

**HIGH SCHOOL ALGEBRA QUIZ CONTEST 2016**  
**SAMPLE QUESTIONS**

- (1) (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**)
- (2) The set of real numbers  $-1 < x \leq 5$  when written using interval notation is \_\_\_\_\_. (**Answer:  $(-1, 5]$** )
- (3) If the slope of a line is 2 and the slope of another line is  $\frac{1}{2}$  then the lines are perpendicular (True or False). (**Answer: False**)
- (4) Every quadratic equation has two real solutions (True or False). (**Answer: False**)
- (5) The slope of the line given by the equation  $y = 5 - 3x$  is  $-3$ . (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**)

- (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

$$15x - 23y = 38$$

$$46y = 30x$$

of linear equations have? (**Answer: None**)

- (b) How many solutions does the system

$$35x + 2y = 5$$

$$2x - 35y = 7$$

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

- (10) 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**)
- (12) What is the vertex of the parabola given by the equation

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

(**Answer:**  $(-1, -2)$ )

- (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 sum  $x_1x_2$ ? (**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  $x + 2y + 5 = 0$  and  $2x + y = 0$  are

(a) parallel.

(b) perpendicular.

(c) neither parallel nor perpendicular.

(**Answer: C**)

(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:** 0)

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