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- isolate the squared  
- take the square root  
\*don't forget  $\pm$  \*

Date \_\_\_\_\_  
Pre Calculus

## Solving Quadratic Equations Using Isolate/Square Root Method

Solve the following equations

1.  $2x^2 - 8 = 24$   
+8 +8

$$\frac{2x^2 = 32}{2} \quad \frac{32}{2}$$

$$\sqrt{x^2 = 16}$$

$$x = \pm 4$$

2.  $3x^2 - 5 = 70$   
+5 +5

$$\frac{3x^2 = 75}{3} \quad \frac{75}{3}$$

$$\sqrt{x^2 = 25}$$

$$x = \pm 5$$

3.  $4x^2 - 7 = 41$   
+7 +7

$$\frac{4x^2 = 48}{4} \quad \frac{48}{4}$$

$$\sqrt{x^2 = 12}$$

$$x = \pm \sqrt{12}$$

$$\sqrt{4} \sqrt{3}$$

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

4.  $-3x^2 - 2 = -146$   
+2 +2

$$\frac{-3x^2 = -144}{-3} \quad \frac{-144}{-3}$$

$$\sqrt{x^2 = 48}$$

$$\pm \sqrt{16} \sqrt{3}$$

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

5.  $2x^2 + 20 = -52$   
-20 -20

$$\frac{2x^2 = -72}{2} \quad \frac{-72}{2}$$

$$\sqrt{x^2 = -36}$$

$$x = \pm \sqrt{-36}$$

$$x = \pm i\sqrt{36}$$

$$x = \pm 6i$$

6.  $3x^2 + 91 = 88$   
-91 -91

$$\frac{3x^2 = -3}{3} \quad \frac{-3}{3}$$

$$\sqrt{x^2 = -1}$$

$$x = \pm \sqrt{-1}$$

$$x = \pm i\sqrt{1}$$

$$x = \pm i$$

7.  $5x^2 + 60 = 0$   
-60 -60

$$\frac{5x^2 = -60}{5} \quad \frac{-60}{5}$$

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

$$x = \pm \sqrt{-12}$$

$$x = \pm i\sqrt{12}$$

$$x = \pm i\sqrt{12}$$

$$\sqrt{4} \sqrt{3}$$

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

8.  $x^2 + 80 = -10$   
-80 -80

$$\sqrt{x^2 = -90}$$

$$x = \pm \sqrt{-90}$$

$$x = \pm i\sqrt{90}$$

$$\sqrt{9} \sqrt{10}$$

$$x = \pm 3i\sqrt{10}$$

$$9. 2x^2 + 8 = -22$$

$$\begin{aligned} & \frac{-8}{-8} \quad \frac{-22}{-8} \\ 2x^2 &= \frac{-30}{2} \\ \sqrt{x^2} &= \sqrt{-15} \end{aligned}$$

$$\begin{aligned} x &= \pm \sqrt{-15} \\ x &= \pm i\sqrt{15} \end{aligned}$$

$$10. -3x^2 - 50 = 130$$

$$\begin{aligned} & +150 \quad +150 \\ -3x^2 &= \frac{180}{-3} \\ \sqrt{x^2} &= \sqrt{60} \\ x &= \pm \sqrt{60} \end{aligned}$$

$$\begin{aligned} x &= \pm i\sqrt{60} \\ &= \pm i\sqrt{4} \sqrt{15} \\ x &= \pm 2i\sqrt{15} \end{aligned}$$

$$11. (2x-3)^2 = 16$$

$$2x-3 = \pm 4$$

$$\begin{aligned} 2x-3 &= 4 \\ +3 \quad +3 \end{aligned}$$

$$\begin{aligned} 2x &= 7 \\ \frac{2x}{2} &= \frac{7}{2} \\ x &= \frac{7}{2} \end{aligned}$$

$$\begin{aligned} 2x-3 &= -4 \\ +3 \quad +3 \end{aligned}$$

$$\begin{aligned} 2x &= -1 \\ \frac{2x}{2} &= \frac{-1}{2} \\ x &= \frac{-1}{2} \end{aligned}$$

$$12. (3x+1)^2 = 4$$

$$3x+1 = \pm 2$$

$$\begin{aligned} 3x+1 &= 2 \\ -1 \quad -1 \end{aligned}$$

$$\begin{aligned} 3x &= 1 \\ \frac{3x}{3} &= \frac{1}{3} \\ x &= \frac{1}{3} \end{aligned}$$

$$\begin{aligned} 3x+1 &= -2 \\ -1 \quad -1 \end{aligned}$$

$$\begin{aligned} 3x &= -3 \\ \frac{3x}{3} &= \frac{-3}{3} \\ x &= -1 \end{aligned}$$

$$13. 2(4x-5)^2 = 18$$

$$\begin{aligned} & \frac{2}{2} \quad \frac{18}{2} \\ \sqrt{(4x-5)^2} &= \sqrt{9} \end{aligned}$$

$$4x-5 = \pm 3$$

$$\begin{aligned} 4x-5 &= 3 \\ +5 \quad +5 \end{aligned}$$

$$\begin{aligned} 4x &= 8 \\ \frac{4x}{4} &= \frac{8}{4} \\ x &= 2 \end{aligned}$$

$$\begin{aligned} 4x-5 &= -3 \\ +5 \quad +5 \end{aligned}$$

$$\begin{aligned} 4x &= 2 \\ \frac{4x}{4} &= \frac{2}{4} \\ x &= \frac{1}{2} \end{aligned}$$

$$14. (6x-1)^2 + 4 = 5$$

$$\begin{aligned} & -4 \quad -4 \\ \sqrt{(6x-1)^2} &= \sqrt{1} \\ 6x-1 &= \pm 1 \end{aligned}$$

$$\begin{aligned} 6x-1 &= 1 \\ +1 \quad +1 \end{aligned}$$

$$\begin{aligned} 6x &= 2 \\ \frac{6x}{6} &= \frac{2}{6} \\ x &= \frac{1}{3} \end{aligned}$$

$$\begin{aligned} 6x-1 &= -1 \\ +1 \quad +1 \end{aligned}$$

$$\begin{aligned} 6x &= 0 \\ \frac{6x}{6} &= \frac{0}{6} \\ x &= 0 \end{aligned}$$

$$15. (5x-3)^2 = 2$$

$$\begin{aligned} 5x-3 &= \pm \sqrt{2} \\ +3 \quad +3 \end{aligned}$$

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

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

$$16. 2(8x-2)^2 - 1 = 5$$

$$\begin{aligned} & +1 \quad +1 \\ \frac{2(8x-2)^2}{2} &= \frac{6}{2} \\ \sqrt{(8x-2)^2} &= \sqrt{3} \end{aligned}$$

$$\begin{aligned} 8x-2 &= \pm \sqrt{3} \\ +2 \quad +2 \end{aligned}$$

$$\frac{8x}{8} = \frac{2 \pm \sqrt{3}}{8}$$

$$x = \frac{1}{4} \pm \frac{\sqrt{3}}{8}$$