

Due _____

1. Solve the following radical equations algebraically and graphically:

a. $(4\sqrt{x+2})^2 = (x-3)^2$

$$16(x+2) = x^2 - 6x + 9$$

$$16x + 32 = x^2 - 6x + 9$$

$$x^2 - 22x - 23 = 0$$

$$(x-23)(x+1) = 0$$

$$x = 23 \quad x = -1$$

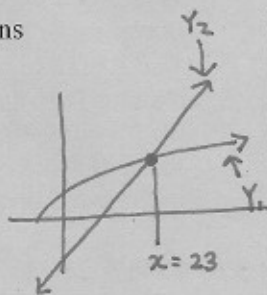
Check:

$$x = 23$$

$$x = -1$$

$$4\sqrt{23+2} = 27-3 \quad 4\sqrt{-1+2} = \underline{\underline{-1-3}}$$

$$20 = 20$$



3. Solve algebraically and give exact solutions:

$$2x^2 + 3x = 1$$

$$2x^2 + 3x - 1 = 0$$

$$x = \frac{-3 \pm \sqrt{9 - 4(2)(-1)}}{4}$$

$$x = \frac{-3 \pm \sqrt{17}}{4}$$

4. Solve the following inequality:

$$0 < \frac{x-1}{3} + \frac{3x}{4} < 7$$

5. For a lab project, a student needs 100 cubic centimeters of a solution that is 9% HCl. The lab has only solutions that are 12% and 4% HCl. How many cubic centimeters of each available solution should be mixed to get 100 cubic centimeters of 9% HCl?

$$0.12x + 0.04(100 - x) = 100(0.09)$$

$$0.12x + 4 - 0.04x = 9$$

$$0.08x = 5$$

$$x = \frac{5}{0.08}$$

$$x = 62.5$$

62.5 cc of 12% HCl solution

100 - 62.5 = 37.5 cc of 4% HCl solution

b. $\sqrt{x+2} - \sqrt{2x+5} = 1$

$$(-\sqrt{2x+5})^2 = (-\sqrt{x+2} + 1)^2$$

$$2x+5 = (x+2) - 2\sqrt{x+2} + 1$$

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

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

$$x^2 + 4x + 4 = 4(x+2)$$

$$x^2 + 4x + 4 = 4x + 8$$

$$x^2 - 4 = 0$$

$$x^2 = 4$$

$$x = \pm 2 \quad (\text{No solution})$$

$$x=2 \quad \text{Check: } \frac{\sqrt{2+2}}{2-3} - \sqrt{2(2)+5} = 1$$

$$x=-2 \quad \frac{\sqrt{-2+2}}{0-1} - \sqrt{2(-2)+5} = 1$$

$$0 - 1 \neq 1$$

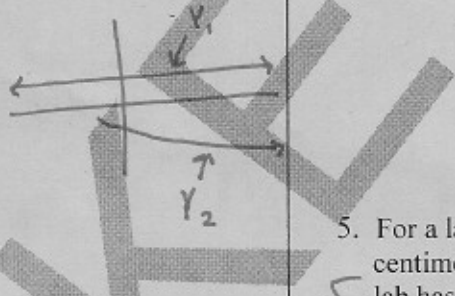
2. Solve: $x^2 - 7x + 6 = 3x - 16$

$$x^2 - 10x + 22 = 0$$

$$\frac{10 \pm \sqrt{100 - 4(1)(22)}}{2}$$

$$x = \frac{10 \pm \sqrt{12}}{2}$$

$$x = \frac{10 \pm 2\sqrt{3}}{2} = \frac{10 \pm 2\sqrt{3}}{2} = 5 \pm \sqrt{3}$$



6. Solve the following absolute value inequalities algebraically and graphically:

a. $|2-7m| - 1 > 4$

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b. Solve the following inequality, and sketch the solution on the number line provided.



$3|2-3x| + 1 \leq 7$

7. A group of benefactors plans to invest \$12,000 in two funds paying 7.5% and 10% simple interest. (There is more risk in the 10% fund.) Their goal is to obtain a total annual interest income of \$1000 from the investments to use as a scholarship for a UNCW student. What is the smallest amount they can invest in the 10% fund in order to meet their objective?

$$0.075x + 0.1(12,000 - x) = 1000$$

$$0.075x + 1200 - 0.1x = 1000$$

$$-0.025x = -200$$

$$x = \frac{-200}{-0.025} = \$8,000$$

\$8,000 for the 7.5% fund

$12,000 - 8,000 = \$4,000$ for the 10% fund

8. Find an equation of the line that passes through the point $(-1, 2)$ and is perpendicular to the line $4x - 5y = 9$.

$$4x - 5y = 9$$

$$-5y = -4x + 9$$

$$y = \frac{4}{5}x - \frac{9}{5}$$

$$y - 2 = \frac{-5}{4}(x + 1)$$

$$y - 2 = \frac{-5}{4}x - \frac{5}{4}$$

$$y = \frac{-5}{4}x + \frac{3}{4}$$

9. Find the x-intercepts and y-intercepts of the equation $y = x^2 - 5x - 36$, algebraically and graphically.

$$x\text{-int} \Rightarrow y = 0$$

$$x^2 - 5x - 36 = 0$$

$$(x-9)(x+4) = 0$$

$$x = 9 \quad x = -4$$

$$y\text{-int} \Rightarrow x = 0 \text{ or } c$$

$$y = -36$$

