
Problem 1**Points 1**

If x is a positive INTEGER, for which of the following equations MUST y be a negative INTEGER?

a) $x \cdot y = 9$

b) $x + y = 7$

c) $x + 2y = 6$

d) $-x - y = 3$

Problem 2**Points 2**

Two sets of 4 consecutive positive integers have exactly one integer in common. Find the difference between the sum of greater four numbers and the sum of four smaller numbers.

a) 7

b) 12

c) 8

d) 4

Problem 3**Point 2**

$$\begin{array}{r} 5 \ A \\ + \\ \hline D \ 4 \ 3 \end{array}$$

In the following correctly worked addition sum, A , B , C and D represent different digits, and all the digits in the sum are different. What is the sum of A , B , C and D ?

a) 23

b) 22

c) 18

d) 14

Problem 4

Points 2

Which of the following CANNOT be an INTEGER if the integer k is a multiple of 12 but not a multiple of 9?

a) $\frac{k}{4}$

b) $\frac{k}{10}$

c) $\frac{k}{12}$

d) $\frac{k}{36}$

Problem 5

Points 2

The sum of x distinct integers greater than zero is less than 75. What is the greatest possible value of x ?

a) 9

b) 10

c) 11

d) 12

Problem 6

Point 1

If the product of 6 integers is negative, at most how many of the integers can be negative?

a) 3

b) 4

c) 5

d) 6

Problem 7

Point 1

If n is even, which of the following cannot be odd?

a) $n + 3$

b) $3n$

c) $3(n-1)$

d) n^2-1

Problem 8

Point 1

For how many integer values of n will the value of the expression $4n + 7$ be an integer greater than 1 and less than 200?

- a) 48 b) 51 c) 50 d) 49

Problem 9

Point 1

What is the greatest possible value of integer n if $6^n < 10000$?

- a) 5 b) 6 c) 7 d) 8

Problem 10

Points 1

If $n > 0$, which of the following expressions CAN BE less than n ?

- c) $2n$ b) $2 + n$ c) n^2 d) 2^n

Problem 11

Point 1

Six years ago Anita was P times as old as Ben was. If Anita is now 17 years old, how old is Ben now in terms of P ?

- a) $\frac{11}{P} + 6$ b) $\frac{P}{11} + 6$ c) $17 - \frac{P}{6}$ d) $\frac{P}{11} - 6$

Problem 12**Point 1**

$(3x + 2) \cdot (2x - 5) \equiv ax^2 + kx + n$. What is the value of $a - n + k$?

- a) 5 b) 9 c) 10 d) 8

Problem 13**Points 1**

Flour, chees, butter and eggs are mixed to prepare khachapuri in proportion 11 : 9 : 3 : 2 respectively. How many kilograms of butter must be taken in 20 kilograms of mixture?

- a) 1.6 b) 1.8 c) 2 d) 2.4

Problem 14**Point 2**

$\clubsuit n$ denotes the number obtained when n is rounded to the nearest tenth. For example $\clubsuit 4.31 = 4.3$.
Then $\clubsuit 0.089 - \spadesuit 1.135 =$

- a) -0.1 b) 1.05 c) -1.05 d) -1.0

Problem 15**Points 3**

Let us define the operation $y \blacksquare x$ for positive integers x and y as $y \blacksquare x = y^{2^x}$.
Calculate $(3 \blacksquare 4) \blacksquare 2$.

- a) 3^8 b) 3^{32} c) 3^{12} d) 3^{24}

Problem 16

Points 3

What digit appears in the units place in the number 2^{320} ?

- a) 2 b) 4 c) 6 d) 8

Problem 17

Points 3

n and p are integers greater than 1, $5n$ is the square of some integer, $75np$ is the cube of some other integer. Find smallest value for $n + p$.

- a) 14 b) 18 c) 20 d) 30

Problem 18

Point 1

If $5x + 4y = 6$ and $4x + 3y = 5$, then what is $x + y$?

- a) 6 b) 1 c) 12 d) 8

Problem 19**Point 1**

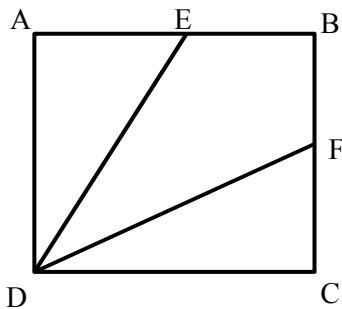
$$12m^2 - 8m - 64 =$$

- a) $4 \cdot (3m + 8) \cdot (m - 2)$ b) $4 \cdot (3m - 8) \cdot (m + 2)$ c) $4 \cdot (3m - 2) \cdot (m + 8)$ d) $4m^2 - 64$

Problem 20**Point 1**

If $m + n = 24$, and $m - n + p = 15$, then $4m + 2p =$

- a) 13 b) 39 c) 64 d) 78

Problem 21**Points 1**

$ABCD$ is a square of side 3, and E and F are the mid points of sides AB and BC respectively. What is the area of the quadrilateral $EBFD$?

- a) 3 b) 4 c) 4.5 d) 6

Problem 22

Points 1

A triangle has sides 4, 7, and x . Which of the following could be the perimeter of the triangle?

- a) 11 b) 14 c) 22 d) 18

Problem 23

Points 2

A triangle has a perimeter 13. The two shorter sides have integer lengths equal to x and $x + 1$. Which of the following could be the length of the other side?

- a) 6 b) 9 c) 8 d) 10

Problem 24

Points 2

What is the area enclosed by the points (1,3), (2,5) and (3,7)?

- a) 5 b) 4.5 c) 3 d) 0

Problem 25

Points 2

The number of degrees that the hour hand of a clock moves through between noon and 2.30 in the afternoon of the same day is

- a) 720 b) 75 c) 65 d) 60

Problem 26

Point 1

The distance from town A to town B is three miles. C is four miles from B . Which of the following CAN NOT be the distance from A to C ?

- a) 7 b) 8 c) 5 d) 1

Problem 27

Point 1

Which of the following could not be the lengths of the sides of a right angled triangle?

- a) 3, 4, 5 b) 5, 12, 13 c) 8, 15, 17 d) 12, 15, 18

Problem 28**Point 1**

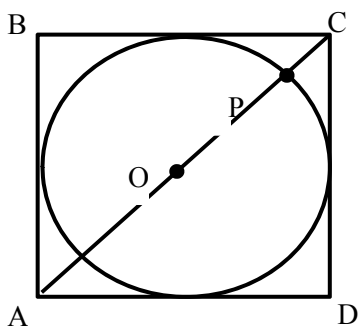
A rectangle with sides 3 and 4 is inscribed in circle. What is the circumference (length) of the circle?

- a) 2.5π b) 3π c) 4π d) 5π

Problem 29**Point 1**

One side of a triangle has length 8 and a second side has length 5. Which of the following could not be the area of the triangle?

- a) 21 b) 18 c) 6 d) 1

Problem 30**Points 1**

A circle of radius 3 is inscribed in square. Find AP .

- a) $3\sqrt{2} + 3$ b) $3\sqrt{2}$ c) $6 + \sqrt{2}$ d) $3\sqrt{2}$

Problem 31

Points 1

The first term in a sequence is 1 and the second term is 5. From the third term on each term is the average (arithmetic mean) of all preceding terms. What is the 25th term in the sequence?

- a) 3 b) 25 c) 50 d) 5

Problem 32

Point 1

-20 , -16 , -12 , -8,

In the sequence above, each term after the first is 4 greater than the preceding term. Which of the following could NOT be a term in the sequence?

- a) 200 b) 440 c) 762 d) 816

Problem 33

Point 2

In a class of 78 students 41 are taking French, 22 are taking German. Of the students taking French or German, 9 are taking both courses. How many students are not enrolled in either course?

- a) 24 b) 6 c) 15 d) 33

Problem 34

Points 3

In the set of positive distinct integers $\{a, b, c, d, e\}$ the median is 16. What is the minimum value of $a + b + c + d + e$?

- a) 26 b) 48 c) 54 d) 80

Problem 35

Points 3

In the set of numbers $\{12, 5, 14, 12, 9, 15, 10\}$, f equals to mean, g equals to median, h equals to mode, and j equals to range. Which of the following is true?

- a) $f > g > h > j$ b) $g = h > f > j$ c) $f = h > g > j$ d) $g > h > f = j$

Problem 36

Point 2

A solid cube of side 3 is first painted red and then cut into smaller cubes of side 1. How many of the smaller cubes have paint on exactly 2 sides?

- a) 12 b) 8 c) 6 d) 24

Problem 37

Point 1

56 is what percent of 80?

- a) 66% b) 70% c) 75% d) 80%

Problem 38

Point 1

The average (arithmetic mean) of seven numbers is 9. The average of three of these numbers is 5. What is the average of the other four numbers?

- a) 5 b) 7 c) 10 d) 12

Problem 39

Point 1

The average (arithmetic mean) of a set of six numbers is 28. If a certain number is removed from the set, the average of the remaining numbers in the set is 24. Find the removed number.

- a) 24 b) 36 c) 48 d) 52

Problem 40

Point 1

If the cost of one-hour telephone call is \$ 7.20, what would be the cost of ten-minute telephone call at the same rate?

- a) \$3.60 b) \$1.80 c) \$1.20 d) \$7.10