

HOMWORK: SOLVING

NAME: _____

DAY 3 DUE: _____

Solve the equations

1. $6x^2 - 7x - 3 = 0$

$$\frac{6x^2 + 2x - 9x - 3}{2x} = 0$$

$$\begin{array}{r} 18 \\ 1 \ 18 \\ + 2 - 9 \\ 3 \ 6 \end{array}$$

$$2x(3x+1) - 3(3x+1) = 0$$

$$(3x+1)(2x-3) = 0$$

$$3x+1=0$$

$$2x-3=0$$

$$x = -\frac{1}{3}$$

$$x = \frac{3}{2}$$

2. $2x^3 = 32x$

$$\frac{2x^3 - 32x}{2x} = 0$$

$$2x(x^2 - 16) = 0$$

$$2x(x-4)(x+4) = 0$$

$$2x=0 \quad x-4=0 \quad x+4=0$$

$$x=0$$

$$x=4$$

$$x=-4$$

$$x = 0, 4, -4$$

3. $\frac{x^2}{9} - 1 = 5$

$$9 \cdot \frac{x^2}{9} = 6 \cdot 9$$

$$\sqrt{x^2} = \sqrt{54}$$

$$x = \pm \sqrt{9} \sqrt{6}$$

$$x = \pm 3\sqrt{6}$$

4. $\frac{-4(x+2)^2}{-4} = \frac{-100}{-4}$

$$\sqrt{(x+2)^2} = \sqrt{25}$$

$$x+2 = \pm 5$$

$$x = -2 \pm 5$$

$$x = -2+5, -2-5$$

$$x = 3, -7$$

5. $x^2 - 4x - 8 = 0$

$$\frac{x^2 - 4x + 4}{x^2 - 4x + 4} = \frac{8+4}{x^2 - 4x + 4}$$

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

$$\sqrt{(x-2)^2} = \sqrt{12}$$

$$x-2 = \pm \sqrt{4} \sqrt{3}$$

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

$$x = 2 \pm 2\sqrt{3}$$

$$\left(\frac{-4}{2}\right)^2 = 4$$

6. $x^2 - 10x = 1$

$$x^2 - 10x + 25 = 1 + 25 \left(\frac{-10}{2}\right)^2 = 25$$

$$\sqrt{(x-5)^2} = \sqrt{26}$$

$$x-5 = \pm \sqrt{26}$$

$$x = 5 \pm \sqrt{26}$$

SOLVE the equation. CHECK for extraneous roots.

$$7. \quad -4\sqrt{3x} - 6 = -2$$

$$\quad \quad \quad +6 +6$$

$$-4\sqrt{3x} = 4$$

$$\quad \quad \quad -4 \quad -4$$

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

$$3x = 1$$

$$x = \frac{1}{3} \text{ ext.}$$

No Solution!

$$8. \quad (\sqrt{x+3})^2 = (\sqrt{2x-7})^2$$

$$x+3 = 2x-7$$

$$\quad \quad \quad -x \quad \quad -x$$

$$3 = x - 7$$

$10 = x$

$$9. \quad (\sqrt{5x+1})^2 = (x-4)^2$$

$$5x+1 = (x-4)^2$$

$$5x+1 = x^2 - 8x + 16$$

$$0 = x^2 - 13x + 15$$

$$x = \frac{+13 \pm \sqrt{(-13)^2 - 4(1)(15)}}{2(1)}$$

$$x = \frac{13 \pm \sqrt{169 - 60}}{2}$$

$x = \frac{13 \pm \sqrt{109}}{2}$

$$10. \quad (\sqrt[3]{2t-1})^3 = 2^3$$

$$2t-1 = 8$$

$$2t = 9$$

$t = \frac{9}{2}$

$$11. \quad (\sqrt{15-2x})^2 = x^2$$

$$15-2x = x^2$$

$$0 = x^2 + 2x - 15$$

$$0 = (x+5)(x-3)$$

$$x+5=0 \quad x-3=0$$

$$x = -5 \quad x = 3$$

$x = -5, 3$

$$12. \quad x^2 + \sqrt{3}x - 3 = 0$$

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

$$x = \frac{-\sqrt{3} \pm \sqrt{3+12}}{2}$$

$x = \frac{-\sqrt{3} \pm \sqrt{15}}{2}$

Solve. Remember to check for extraneous, if necessary!

$$13. \quad \frac{-2}{x+3} = \frac{1}{x+1}$$

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

$$-2x-2 = x+3$$

$$-2 = 3x+3$$

$$-5 = 3x$$

$$\boxed{x = \frac{-5}{3}}$$

$$\text{Check: } \frac{-2}{\frac{-5}{3} + \frac{4}{3}} \stackrel{?}{=} \frac{1}{\frac{-5}{3} + \frac{3}{3}}$$

$$\frac{-2}{\frac{-1}{3}} = \frac{1}{\frac{-2}{3}}$$

$$-2\left(\frac{3}{-1}\right) = -\frac{3}{2} \checkmark$$

$$14. \quad \frac{t+11}{t-11} = \frac{11t+121}{t^2-6t-55}$$

$$\frac{t+11}{t-11} = \frac{11(t+11)}{(t-11)(t+5)}$$

$$\frac{(t+11)(t+5)}{(t-11)(t+5)} = \frac{11(t+11)}{(t-11)(t+5)}$$

$$\frac{(t+11)(t+5)}{(t+11)} = \frac{11(t+11)}{(t+11)}$$

$$t+5 = 11$$

$$\boxed{t = 6}$$

$$15. \quad \frac{6}{x-3} = \frac{8x^2}{x^2-9} - \frac{4x}{x+3}$$

$$\frac{6}{x-3} = \frac{8x^2}{(x+3)(x-3)} - \frac{4x}{x+3}$$

$$\frac{6(x+3)}{(x-3)(x+3)} = \frac{8x^2}{(x+3)(x-3)} - \frac{4x(x-3)}{(x+3)(x-3)}$$

$$6(x+3) = 8x^2 - 4x(x-3)$$

$$6x+18 = 8x^2 - 4x^2 + 12x$$

$$0 = 4x^2 + 6x - 18$$

$$0 = 2(x^2 + 3x - 9)$$

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

$$x = \frac{-3 \pm \sqrt{9+36}}{2}$$

$$x = \frac{-3 \pm \sqrt{45}}{2}$$

$$x = \frac{-3 \pm \sqrt{9 \cdot 5}}{2} = \boxed{\frac{-3 \pm 3\sqrt{5}}{2}}$$