Problem 1 **point 1**

If the sum of two positive integers is 43 and the difference of their squares is 43, then the smaller integer is

a) 19 b) 20 c) 21 d) 22

Problem 2 **point 1**

If $\sqrt{7} < x < \sqrt{37}$ and x is an integer, then x can have how many different values?

a) Three b) Four c) Five d) Six

Problem 3 **point 1**

$\frac{18}{60} \cdot 0.1254 =$

a) 0.00522 b) 0.03762 c) 0.0418 d) 0.0627

Problem 4 **point 1**

If $k = 6 \cdot 17$, then which of the following is a multiple of k?

a) 78 b) 85 c) 136 d) 204

Problem 5 **point 1**

What percent of integers 100 and 999, inclusive, have all three digits the same?

a) 1% b) 2% c) 3% d) 4%

Problem 6 **point 1**

If you type a page in p minutes, what piece of the page can you tape in 5 minutes?

a) $\frac{5}{p}$ b) $p-5$ c) $p+5$ d) $\frac{p}{5}$

Problem 7 **point 1**

The sales price of a car is $ 12, 590, which is 20 % less than original price. What is the original price?

a) 14,310.40 b) 14,990.90 c) 15,290.70 d) 15,737.50

Problem 8 **point 1**

Solve the equation $\frac{2x}{3} = 8 + 4x$

a) -2.4 b) 2.4 c) 1.3 d) -1.3

Problem 9 **point 1**

If 8x +5 x + 2x + 4x =114, then 5x + 3 =

a) 12 b) 24 c) 33 d) 47

Problem 10 **point 1**

If a certain town has 90 doctors and the ratio of male doctors to female doctors is 3 to 2, then the number of female doctors in this town is

a) 18 b) 30 c) 36 d) 45

Problem 11 **point 1**

If $x^2 + 2xy + y^2 = 25$, then $(x + y)^3$ can be

a) 5 b) -25 c) 75 d) -125

Problem 12 **point 1**

The expression $(4x^2 + 4x + 2) + (3 – 7x) – (5 – 3x)$ equals to

a) $4x^2 + 1$ b) $4x^2$ c) $4x^2 + 6x$ d) $4x^2 + 10$

Problem 13 **point 1**

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

a) 1 b) 2 c) 3 d) 4

Problem 14 **point 1**

If $x \neq 1$ and $x \neq 0$, then $\dfrac{1-\dfrac{1}{x}}{x-1}$ is equivalent to

a) $\dfrac{1}{x}$ b) x c) $\dfrac{x}{1-x}$ d) $\dfrac{1-x}{x}$

Problem 15 **point 1**

If $3x + 9y = 7x + y$, then $4y =$

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

Problem 16 **point 1**

$2^x + 2^x =$

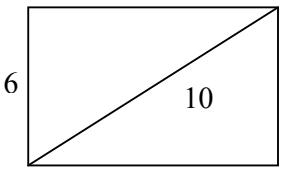
a) 2^{x+1} b) 2^{x+2} c) 2^{2x} d) 4^x

Problem 17 **point 1**

The price of certain good increased by 8 GEL, then decreased by 13 GEL, and increased by 9 GEL. If the price before the changes was x, which of the following is the price after the changes?

a) x – 5 b) x - 4 c) x + 4 d) x + 5

Problem 18 **point 1**



What is the perimeter of the rectangle shown above?

a) 14 b) 24 c) 28 d) 38

Problem 19 **point 1**

Of the following, which is closest to $30^{1/3}$?

a) 6 b) 5 c) 4 d) 3

Problem 20 **point 1**

Which of the following is equal to $\frac{1}{4}$ of 0.01 percent?

a) 0.000025 b) 0.00025 c) 0.0025 d) 0.025

Problem 21 **point 1**

If Sally can paint a house in 4 hours, and John can paint the same house in 6 hours, how long will it take for both of them to paint the house together?

a) 3 hours and 12 minutes b) 2 hours and 24 minutes c) 3 hours and 44 minutes d) 4 hours and 10 minutes

Problem 22 **point 1**

In the equation $ax + b = 26$, x is constant. It is known that when $b = 5$, then $a = 3$. What is the value of b when $a = 5$?

a) -11 b) -9 c) 7 d) 3

Problem 23 **point 1**

For which of the following expressions is the value for $x = 0$ equal to the value for $x = 1$?

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

Problem 24 **point 1**

A book cost \$ 80.00, and the sales tax where you are purchasing the book is 8.2 %. You have \$ 100. How much change will you receive back?

a) \$ 4.80 b) \$ 7.40 c) \$13.44 d) \$19.90

Problem 25 **point 1**

If F(1) = 2 and F(n) = F(n-1)+0.5 for all integers n>1, then F(101) =

a) 50 b) 51 c) 52 d) 53

Problem 26 **point 2**

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

a) xy = 9 b) x + y = 7 c) - x - y = 3 d) x – y =4

Problem 27 **point 2**

One integer is randomly selected from the integers 11 to 60, inclusive. What is the probability that the selected integer will be a perfect square or a perfect cube?

a) 0.1 b) 0.125 c) 0.16 d) 0.5

Problem 28 **point 2**

The 500 delegates attending a convention, 200 are Republicans and the rest are Democrats. One hundred of the delegates are vegetarians and, of those who are not vegetarians, 270 are Democrats. How many of the vegetarian delegates are Republicans?

a) 40 b) 50 c) 60 d) 70

Problem 29 **point 2**

In a group of 80 students, 24 are enrolled in geometry, 40 in biology, and 20 in both. If a student were randomly selected from the 80 students, what is the probability that the student selected would not be enrolled in either course?

a) 0.20 b) 0.25 c) 0.45 d) 0.60

Problem 30 **point 2**

If $0 < st < 1$, then which of the following can 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 31 **point 2**

Consider the points A = (0,0), B = (1,-1), C = (1,1) in the plane. For how many different points D in this plane are A, B, C, D the vertices of a parallelogram?

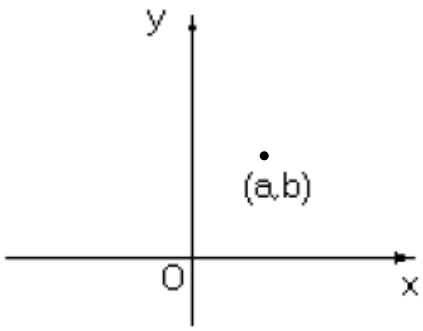
a) Two b) Three c) Four d) Five

Problem 32 **point 2**

The sum of the first 50 positive integers is 1275. What is the sum of the integers from 51 to100?

a) 2525 b) 2550 c) 3250 d) 3775

Problem 33 **point 2**



In the rectangular coordinate system above, if point (a, b), shown, and the two points ($4a$, b) and ($2a$, $2b$), not shown, were connected by straight lines, then the area of the resulting triangular region, in terms of a and b, would be

a) $\frac{ab}{2}$ b) ab c) $\frac{3ab}{2}$ d) $2ab$

Problem 34 **point 2**

A polygon has 20 diagonals. How many sides does it have?

a) 12 b) 10 c) 8 d) 6

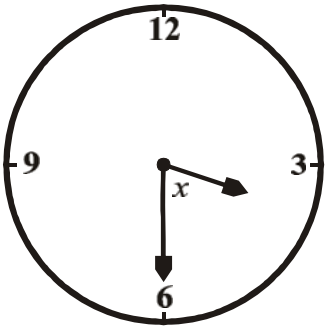
Problem 35 **point 2**

If the average (arithmetic mean) of 5 consecutive integers is 12, what is the sum of the least and greatest of the 5 integers?

a) 14 b) 10 c) 24 d) 18

Problem 36 **point 3**

The circular clock above shows a time of exactly 3:30. What is value of x?



a) 60^o b) 75^o c) 85^o d) 90^o

Problem 37 **point 3**

The sum of x distinct natural numbers is less then 75. What is the greatest possible value of x?

a) 12 b) 11 c) 10 d) 9

Problem 38 **point 3**

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

a) k/3 b) k/10 c) k/12 d) k/36

Problem 39 **point 3**

How many integers from 1 to 1000 are divisible by 30 but not by 16?

a) 28 b) 29 c) 30 d) 32

Problem 40 **point 3**

For all real numbers x and y, the expression $\frac{x+y+|x-y|}{2}$ is equal to

a) the maximum of x and y b) the minimum of x and y c) |x + y| d) the average of |x| and |y|

Answer Keys

1	c
2	b
3	b
4	d
5	a
6	a
7	d
8	a
9	c
10	c
11	d
12	b
13	b
14	a
15	a
16	a
17	c
18	c
19	d
20	a
21	b
22	b
23	d
24	c
25	c
26	c
27	a
28	d
29	c
30	c
31	b
32	d
33	c
34	c
35	c
36	b
37	b
38	d
39	b
40	a