

1. In the following equation p cannot be divided by 3.

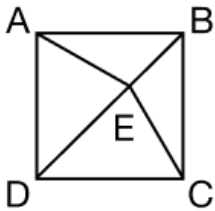
$$3^p \cdot p = 324$$

Then $p = \underline{\hspace{1cm}}$.

- A) 5
- B) 1
- C) 2
- D) 4

(Correct +3, Wrong 0, Blank 0)

2. In the following figure, ABCD is a square with area 36 and BD is a straight line. The ratio between the area of triangle ABE and triangle CDE is 1:2.

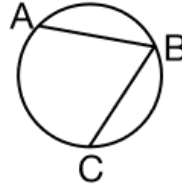


The area of triangle BCE is $\underline{\hspace{1cm}}$ unit squared.

- A) 12
- B) 6
- C) 9
- D) 3

(Correct +3, Wrong 0, Blank 0)

3. In the following figure arc AB is 8 unit, arc BC is 12 unit and arc AC is 10 units.



The angle ABC is $\underline{\hspace{1cm}}$ degrees.

- A) 60
- B) 120
- C) 45
- D) 90

(Correct +3, Wrong 0, Blank 0)

4. Consider the following sequences of numbers.

1, 4, 2, 8, 4, 16, 8, 32, 16, 64, ...

The sum of the first 20 terms on that sequence is $\underline{\hspace{1cm}}$.

- A) 10230
- B) 5115
- C) 258
- D) 127

(Correct +3, Wrong 0, Blank 0)

5. How many integers satisfy the inequalities $7 - x < 1 < 10 - x$?

A) 1
B) 2
C) 3
D) 4

(Correct +3, Wrong 0, Blank 0)

6. Within $x \in [0, 2\pi]$, how many times does $\sin x = \cos x$?

A) 3
B) 1
C) 2
D) 0

(Correct +3, Wrong 0, Blank 0)

7. How many different linear functions f has the property $f \circ f(x) = 4x + 3$?

A) 2
B) 3
C) 0
D) 1

(Correct +3, Wrong 0, Blank 0)

8. James has marbles of four different colors, red, yellow, blue, and green. There are 2 marbles of each color. He is going to randomly choose four out of them.

The probability that he will get four marbles with four different colors is ____.

A) $\frac{16}{35}$
B) $\frac{32}{35}$
C) $\frac{8}{35}$
D) $\frac{24}{35}$

(Correct +3, Wrong 0, Blank 0)

9. Ben has 7 identical marbles and he's going to give all of them to his three little brothers.

If each of the brothers must get at least one, how many different ways can Ben distribute his marble?

- A) 3
- B) 6
- C) 4
- D) 15

(Correct +3, Wrong 0, Blank 0)

10. An odd number p has 8 positive divisors.

How many positive divisors does $4p$ have?

- A) 12
- B) 24
- C) 16
- D) 48

(Correct +3, Wrong 0, Blank 0)

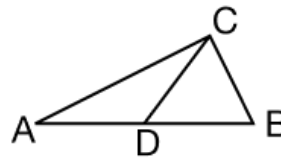
11. Two trains are coming from opposite directions along the two opposite tracks. Both trains have the same length of 600 meters and moves with the same speed of 15 meter per second.

The two trains will take ____ seconds to completely pass each other.

- A) 40
- B) 20
- C) 80
- D) 10

(Correct +3, Wrong 0, Blank 0)

12. In the following, triangle $AD = DB = CD = 4$ units.



The angle ACB is ____ degrees.

- A) 30
- B) 90
- C) 60
- D) 45

(Correct +3, Wrong 0, Blank 0)

13. Ben wants to choose certain number out of 6 flavors of ice cream available and he has 20 different possible combinations.

How many number of flavor does he intend to include in his ice cream?

- A) 3
- B) 4
- C) 1
- D) 2

(Correct +3, Wrong 0, Blank 0)

14. A cube with volume 30 unit cubed is enlarged so that its surface area increases 9 times its original value.

The cube's new volume would be ____ unit cubed.

- A) 270
- B) 810
- C) 60
- D) 90

(Correct +3, Wrong 0, Blank 0)

15. The four digit number $4A2B$ is divisible by both 2 and 9.

What is $B - A$ if we chose the minimum value possible for the number $4A2B$ satisfying the condition above?

- A) 1
- B) 4
- C) 3
- D) 2

(Correct +3, Wrong 0, Blank 0)

16. Two numbers p and q each has 12 and 7 prime divisors respectively.

The minimum number of prime divisors that $p \cdot q$ has is ____ .

- A) 19
- B) 5
- C) 12
- D) 7

(Correct +3, Wrong 0, Blank 0)

17. If p can be divided by 6 and q can be divided by 16 then the largest positive integer that can always divide $4p + 3q$ is ____.

A) 16
B) 48
C) 24
D) 12

(Correct +3, Wrong 0, Blank 0)

18. The point $(5, 9)$ is reflected through the point (a, b) and the image is at $(13, 3)$.

Then $a + b =$ ____.

A) 9
B) 15
C) 6
D) 12

(Correct +3, Wrong 0, Blank 0)

19. The roots of equation $x^2 + bx + c = 0$ are reciprocals of the roots of equation $x^2 + bx + d = 0$.

Then $c + d =$ ____.

A) 1
B) 8
C) 4
D) 2

(Correct +3, Wrong 0, Blank 0)

20. Because of a system error, there are three students who get wrong points for their exam. Andy got 10 less points that he should get, Betty got 5 more points than she should get. And Charlie got 50 instead of his proper points. There are 10 students in the classroom and the average rose by 1 point when the error is fixed.

Charlie's proper point is ____.

A) 60
B) 40
C) 45
D) 55

(Correct +3, Wrong 0, Blank 0)

21. What is the smallest positive integer that has a remainder of 8 when divided by 9 and remainder of 9 when divided by 10. (Write your answer only in numbers.)

(Correct +4, Wrong 0, Blank 0)

22. How many integers between 0 and 20 that have odd numbers of positive factors? (Write your answer only in numbers)

(Correct +4, Wrong 0, Blank 0)

23. A function f satisfies the following properties.

1. $f(0) = 2$

2. $f(x + 2) = 2 \cdot f(x)$

Find $f(16)$. (Write your answer only in numbers.)

(Correct +4, Wrong 0, Blank 0)

24. How many integers satisfy the inequality $|x - 2| \leq 8$? (Write your answer only in numbers.)

(Correct +4, Wrong 0, Blank 0)

25. Find x that satisfies the following equations.

$$4x + 8y = 36$$

$$3y - 2x = 3$$

(Write your answer only in numbers.)

(Correct +4, Wrong 0, Blank 0)

26. The sum of all the internal angle in a regular n -gon is 1800 degrees.

Then $n = \underline{\hspace{1cm}}$. (Write your answer only in numbers.)

(Correct +4, Wrong 0, Blank 0)

27. Palindromic numbers are those who don't change when all their digits are reversed, such as 121 or 87678.

If ABC is the greatest three-digit palindromic numbers whose digits are not all equal, find $A + B + C$. (Write your answer only in numbers)

(Correct +4, Wrong 0, Blank 0)

28. On a remote island in the Pacific Ocean, there are 3 cities called A on the western sea shore, B on the center of the island, and C in the eastern sea shore. Between A and B there are 3 different routes, meanwhile there are 5 between B and C, and 7 between A and C.

How many different routes can one take to move east from A to C without turning back westward in the middle of the journey? (Write your answer only in numbers.)

(Correct +4, Wrong 0, Blank 0)

29. The mode and the mean of the following data are equal and all data must be positive integer less than 10.

1, 4, 9, 5, 2, x , 6, y

Find $x \cdot y$ (Write your answer only in numbers)

(Correct +4, Wrong 0, Blank 0)

30. A perfect solid sphere is cut into two identical hemispheres. The ratio of the sum of the area of the two parts with the initial sphere is $p : q$ where p and q are relatively prime.

Then $p + q = \underline{\hspace{1cm}}$. (Write your answer only in numbers)

(Correct +4, Wrong 0, Blank 0)

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Answer Keys

No	Key	Code
1	D	KMF/3424/PWNDB
2	B	KMF/3446/QJ8ML
3	A	KMF/3444/9UKNB
4	B	KMF/3427/CHMII
5	B	KMF/3426/LX1ZY
6	C	KMF/3452/GOJTY
7	A	KMF/3425/9VBTT
8	C	KMF/3439/97Z1E
9	D	KMF/3436/B3SES
10	B	KMF/3455/FZKZ1
11	B	KMF/3423/QQECK
12	B	KMF/3448/UE2F8
13	A	KMF/3428/XZQPZ
14	B	KMF/3453/YR7KD
15	C	KMF/3458/SBDHI
16	C	KMF/3456/XLM0W
17	C	KMF/3457/Q7KVJ
18	B	KMF/3454/3IYBS
19	D	KMF/3422/WIPYZ
20	D	KMF/3440/PHDQU