

Name: K = Y SEC ID#:

1. Which ONE of the following is TRUE:

a) The equation $x^2 = x$ has one real solution

b) 5 is the solution of the equation $\frac{x}{x-5} = 1 - \frac{5}{x-5}$

c) $\frac{x}{x-2} = \frac{2}{x-2}$ and $2x-3=1$ are equivalent equations

d) The equation $3|x+12|=9$ has two real solutions

The equation $\frac{1}{5} - \frac{2}{3}x - \frac{1}{3}$ has two real distinct roots

2. Solve $-2 < |x^2 - 1| < 6$

$$|x^2 - 1| < 6 \quad \text{and} \quad |x^2 - 1| > -2$$

$$x^2 - 1 < 6 \quad \text{and} \quad x^2 - 1 > -6 \quad (-\infty, \infty)$$

$$x^2 - 7 < 0 \quad x^2 + 5 > 0$$

$$(x - \sqrt{7})(x + \sqrt{7}) < 0 \quad (-\infty, \infty)$$

$$\begin{array}{c} \text{-----} \\ -\sqrt{7} \quad \sqrt{7} \end{array}$$

$$(-\sqrt{7}, \sqrt{7})$$

Ans: $(-\sqrt{7}, \sqrt{7})$

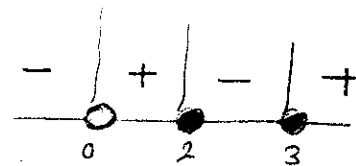
3. Solve: $\frac{(x+1)^2}{x} - \frac{+5}{x} \geq 5$

$$\frac{(x+1)^2 - 2x}{x} - 5 \geq 0$$

$$\frac{x^2 - 5x + 6}{x} \geq 0$$

$$\frac{(x-2)(x-3)}{x} \geq 0$$

D.V: 0, 2, 3



$$(0, 2] \cup [3, \infty)$$

4. Given $Z = \frac{(1-i)}{\sqrt{-2\sqrt{-i}}}$ $\frac{3i}{-i^{203}}$. Find the conjugate

$$\frac{1 - 2i + i + 3i}{4i^2 - i^3}$$

$$\frac{1 - 4i}{-4 + i}$$

$$\frac{1 - 4i}{17} = \frac{1}{17} - \frac{4i}{17}$$

π - Conjugate:

$$\frac{1}{17} + \frac{4}{17}i$$

5. Write the following without absolute value notation:

$$\left| \frac{-0.6 + |0.6 + x|}{|x - 0.8|} \right| ; x > \frac{3}{4}$$

$$\left| \frac{x + 0.6 + 0.6 + x}{|x - 0.8|} \right| = \frac{|2x + 1.2|}{|x - 0.8|} = \frac{2x + 1.2}{|x - 0.8|}$$

6. Factor: $x^2 - x^2 - 2xy + y^2 + y^3$

$$\begin{aligned} x^2 - 2xy + y^2 - x^3 + y^3 \\ x^2 - 2xy + y^2 - (x^3 - y^3) \\ (x-y)^2 - (x-y)(x^2 + xy + y^2) \end{aligned}$$

$$(x-y) \left[(x-y) - (x^2 + xy + y^2) \right]$$

7. The expression $\frac{-y^{-1} \cdot x+y}{+y^{-1} \cdot x-y}$ simplifies to:

$$\frac{\frac{1}{x} - \frac{1}{y}}{\frac{1}{x} + \frac{1}{y}} \cdot \frac{x+y}{x-y} \Rightarrow \frac{y}{y-x} \cdot \frac{x+y}{x-y} = -1$$

8. If $\sqrt[n]{16x^5y^6} = 2xy^2\sqrt[n]{2x^2}$, what is the value of n ?

$$n = 3$$

9. Solve the equation $\sqrt{x+1} - \sqrt{2x+4} = 1$

$$\left(\sqrt{4x+1}\right)^2 = \left(\sqrt{2x+4}\right)^2$$

$$4x+1 = 1+2\sqrt{2x+4} + 2x+4$$

$$2x-4 = 2\sqrt{2x+4}$$

$$(x-2)^2 = \left(\sqrt{2x+4}\right)^2$$

$$x^2 - 4x + 4 = 2x + 4$$

$$x^2 - 6x = 0$$

$$x=0 \text{ or } x=6$$

check: $x=0$ rejected

$$S.S = \{6\}$$

10. Solve $(x+1)^{2/3} = (x+1)^{1/3} - 6$

$$\text{let } y = (x+1)^{1/3}$$

$$y^2 - 5y + 6 = 0$$

$$y = 2 \text{ or } y = 3$$

$$(x+1)^{1/3} = 2$$

$$(x+1)^{1/3} = 3$$

$$x+1 = 8$$

or

$$x+1 = 27$$

$$x = 7$$

$$x = 26$$

$$S.S = \{7, 26\}$$