

Math 32 Quiz

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Name: _____ Score: _____ /10

You have twenty minutes to complete this quiz. You may not use calculators or notes, but the chalkboards are yours.

1. (3 pts) Solve the equation for x :

$$\sqrt{3x-8} - \sqrt{2x+3} + \sqrt{x+1} = 0$$

$$\sqrt{3x-8} - \sqrt{2x+3} + \sqrt{x+1} = 0$$

$$\sqrt{3x-8} + \sqrt{x+1} = \sqrt{2x+3}$$

$$(\sqrt{3x-8} + \sqrt{x+1})^2 = (\sqrt{2x+3})^2$$

$$3x-8+x+1+2\sqrt{(3x-8)(x+1)} = 2x+3$$

$$2\sqrt{(3x-8)(x+1)} = -2x+10$$

$$\sqrt{3x^2-5x-8} = -x+5$$

$$3x^2-5x-8 = (-x+5)^2$$

$$= x^2 - 10x + 25$$

$$2x^2 + 5x - 33 = 0$$

$$x = \frac{-5 \pm \sqrt{25 - 4(2)(-33)}}{4}$$

$$= \frac{-5 \pm \sqrt{25 + 264}}{4}$$

$$= \frac{-5 \pm 17}{4}$$

$$= 3 \text{ or } -\frac{11}{2}$$

Check answers: $x = 3$ works. $x = -11/2$ gives a square root of a negative.

2. (3 pts) Solve the inequality:

$$\left| \frac{x+1}{2} - \frac{x-2}{3} \right| < 1$$

$$\left| \frac{x+1}{2} - \frac{x-2}{3} \right| < 1$$

$$\left| \frac{3(x+1) - 2(x-2)}{2 \cdot 3} \right| < 1$$

$$\left| \frac{x+7}{6} \right| < 1$$

$$|x+7| < 6$$

$$x \in \boxed{(-13, -1)}$$

3. (4 pts) Solve the compound inequality as two separate inequalities:

$$x - 5 \leq 3x + 1 \leq 17 - x$$

$$x - 5 \leq 3x + 1$$

$$x - 5 - x - 1 \leq 3x + 1 - x - 1$$

$$-6 \leq 2x$$

$$-3 \leq x$$

$$3x + 1 \leq 17 - x$$

$$3x + 1 + x - 1 \leq 17 - x + x - 1$$

$$4x \leq 16$$

$$x \leq 4$$

$$x \in \boxed{[-3, 4]}$$