

Name _____

Date _____

Advanced Algebra

Disguised Quadratics Assignment #3

Solve each of the following for x

1) $x^2 + 1 = \frac{6}{x^2}$

* Multiply Everything
by x^2

$$x^4 + x^2 = 6$$

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

$$(x^2 + 3)(x^2 - 2)$$

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

2) $x^3 + 7 = \frac{8}{x^3}$

* Multiply Everything
by x^3

$$x^6 + 7x^3 = 8$$

$$x^6 + 7x^3 - 8 = 0$$

$$(x^3 + 8)(x^3 - 1)$$

$$x = -2 \quad x = 1$$

3) $x = 12\sqrt{x} - 35$

$$x - 12\sqrt{x} + 35 = 0$$

$$(x^{\frac{1}{2}} - 7)(x^{\frac{1}{2}} - 5)$$

4) $x^3 - 6x + \frac{8}{x} = 0$

* Multiply Everything
by x

$$x^4 - 6x^2 + 8 = 0$$

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

5) $\sqrt{x} + \frac{10}{\sqrt{x}} = 7$

* Multiply Everything
by \sqrt{x}

$$x + 10 = 7\sqrt{x}$$

$$x - 7\sqrt{x} + 10 = 0$$

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

$$25 \text{ and } 4$$

6) $x^2 + 3 = \frac{18}{x^2}$

* Multiply by x^2

$$x^4 + 3x^2 = 18$$

$$x^4 + 3x^2 - 18 = 0$$

$$(x^2 + 6)(x^2 - 3) = 0$$

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

$$7) x^4(x^4-20) + 64 = 0 \quad \text{distribute}$$

$$x^8 - 20x^4 + 64 = 0$$

$$(x^4 - 16)(x^4 - 4) = 0$$

$$x^4 - 16 = 0 \quad x^4 - 4 = 0$$

$$x = \pm 2$$

$$x = \pm 1.4$$

$$8) 15 = \sqrt{x}(8 - \sqrt{x})$$

$$15 = 8x^{\frac{1}{2}} - x$$

$$x - 8x^{\frac{1}{2}} + 15 = 0$$

$$(x^{\frac{1}{2}} - 5)(x^{\frac{1}{2}} - 3) = 0$$

$$x = 25$$

$$x = 9$$

$$9) \frac{5}{x^2} = x^2 + \frac{4}{x^6}$$

$$5x^4 = x^8 + 4$$

$$x^8 - 5x^4 + 4 = 0$$

$$(x^4 - 4)(x^4 - 1) = 0$$

$$x^4 = 4$$

$$x = \pm 1.4$$

$$x = \pm 1$$

$$10) 2(x^4 + 6) = 11x^2$$

distribute

$$2x^4 + 12 = 11x^2$$

$$2x^4 - 11x^2 + 12 = 0$$

$$(2x^2 - 3)(x^2 - 4) = 0$$

~~$$2x^2 - 3 = 0$$~~

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

$$x = \pm 2$$

$$11) 2 + \frac{10}{x} = \frac{9}{\sqrt{x}}$$

Multiply everything
by x

$$2x + 10 = 9x^{\frac{1}{2}}$$

$$2x - 9x^{\frac{1}{2}} + 10 = 0$$

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

$$x = \frac{25}{4} \quad x = 4$$

$$12) x = \frac{2(x^3 + 8)}{x^5}$$

Multiply by x^5

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

$$x^6 = 2x^3 + 16$$

$$x^6 - 2x^3 - 16 = 0$$

~~$$x^3 + 4 = 0$$~~