b is 4 more than c, and d is 3 more than c, find the positive difference between b and d.

A) 1 B) 2 C) 0 D) 5

10. Calculate $3 \times (49 - 26) + 5(2 + 3)^2 - (6 - 4^2)$.

A) 204 B) 240 C) 250 D) 200

11. Alisha wants to fold a cube from a paper net. By mistake, she drew seven squares on her sheet instead of 6 squares. Which squares can she remove so that the figure remains connected and she can fold a cube from it?



A) 4 or 7 B) 6 or 3

C) 3 or 4 D) 3 or 7

12. Given that a, b, and c are natural numbers. If $a \times b = 8 \times c + 4$, which of the following is always true?

A) a+b is odd B) a×b×c is even C) a-b is even D) a+b+c is odd

13. Calculate $\frac{(0.2)^3}{(0.02)^3}$.

A) 1 B) 0.1 C) 10 D) 1000

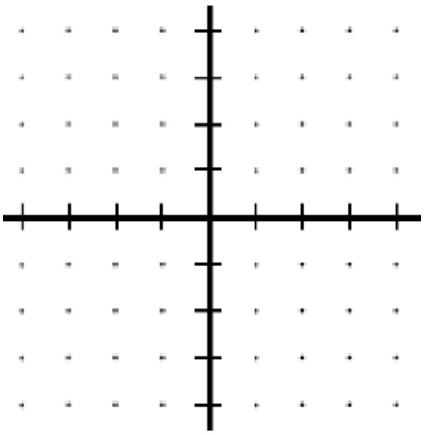
14. If $\oplus$ is an operation defined as $\oplus b = \frac{a-b}{a+b}$, find the $(6 \oplus 4) \oplus 3$.

A) $\frac{8}{7}$ B) $-\frac{8}{7}$ C) $\frac{7}{8}$ D) $-\frac{7}{8}$

15. Points A, B, C and D have these coordinates:
A(3, 1), B(3,-1), C(-3,-1) and D(-3, 0). Find the area of quadrilateral ABCD.

A) 9 square units B) 10 square units

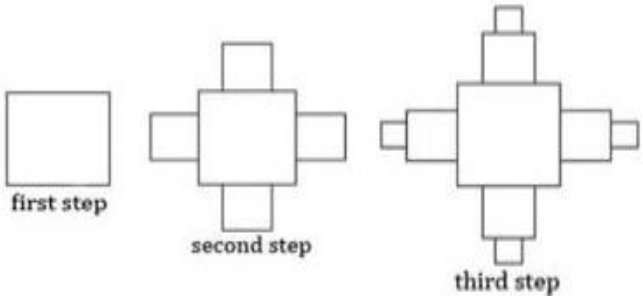
C) 11 square units D) 12 square units



16. Louis has a string wire 32 cm long. If he bends it and makes a square, what will be the area of that square?

A) 36 cm^2 B) 49 cm^2 C) 64 cm^2 D) 81 cm^2

17. According to the following pattern, how many squares will be used to prepare the 6^{th} step?



A) 9 B) 17

C) 14 D) 21

18. In the equation below, let a, b and c be integers and x = 2a - 4b + 5c.
If we increase a by 1, c by 3 and decrease b by 2, what would be the change in the number x?

A) increase by 13 B) decrease by 13 C) decrease by 25 D) increase by 25

19. If $-4 \le a \le 3$ and $-3 \le b \le 5$ find the greatest value of $a^2 - b^2$.

A) 9 B) 16 C) 25 D) 36

20. If $x + y = 7$, $y + z = 5$ and $z + x = 12$, then find the value of xyz .

A) 12 B) 24 C) 30 D) 0

21. If $152x = 63^2 - 13^2$ find the value of x .

A) 30 B) 25 C) 20 D) 15

22. Find the sum of all positive factors of 90.

A) 260 B) 252 C) 234 D) 235

23. Evaluate $\frac{1}{4} \div \frac{1}{4} \div \frac{1}{4} \div 4 \div 4 \div 4$.

A) 16 B) 4 C) $\frac{1}{4}$ D) $\frac{1}{16}$

24. If a, b, c, d, e are positive integers, then find the digit in the unit place of the expression $1^a + 5^{2b} + 6^{3c} + 10^{4d} + 11^{5e}$.

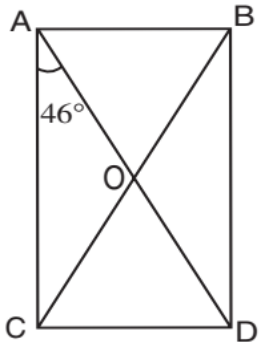
A) 2 B) 3 C) 6 D) 8

25. If $\sqrt{4^n} = 16$, then find the value of n.

A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) 2 D) 4

26. The figure $ABCD$ is a rectangle. If $\angle CAD = 46^0$, then find the measure of $\angle ABC$.

A) 54^0 B) 50^0 C) 48^0 D) 44^0



27. How many numbers between 80 and 320 are exactly divisible by 2, 3, and 10?

A) 7 B) 8 C) 9 D) 10

28. What is the following number in this sequence 2, 5, 9, 14, 20, … ?

A) 25 B) 26 C) 27 D) 28

29. Find the last digit of 7×3^{2007}.

A) 7 B) 3 C) 9 D) 1

30. On a farm, the ratio of horses to cows is 4:3, and the ratio of cows to goats is 4:5. Find the ratio of goats to horses.

A) 15:16 B) 3:4 C) 4:3 D) 16:15

31. A tank is $\frac{1}{6}$ full. When 330 liters of water are added to the tank, it is then $\frac{5}{8}$ full. How many additional liters of water are required to fill the tank?

A) 250 B) 260 C) 270 D) 300

32. A data set of 5 positive integers is given with the following conditions;

- Only 8 repeats more than once
- Median of the data is 9 (middle value in sorted data)
- Mean of the data is 10 (the arithmetic mean, or average)

Which of the below numbers can be the largest possible value in this data set?

A) 14 B) 15 C) 17 D) 18

33. If A is the product of four eights and B is the sum of eight fours. What is the value of $A \div B$?

A) 2^7 B) 2^4 C) 2^5 D) 2^8

34. If $3^{-4} = \frac{1}{x} \times \frac{1}{x}$ and $y^{-3} = \frac{1}{8} \times \frac{1}{8}$, find $xy - 2y + x$.

A) 10 B) 19 C) 28 D) 37

35. Joseph completed the bike track in 180 seconds and Jasmine in 150 seconds. If they started at the same time, how many minutes would they meet again after they started?



A) 9 B) 12

C) 15 D) 18

36. Find the value of $(-5)^{-3}$.

A) -125 B) 125 C) $-\frac{1}{125}$ D) $\frac{1}{125}$

37. Nataly makes some purple paint. She mixes red, blue, and white paint in a ratio of 3:5:1. She uses 650 ml of blue paint. How much purple paint does she have?

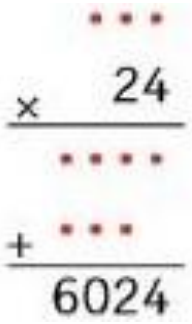
A) 1000 B) 1040 C) 1110 D) 1170

38. In a family, the father's age is five times the child's. Mother is four years younger than father. 6 years later, the sum of the ages of the father, mother, and child is 91. What is the child`s current age?

A) 15 B) 13 C) 9 D) 7

39. Find the sum of the digits of multiplicand.

A) 4 B) 9 C) 7 D) 8



40. Find x in this equation $\left(1-\frac{1}{2}\right)\left(1-\frac{1}{3}\right)\left(1-\frac{1}{4}\right)\cdots\left(1-\frac{1}{x}\right)=\frac{1}{79}$.

A) 81 B) 78 C) 80 D) 79

Answers:

1. A) 75% **2.** B) 168 cm **3.** C) 516 cm^2 **4.** D) 257.85 USD **5.** B) 120^0
6. C) 34.09 USD **7.** A) 2 **8.** C) 9 **9.** A) 1 **10.** A) 204 **11.** D) 3 or 7

12. B) a×b×c is even **13.** D) 1000 **14.** D) $-\frac{7}{8}$ **15.** A) 9 square units **16.** C) 64 cm^2

17. D) 21 **18.** D) increase by 25 **19.** B) 16 **20.** D) 0 **21.** B) 25 **22.** C) 234

23. D) $\frac{1}{16}$ **24.** B) 3 **25.** D) 4 **26.** D) 44^0 **27.** B) 8 **28.** C) 27 **29.** C) 9 **30.** A) 15:16

31. C) 270 **32.** B) 15 **33.** A) 2^7 **34.** D) 37 **35.** C) 15 **36.** C) $-\frac{1}{125}$ **37.** D) 1170

38. D) 7 **39.** D) 8 **40.** D) 79

Category-4 IMC 2022

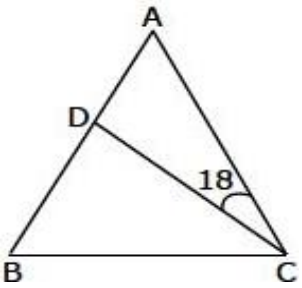
1. If $a = \left(2 - \frac{1}{2}\right)\left(2 - \frac{1}{3}\right)\left(2 - \frac{1}{4}\right)\cdots\left(2 - \frac{1}{15}\right)$ and $b = \left(1 + \frac{1}{3}\right)\left(1 + \frac{1}{5}\right)\left(1 + \frac{1}{7}\right)\cdots\left(1 + \frac{1}{29}\right)$.

Find the product of a and b.

A) $\frac{29}{30}$ B) $\frac{1}{2}$ C) 4^7 D) 2

2. In the figure, |AB|=|AC|, |BC|=|DC| and m(∠DCA)=18^0. Find m(∠BCD).

A) 18^0 B) 72^0 C) 48^0 D) 36^0



3. If $x, y \in Z$ and $2^{x+1} + 2^x = 3^{y+2} - 3^y$, then find $x + y$.

A) 2 B) 4 C) 3 D) 5

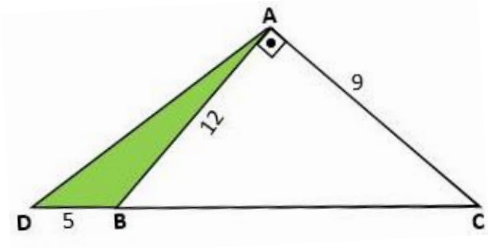
4. If $\frac{a}{2} = \frac{b}{3} = \frac{c}{4}$ and $3a - b + 2c = 66$, then find $a + b + c$.

A) 36 B) 24 C) 30 D) 54

5. In the figure AB⊥AC, |AC|=9 cm, |AB|=12 cm and |DB|=5 cm. Find the area of triangle ADB.

A) 18 cm^2 B) 72 cm^2

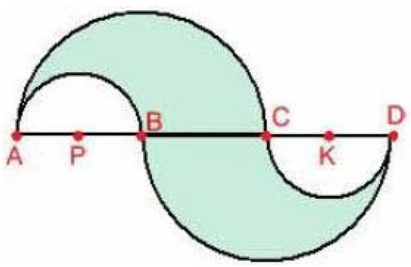
C) 69 cm^2 D) 28 cm^2



6. B, C, P, and K are the centers of four circles in the given figure. If |AB|=|BC|=|CD|=6 cm, find the area of the shaded region.

A) 18π B) 36π

C) 27π D) 9π



7. If $x + y = 3,\ y + z = 7$ and $x + z = 6$, find the value of $x \times y \times z$.

A) 10 B) 20 C) 100 D) 50

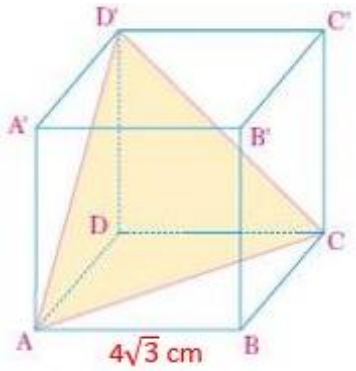
8. Ricardo needs 75% on a final test to receive a C for a course. If the exam has 180 questions, how many questions must he answer correctly to get C?

A) 150 B) 93 C) 105 D) 135

9. Mr. Tito is 2 years more than 3 times as old as his son. If the difference between their ages is 24, how old is Mr. Tito?

A) 35 B) 12 C) 24 D) 29

10. Find the area of triangle *ACD´* in the cube if the edge length of the cube is $4\sqrt{3}$ cm.



A) $24\sqrt{3}$ cm² B) $24\sqrt{2}$ cm²

C) $6\sqrt{12}$ cm² D) $6\sqrt{2}$ cm²

11. Given that $f(x) = \begin{cases} x - 2 & if \quad x > 3 \\ x^2 + 3x - 2 & if \quad 1 < x \leq 3 \\ x + 6 & if \quad x \leq 1 \end{cases}$, find $f(-2) + f(0) - f(1) + f(5)$.

A) 6 B) 12 C) 4 D) -10

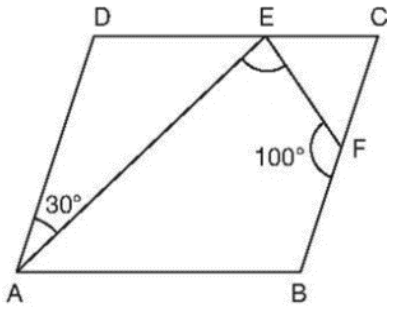
12. If $a = 2000$ and $b = |3a^2 - a + 3| - 3|a^2 + 1| + 11a + 1$, find the value of b.

A) 0 B) 20001 C) 1 D) 2000

13. Given $a^2 + b^2 = 43$ and $a \times b = 9$. Find the positive value of $(a - b)$.

A) 12 B) 9 C) 34 D) 5

14. According to the following parallelogram, find the sum of angles ∠AED and ∠FEC.



A) 70^0 B) 80^0
C) 90^0 D) 110^0

15. Given that f(x) = 5 – x and g(x) = x + 4, find the area enclosed by f(x), g(x) and x-axis.

A) 20 square unit B) 20.25 square unit
C) 20.50 square unit D) 20.75 square unit

16. Given that $\frac{6^m + 6^m + 6^m}{3^m + 3^m + 3^m + 3^m + 3^m + 3^m} = 32$, find the value of m.

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

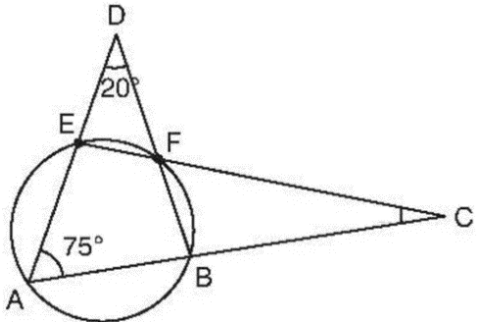
17. Given a and n are natural numbers where $(a \times 10^n)$ is the scientific notation of a 20-digit natural number, find the maximum difference of $n - a$.

A) 19 B) 18 C) 30 D) 40

18. Given that $2^a = 40$, $3^b = 230$, $5^c = 620$, which of the following is correct?

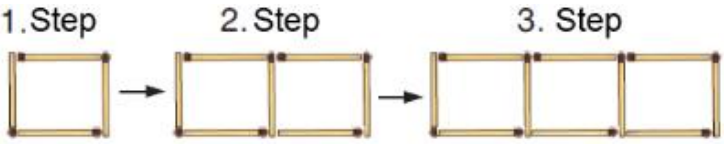
A) b<a<c B) a<b<c C) c<b<a D) b<c<a

19. The following figure shows that points A, B, E, and F are on the circle. Find the sum of angles ∠CBF and ∠CFB.



A) 170^0 B) 180^0
C) 90^0 D) 110^0

20. According to the following progression, how many matchsticks will be at the 100^{th} step?

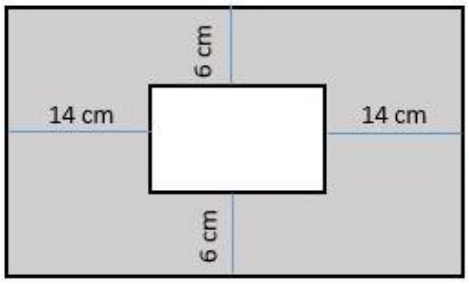


A) 300 B) 301
C) 302 D) 400

21. How many numbers between 80 and 320 are exactly divisible by 2, 3, and 10?

A) 7 B) 8 C) 9 D) 10

22. The figure shows two rectangles. The length of the bigger rectangle is 36 cm, and the perimeter of the smaller rectangle is 22 cm. Find the area of the shaded region.



A) 540 cm^2 B) 564 cm^2
C) 516 cm^2 D) 534 cm^2

23. If $\frac{1}{a^b} = 2$, then find the value of $a^{-6b} - 11$.

A) 53 B) 19 C) 51 D) 3

24. If $\cos\theta = \frac{3}{5}$ and $0 < \theta < 90^0$, find $\tan\theta - \frac{1}{\sin\theta}$.

A) $\frac{8}{15}$ B) $-\frac{8}{15}$ C) $-\frac{1}{12}$ D) $\frac{1}{12}$

25. If $\sqrt[5]{4^n} = 64$, then find the value of n.

A) 10 B) 13 C) 15 D) 18

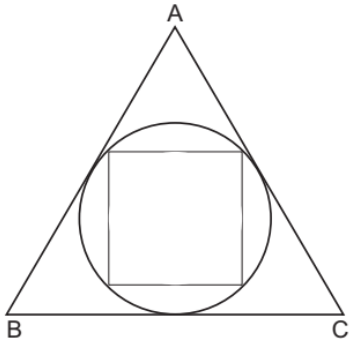
26. If $a - b + c = 0$, then find the value of $a^2 - b^2 + ac + bc$.

A) 0 B) a C) ab D) $c + a$

27. Given that $\frac{1}{a}-\frac{1}{b}=\frac{4}{a-b}$, find $\frac{a}{b}+\frac{b}{a}$.

A) -2 B) -1 C) 1 D) 0

28. A circle is inscribed in an equilateral triangle ΔABC of side 6 cm. What is the area of any square inscribed in the circle?



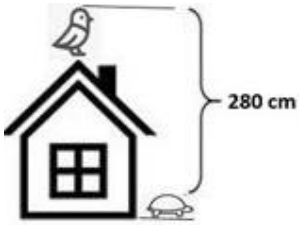
A) $3\ cm^2$ B) $6\ cm^2$

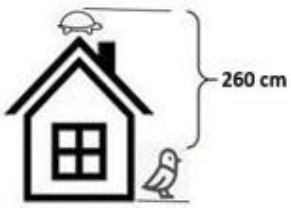
C) $9\ cm^2$ D) $12\ cm^2$

29. Calculate $\left(\frac{\sqrt{561^2-459^2}}{4\frac{2}{7}\times 0.15+4\frac{2}{7}\div\frac{20}{3}}+4\sqrt{10}\right)\div\frac{\sqrt{40}}{3}$.

A) 131 B) 250 C) 242 D) 125

30. How tall is the house?





A) 230 B) 20 C) 540 D) 270 cm

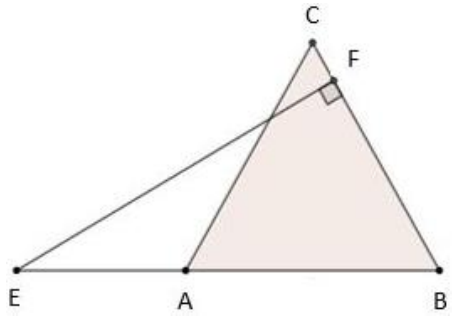
31. What is the following number in this sequence 12, 11, 10, 14, 8, 17, 6, … .

A) 21 B) 20 C) 7 D) 5

32. Solve the equation $3x-(2-x)-4(3-2x)=34$.

A) 60 B) 36 C) 4 D) 2

33. In the triangle below $|AB| = |AC| = |BC| = 12cm$, $|EA| = 8cm$ and $EF \perp BC$. Find $|CF|$.



A) 1 cm B) 1.5 cm
C) 2 cm D) 2.5 cm

34. The operation is defined on the set $A = \{1, 2, 3, 4, 5\}$ as shown in the table. Find x if $[(2 \bigstar x) \bigstar 4] \bigstar 2 = 6$

★	1	2	3	4	5
1	0	2	3	4	5
2	2	3	4	5	6
3	3	4	5	6	7
4	4	5	6	7	8
5	5	6	7	8	9

A) 1 B) 3
C) 5 D) 2

35. Calculate $\frac{1}{\sqrt{0.01}} + \frac{2}{\sqrt{0.04}} + \frac{3}{\sqrt{0.09}}$.

A) 0.3 B) 30 C) 10 D) 20

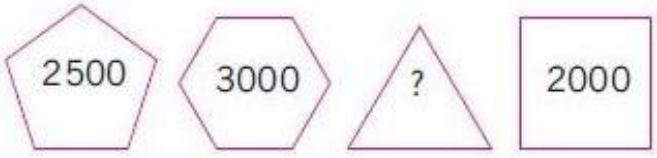
36. Calculate $\sqrt[4]{78 + \sqrt[3]{25 + \sqrt[3]{10 - \sqrt{4}}}}$.

A) 5 B) 2 C) 9 D) 3

37. Find the 25% of 4^{60}.

A) 4^{61} B) 2^{10} C) 2^{59} D) 2^{118}

38. Which number should be in the triangle?



A) 1000 B) 1500 C) 3500 D) 500

39. Calculate $(18 + 3) \div 7 \times 3 - 5 + 1$.

A) 7 B) 3 C) -3 D) 5

40. Given that x and y are integers with $-3 < x \leq 7$ and $-1 \leq y \leq 13$, find the biggest possible value of 3x + 2y.

A) 100 B) 50 C) 27 D) 47

Answers:

1. C) 4^{7} **2.** C) 48^{0} **3.** B) 4 **4.** D) 54 **5.** A) 18 cm^2 **6.** C) 27π **7.** A) 10 **8.** D) 135
9. A) 35 **10.** A) $24\sqrt{3}$ cm^2 **11.** A) 6 **12.** B) 20001 **13.** D) 5 **14.** A) 70^{0}
15. B) 20.25 square unit **16.** A) 6 **17.** B) 18 **18.** C) c<b<a **19.** A) 170^{0} **20.** B) 301
21. B) 8 **22.** C) 516 cm^2 **23.** A) 53 **24.** D) $\frac{1}{12}$ **25.** C) 15 **26.** A) 0 **27.** A) -2
28. B) $6\ cm^2$ **29.** D) 125 **30.** D) 270 cm **31.** B) 20 **32.** C) 4 **33.** C) 2 cm
34. A) 1 **35.** B) 30 **36.** D) 3 **37.** D) 2^{118} **38.** B) 1500 **39.** D) 5 **40.** D) 47

Category-5 IMC 2022

1. Calculate the expression $\left(1-\frac{1}{2^2}\right)\left(1-\frac{1}{3^2}\right)\left(1-\frac{1}{4^2}\right)\cdots\left(1-\frac{1}{99^2}\right)\left(1-\frac{1}{100^2}\right)$.

A) $\frac{101}{200}$ B) $\frac{100}{200}$ C) $\frac{99}{100}$ D) $\frac{99}{200}$

2. If $9^{1-a}=16$, then find 27^a.

A) $\frac{125}{64}$ B) $\frac{27}{16}$ C) $\frac{27}{64}$ D) $\frac{64}{125}$

3. Given the sequence with general term $a_n=5^n\times n!$, then find $\frac{a_n}{a_{n-1}}$.

A) $n-1$ B) 5^n C) $5n$ D) $n!$

4. Given an arithmetic sequence (a_n) with $a_6+a_9=30$, find S_{14}.

A) 180 B) 210 C) 420 D) 450

5. Given that $g(x)=\begin{cases} x^2+5x-6 & x>1 \\ 5 & x=1 \\ 6x-1 & x<1 \end{cases}$, find $\frac{g(2)+g(1)}{g(-2)}$.

A) -1.5 B) 2 C) -2 D) -1

6. If $f(x)+f(x+1)=2x+3$ and $f(3)=4$, find $f(499)$.

A) 500 B) 998 C) 1000 D) 498

7. Simplify $\cos 20^{0} \times \cos 40^{0} \times \cos 60^{0} \times \cos 80^{0}$.

A) $\frac{1}{2}$ B) $\frac{\sqrt{3}}{2}$ C) $\frac{1}{16}$ D) $\frac{\sqrt{3}}{3}$

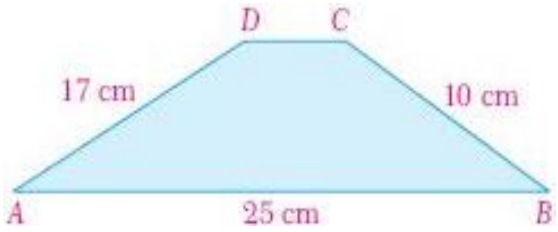
8. If $\frac{(298^{2}-98^{2})-200\times 392}{2a}=16$, find a.

A) 198 B) 25 C) 298 D) 45

9. If $mx^{2}-2(m-1)x+3m-1=0$ has two equal roots, then find the sum of possible value of m.

A) $-\frac{1}{2}$ B) $\frac{3}{2}$ C) $\frac{1}{2}$ D) 1

10. The 8 cm high trapezoid shown is rotated around its side AB. Find the volume of the solid of revolution created.



A) 448π B) 256π

C) 704π D) 653π

11. Find the sum of the roots of $x^{\log_{3} 3x}=9$.

A) $\frac{25}{9}$ B) $3\frac{1}{9}$ C) $3\frac{5}{27}$ D) -1

12. If $f(x)=(3x+2)^{100}$, find $f^{(100)}(10)$ where $f^{(n)}(x)$ denotes the n^{th} derivative of $f(x)$.

A) $100!\times 51^{100}$ B) $100!\times 17^{100}$ C) $10!\times 3^{10}$ D) $100!\times 3^{100}$

13. If $a = 2022$, calculate $b = \left|a^2 - a + 1\right| - \left|a^2 + 1\right| + 2a + 5$.

A) 2023 B) 2025 C) 1 D) 2027

14. Evaluate $\frac{\cos^4 x - \sin^4 x}{\cos^2 x - \sin^2 x} - 1$, if $cos^2x - sin^2x \neq 0$.

A) $\cos x$ B) $\sin x$ C) 1 D) 0

15. If $\tan A = 3$, then find the value of $\frac{\sin A - \cos A}{\sin A + \cos A}$.

A) 2 B) $\frac{1}{2}$ C) $\sin A$ D) $\tan A$

16. If $1^2 + 2^2 + 3^2 + ... + 25^2 = k$, then calculate $2^2 + 4^2 + 6^2 + ... + 50^2$.

A) k^2 B) $2k^2$ C) $4k$ D) $k^2 + 2k$

17. If $\frac{2a + b - c}{a} = \frac{2b + c - a}{b} = \frac{2c + a - b}{c} = k$, then find the value of k.

A) 1 B) 2 C) a D) b

18. If $2^a = 5^b = 100$ and $x = \frac{1}{a} + \frac{1}{b}$, find the value of x.

A) 1 B) $\frac{1}{2}$ C) $\frac{1}{3}$ D) 3

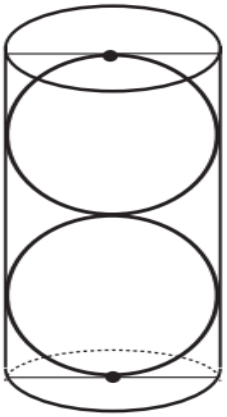
19. Find the remainder when 7^{2022} is divided by 8.

A) 1 B) 3 C) 5 D) 7

20. Evaluate $\int_1^e \left(x \ln x + x \ln^2 x\right) dx$.

A) 0 B) $\frac{e}{2}$ C) $\frac{e^2}{2}$ D) e^2

21. Two identical balls are fit in a cylinder. Find the ratio: $\frac{\text{Volume of two balls}}{\text{Volume of cylinder}}$



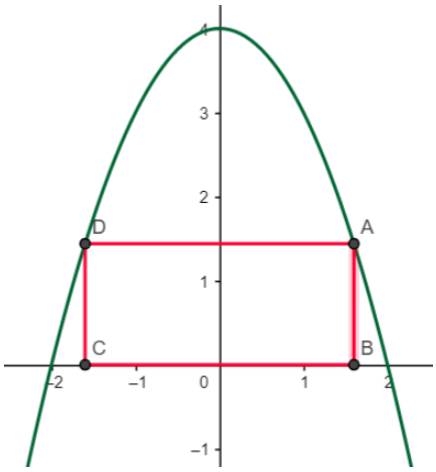
A) $\frac{3}{5}$ B) $\frac{1}{2}$

C) $\frac{1}{3}$ D) $\frac{2}{3}$

22. What number comes next 47592, 2574, 452, … .

A) 28 B) 25 C) 24 D) 52

23. A rectangle is inscribed with its base on the x-axis and its upper corners on the parabola $y = 4 - x^2$. What is the height of the rectangle with the greatest possible area?



A) $\frac{4}{3}$ B) $\frac{8}{3}$

C) 2 D) 3

24. Solve the equation $\log_4 8x - \log_4(x-4) = 2$.

A) 6 B) 8 C) 9 D) 10

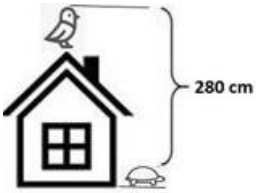
25. Which one of the following is a unit vector perpendicular to $\vec{A} = (5,12)$?

A) $(12,5)$ B) $\left(-\frac{12}{13},\frac{5}{13}\right)$ C) $\left(-\frac{12}{13},-\frac{5}{13}\right)$ D) $\left(-\frac{5}{13},-\frac{12}{13}\right)$

26. $\overline{V} = (1, a)$ is an angle bisector vector of two vectors namely, $\overline{V}_1 = (3, 4)$ and $\overline{V}_2 = (12, 5)$. Which of the following is a possible value for a ?

A) $\frac{5}{7}$ B) $\frac{7}{9}$ C) $\frac{9}{11}$ D) $\frac{11}{13}$

27. How tall is the house?





A) 230 B) 20 C) 540 D) 270 cm

28. Simplify $\frac{8^5 + 4^7 - 2^{13}}{2^{14} + 16^3}$.

A) 4 B) 8 C) 16 D) 2

29. Vladimir wants to text his friend from his mobile phone by using an old keypad given below and when he wants to insert "IMC", he codes it as follows: 444 6 222. According to the given coding system above, how can he input the word "WELCOME"?

1	2 ABC	3 DEF
4 GHI	5 JKL	6 MNO
7 PQRS	8 TUV	9 WXYZ
*	0 +	#

A) 4 1 1 7 7 7 2 2 2 0 0 0 6 4 4 4
B) 9 3 3 2 2 2 6 6 6 6 3 3
C) 9 3 3 5 5 5 2 2 2 6 6 6 6 3 3
D) 9 3 3 5 5 5 2 2 2 6 6 6 3 3

30. Evaluate $\sqrt{4 + \sqrt{9 - 4\sqrt{2}}}$.

A) $1 + \sqrt{2}$ B) $1 - \sqrt{2}$ C) $1 + \sqrt{3}$ D) $1 - \sqrt{3}$

31. Evaluate $\tan^2 45^0 - \cos^2 45^0 + \sin 30^0$.

A) $\frac{1}{4}$ B) $2\frac{3}{6}$ C) $\frac{5}{2}$ D) 1

32. If $2mx^2 + 20x + 5 = 0$ has equal roots ($x_1 = x_2$), find the value of m .

A) 3 B) 4 C) 7 D) 10

33. Evaluate $\frac{2}{\sqrt{49}+\sqrt{47}} + \frac{2}{\sqrt{47}+\sqrt{45}} + \frac{2}{\sqrt{45}+\sqrt{43}} + \ldots + \frac{2}{\sqrt{3}+\sqrt{1}}$.

A) $\frac{1}{7}$ B) 7 C) $5\sqrt{2}$ D) 6

34. If $P(x) = x^4 - 4x^2 + 5x - 2$, what is the constant term of $P(x+2)$?

A) 2 B) 4 C) 6 D) 8

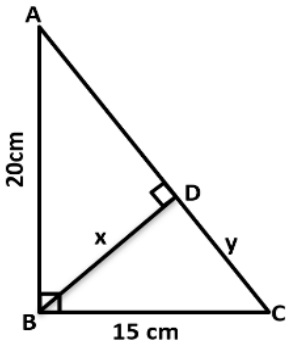
35. If $x^2 - 7 = \sqrt{7}\,x$, then find $x^2 + \frac{49}{x^2}$.

A) 9 B) 21 C) 7 D) 56

36. Given that $\cos 20^0 = \sin\left(\theta + 15^0\right)$, where $\theta + 15^0$ is acute angle, then find the value of θ .

A) 65^0 B) 55^0 C) 45^0 D) 35^0

37. Find the value of $x + y$.



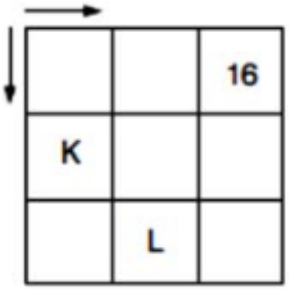
A) 21 B) 23

C) 25 D) 27

38. Calculate $2 + 15 \div 1 + 100 \div [17 + 16 \div (3 - 1)]$.

A) 21 B) 22 C) 23 D) 24

39. According to the following figure, each number in the square is doubled from left to right and halved from the top to down. Find the sum of K and L.



A) 4 B) 5

C) 6 D) 7

40. If $a - \frac{1}{a} = 3\sqrt{2}$, then find the value of $\left(a + \frac{1}{a} \right)^2$.

A) 36 B) 22 C) 20 D) 18

Answers:

1. A) $\frac{101}{200}$ **2.** C) $\frac{27}{64}$ **3.** C) $5n$ **4.** B) 210 **5.** D) -1 **6.** A) 500 **7.** C) $\frac{1}{16}$ **8.** B) 25

9. A) $-\frac{1}{2}$ **10.** C) 704π **11.** B) $3\frac{1}{9}$ **12.** D) $100!\times 3^{100}$ **13.** D) 2027 **14.** D) 0

15. B) $\frac{1}{2}$ **16.** C) $4k$ **17.** B) 2 **18.** B) $\frac{1}{2}$ **19.** A) 1 **20.** C) $\frac{e^2}{2}$ **21.** D) $\frac{2}{3}$ **22.** C) 24

23. B) $\frac{8}{3}$ **24.** B) 8 **25.** B) $\left(-\frac{12}{13},\frac{5}{13}\right)$ **26.** B) $\frac{7}{9}$ **27.** D) 270 cm **28.** D) 2

29. C) 9 3 3 5 5 5 2 2 2 6 6 6 6 3 3 **30.** A) $1+\sqrt{2}$ **31.** D) 1 **32.** D) 10 **33.** D) 6

34. D) 8 **35.** B) 21 **36.** B) 55^0 **37.** A) 21 **38.** A) 21 **39.** A) 4 **40.** B) 22