

**HIGH SCHOOL ALGEBRA QUIZ CONTEST 2024**  
**SAMPLE QUESTIONS**

- (1) The set of real numbers  $-3 \leq x < 2$  when written using interval notation is \_\_\_\_\_. (**Answer:**  $[-3, 2)$ )
- (2) If the slope of a line is 3 and the slope of another line is  $\frac{1}{3}$  then the lines are perpendicular (True or False). (**Answer: False**)
- (3) (a) The equation  $xy + 3x + 2y + 6 = 0$  is a linear equation (True or False). (**Answer: False**)  
(b) The equation  $|x| + 2x = 5y + 15$  is a linear equation (True or False). (**Answer: False**)
- (4) Every quadratic equation with real coefficients has two real solutions (True or False). (**Answer: False**)
- (5) The slope of the line given by the equation  $y = 5 - 2x$  is  $-2$ . (True or False). (**Answer: True**)
- (6) (a) How many solutions does the equation

$$3 - |2 - 3x| = 4$$

have? (**Answer: No Solution**)

- (b) How many solutions does the equation

$$|5 - 2x| + 7 = 10$$

have? (**Answer: Two**)

- (c) The number of points in which the graph of  $y = |x - 3| + 1$  meets the  $x$ -axis is \_\_\_\_\_. (**Answer: None**)
- (7) What is the degree of the expression

$$5xy^2 + 3x^2y^2 - 8x^2y - 3x^2 + 8x - 15?$$

(**Answer: 4**)

- (8) What is the equation of the line passing through the points  $(1, -1)$  and  $(1, 2)$ ? (**Answer:  $x = 1$** )
- (9) (a) How many solutions does the system

$$\begin{aligned} 15x - 23y &= 38 \\ 46y &= 30x \end{aligned}$$

of linear equations have? (**Answer: None or No solution**)

(b) How many solutions does the system

$$35x + 2y = 5$$

$$2x - 35y = 7$$

of linear equations have? (**Answer: One**)

(10) (a) The number that must be added to the expression  $x^2 - 5x$  to make it a complete square is \_\_\_\_\_. (**Answer:  $\frac{25}{4}$** )

(b) Factorize  $(x + 1)^2 + (x + 1) - 2$ . (**Answer:  $x(x + 3)$** )

(11) Let  $a$ ,  $b$ , and  $c$  are three real numbers such that  $\frac{a}{b} = \frac{b}{c}$ . Then

(a)  $2b = a + c$  (True or False). (**Answer: False**)

(b)  $\frac{a + b}{b} = \frac{b + c}{c}$  (True or False). (**Answer: True**)

(c)  $\frac{a + b}{a - b} = \frac{b + c}{b - c}$  (True or False). (**Answer: True**)

(12) (a) The vertex of the parabola given by the equation

$$y = 3(x + 1)^2 - 2$$

lies in the \_\_\_\_\_ quadrant. (**Answer: Third**)

(b) The axis of symmetry of the parabola given by the equation

$$y = 5 - 2(x - 3)^2$$

is \_\_\_\_\_. (**Answer:  $x = 3$** )

(13) If  $x_1$  and  $x_2$  are zeros of the quadratic polynomial  $2x^2 - 4x - 7$  then what is the value of

(a) the sum  $x_1 + x_2$ ? (**Answer: 2**)

(b) the product  $x_1x_2$ ? (**Answer:  $-\frac{7}{2}$** )

(14) What is the slope of a line perpendicular to the line passing through the points  $(2, -1)$  and  $(2, 3)$ ? (**Answer: 0**)

(15) What is the domain of the function  $f(x) = \frac{x + 3}{x^2 + 2x + 5}$ ? (**Answer:**

**All real numbers**)

(16) How many real solutions does the equation

$$\sqrt{3x - 2} + 3 = 2$$

have? (**Answer: No Solution**)

(17) The volume  $V$  of a cylinder of radius  $r$  and height  $h$  is given by  $V = \pi r^2 h$ . What is the expression for  $r$  in terms of  $V$  and  $h$ ?

(**Answer:  $\sqrt{\frac{V}{\pi h}}$** )

(18) What are the values of  $x$  for which  $x^{500} = x^{502}$ ? (**Answer:** 0, -1, and 1)

(19) The rational expression  $\frac{x}{2-x}$  is equivalent to

(a)  $\frac{x}{x-2}$ .

(b)  $-\frac{x}{x-2}$ .

(c)  $-\frac{x}{2+x}$ .

(d)  $\frac{x}{-2-x}$ .

(**Answer:** B)

(20) John can finish a piece of work in four hours and his son can finish the same work in twelve hours. How long will they take to finish the work if they both work together? (**Answer:** 3 hours)

(21) One of the roots of the quadratic equation  $2x^2 - 12x + 15 = 0$  is  $\frac{6 + \sqrt{6}}{2}$ . What is the other root? (**Answer:**  $\frac{6 - \sqrt{6}}{2}$ )

(22) The lines  $2x + 3y + 7 = 0$  and  $3x - 2y = 0$  are

(a) parallel.

(b) perpendicular.

(c) neither parallel nor perpendicular.

(**Answer:** B)

(23) What is the value of  $i^{100} + i^{150}$ ? (**Answer:** 0)

(24) How many real solutions does the quadratic equation

$$x^2 + 5 = 4x$$

have? (**Answer:** None or No real solution)

(25) If  $x+y = 0$ , and  $x \neq 0$  then what is the value of  $\frac{x^{1931}}{y^{1931}}$ ? (**Answer:** -1)