

Problem 1

1 point

If 25 percent of an amount of money is \$500, then 10 percent of the same amount is

- a) 100 b) 250 c) 200 d) 400

Problem 2

2 points

Which of the following is equal to 7 percent of 7 percent?

- a) 49 b) 0.0049 c) 0.49 d) 0.049

Problem 3

1 point

How many integers from 3 to 30, inclusive, are odd?

- a) 14 b) 15 c) 16 d) 17

Problem 4**1 point**

If p and q are positive integers, how many integers are larger than pq and smaller than $(p+1) \cdot (q+2)$?

- a) $p+2q-1$ b) $2p+q$ c) $2p+q+1$ d) $2p+q+2$

Problem 5**1 point**

How many 3-digit integers greater than 100 are there in which the sum of the digits equals 3?

- a) Six b) Four c) Five d) Nine

Problem 6**1 point**

Which of the following numbers is NOT the sum of three consecutive even integers?

- a) 276 b) 294 c) 300 d) 310

Problem 7**1 point**

If $\log_2(5) < x < \log_2(65)$ and x is an integer, then how many different values can x have?

- a) Three b) Four c) Five d) Eight

Problem 8**1 point**

If the vertices of a triangle have rectangular coordinates (1,1), (9,1), and (9,7), respectively, then the perimeter of the triangle is

- a) 10 b) 14 c) 24 d) 36

Problem 9**1 point**

For what point (x, y) on the graph of $y = \frac{1}{2}x + 1$ does the x -coordinate equal to y -coordinate?

- a) $(\frac{1}{2}, \frac{1}{2})$ b) $(-2, -2)$ c) $(-\frac{1}{2}, -\frac{1}{2})$ d) $(2, 2)$

Problem 10**1 points**

In the rectangular coordinate plane, point A has coordinates $(-4, 0)$, point B has coordinates $(0, 4)$, point C has coordinates $(4, 0)$, and point D has coordinates $(0, -4)$. What is the area of quadrilateral $ABCD$?

- a) 8 b) 16 c) 24 d) 32

Problem 11**1 point**

On the real number line, which of the following is halfway between -3.4 and 5.2 ?

- a) 0.9 b) 1.2 c) 1.8 d) 4.3

Problem 12**1 point**

If one number is chosen at random from the first 1000 positive integers, what is the probability that the number chosen is a multiple of 25?

- a) $\frac{1}{40}$ b) $\frac{4}{25}$ c) $\frac{4}{100}$ d) $\frac{25}{1000}$

Problem 13**1 point**

If $2a + 2b = 7$ and $3c + 3d = 15$, then the average (arithmetic mean) of a , b , c , and d is

- a) $1\frac{1}{2}$ b) $2\frac{1}{8}$ c) 3 d) $4\frac{1}{4}$

Problem 14**1 point**

For which of the following lists of numbers is the median equal to the average (arithmetic mean)?

- a) 3, 4, 7 b) 1, 10, 20 c) 3, 6, 7, 10, 12 d) 0, 2, 3, 4, 6

Problem 15**1 point**

$$3.7 \cdot 10^7 =$$

- a) 370 000 b) 3 700 000 c) 37 000 000 d) 370 000 000

Problem 16**1 point**

If $\frac{1}{4x} + \frac{1}{y} = \frac{1}{3} \cdot \left(\frac{1}{x} + \frac{1}{y}\right)$, what is $\frac{x}{y}$?

- a) $\frac{2}{3}$ b) $\frac{1}{2}$ c) $\frac{1}{8}$ d) $\frac{1}{9}$

Problem 17**1 point**

Which of the following is NOT a solution of the inequality $3x - 12 > -5x + 4$?

a) 1.8

b) 2.5

c) 2.7

d) 3.0

Problem 18**1 point**

For which of the following expressions is the value for $x = 1$ equal to the value for $x = -1$?

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

Problem 19**1 point**

If $\frac{12}{7 - \frac{r}{s}} = 2$ which of the following must be true?

a) $r = 6$ b) $r = s$ c) $r = 2s$ d) $r = 3s$

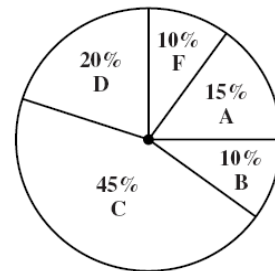
Problem 20**1 point**

A rectangular solid has a square base and altitude of 7. If the volume of the solid is 252, then the perimeter of the square base is

- a) 9 b) 36 c) 28 d) 24

Problem 21**1 point**

The circle graph shown here represents the distribution of the grades of 40 students in a certain class. How many students received F-s or D-s?



- a) 6 b) 10 c) 12 d) 25

Problem 22**1 point**

How many diagonals a pentagon has?

- a) 3 b) 5 c) 2 d) 10

Problem 23**1 point**

Which set cannot represent the lengths of the sides of a triangle?

- a) $\{3, 4, 7\}$ b) $\{4, 6, 9\}$ c) $\{5, 6, 7\}$ d) $\{1, 12, 12\}$

Problem 24**1 point**

A square is inscribed in a circle. If the circle has radius 4, what is the perimeter of the square ?

- a) $8\sqrt{2}$ b) 16 c) $16\sqrt{2}$ d) $32\sqrt{2}$

Problem 25**1 point**

If two sides of a triangle have lengths 3.2 and 5.4 then the length of the third side must be between

- a) 2.2 and 8.6 b) 2.2 and 5.4 c) 0.0 and 2.2 d) 3.2 and 5.4

Problem 26**2 points**

If x is 25 percent more than y , then y is what percent less than x ?

- a) 10% b) 20% c) 15% d) $12\frac{1}{2}\%$

Problem 27**2 points**

If a , b , c , and d are consecutive even integers such that $a < b < c < d$, then in terms of a , the sum $a + b + d =$

- a) $3a$ b) $3a + 2$ c) $3a + 4$ d) $3a + 8$

Problem 28**2 points**

If $\frac{3^6 - 1}{n}$ is an integer and n is an integer, then n could be each of the following EXCEPT

- a) 52 b) 16 c) 26 d) 28

Problem 29**2 points**

If $n = pqrs$, where p, q, r and s are four different positive prime numbers, how many different positive divisors does n have, including 1 and n ?

- a) 5 b) 6 c) 8 d) 16

Problem 30**2 points**

Suppose n is divisible by 8 but not by 6. Then which of the following CANNOT be an integer?

- a) $\frac{n}{2}$ b) $\frac{n}{3}$ c) $\frac{n}{4}$ d) $\frac{n}{5}$

Problem 31**2 points**

One integer will be randomly selected from the integers 1 to 100, inclusive. What is the probability that the selected integer will be a perfect square or a perfect cube?

- a) 0.13 b) 0.14 c) 0.12 d) 0.1

Problem 32**2 points**

If $0 < st < 1$, then which of the following can NOT be true?

- a) $s < 1$ and $t > 0$ b) $s < -1$ and $t < -1$ c) $s > -1$ and $t < -1$ d) $s > 1$ and $t < 1$

Problem 33**2 points**

Which of the following statements is (are) always true? (x, y and z are real and not equal to zero.)

- I. $\frac{1}{x}$ is more than x , when x is less than -1 ;
II. $\frac{x+y}{2x}$ equals $\frac{2y}{x+y}$, when x equals y ;
III. $\frac{x+z}{y+z}$ is more than $\frac{x}{y}$.

- a) I, II and III;
b) I and II only;
c) II and III only;
d) II only.

Problem 34**2 points**

One man can paint a house in a days and another man in b days. If together they can do the work in d days, the equation that expresses the relation between a, b and d is

- a) $a \cdot b = d \cdot (a + b)$ b) $a + b = a \cdot d$ c) $d \cdot (a + b) = 1$ d) $a \cdot b = d$

Problem 35**2 points**

If m men can complete a job in h hours, how long will k men take to do this job?

a) $\frac{k \cdot m}{h}$

b) $\frac{m}{k \cdot h}$

c) $\frac{m \cdot h}{k}$

d) $\frac{h \cdot k}{m}$

Problem 36**3 points**

What percent of the integers between 10 and 99, inclusive, have DIFFERENT digits?

a) 90%

b) 60%

c) 10%

d) 1%

Problem 37**3 points**

Find $(51 + 52 + \dots + 100) - (1 + 2 + \dots + 50)$.

a) 2500

b) 3250

c) 2550

d) 2525

Problem 38**3 points**

How many positive 4-digit integers begin (on the left) with an odd digit and end with an even digit?

- a) 2500 b) 2000 c) 500 d) 5000

Problem 39**3 points**

The average (arithmetic mean) of some 50 numbers is X , and the average of some other 100 numbers is Y . What is average of all 150 numbers?

- a) $\frac{X+Y}{2}$;
b) $50 \cdot X + 100 \cdot Y$;
c) $\frac{X+Y}{150}$;
d) $\frac{50 \cdot X + 100 \cdot Y}{150}$.

Problem 40**3 points**

In a class of 450 students, 300 are taking a mathematics course, 260 are taking a physics course and 30 students are *not* taking either of these courses. How many students are taking both courses?

- a) 30 b) 560 c) 110 d) 140