

## QUIZ 2

1)  $30x^4 - x^2 - 1 = 0$   $u = x^2$

$30u^2 - u - 1 = 0$

$u^2 - u - 30 = 0$

$(u-6)(u+5)=0$  divide by 30

$u = \frac{1}{5}, -\frac{1}{6}$  can't use negative

$x^2 = \frac{1}{5}$   ~~$x^2 = -\frac{1}{6}$~~

$x = \sqrt{\frac{1}{5}} \rightarrow \sqrt{\frac{1}{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \pm \frac{\sqrt{5}}{5}$

2)  $(4x + 9)^2 - 6(4x + 9) + 9 = 0$

$u = 4x+9$

$u^2 - 6u + 9 = 0$

$(u-3)(u-3)=0$   $u = 3$

$4x+9 = 3$

$4x = -6$

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

3)  $(x = 7\sqrt{x})^2$

$x^2 = 49x$

$x^2 - 49x = 0$

$x(x-49) = 0$

$x = 0, 49$

4)  $x^{-2} - 6x^{-1} + 8 = 0$  Use  $u=x^{-1}$   $u^2 - 6u + 8 = 0$

$(u-2)(u-4)=0$   $u = 2, 4$

$x^{-1} = 2$   $x^{-1} = 4$  negative exp makes a fraction

$x = \frac{1}{2}, \frac{1}{4}$

5)  $x + \sqrt{x} = 30$

Use  $u=\sqrt{x}$   $u^2 + u - 30 = 0$

$(u-5)(u+6)=0$   $u = -6, 5$

$\sqrt{x} = -6$   $\sqrt{x} = 5$

no solution  $x = 25$

6)  $x = 2\sqrt{2x - 4}$

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

$x^2 = 8x - 16$

$x^2 - 8x + 16 = 0$

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

7)  $3x^{1/2} - 5x^{1/4} + 1 = 0$

Use  $u$  substitution  $u=x^{1/4}$   $3u^2 - 5u + 1 = 0$  Use quadratic equation

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{5 \pm \sqrt{25 - 4 \cdot 3 \cdot 1}}{6}$$

$$u = \frac{5 \pm \sqrt{13}}{6} \quad *x = u^4$$

$$x = \left(\frac{5 + \sqrt{13}}{6}\right)^4, \left(\frac{5 - \sqrt{13}}{6}\right)^4$$

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

*Square both sides {\*use FOIL on the right}*

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

$$-5x = 8$$

$$x = -\frac{8}{5}$$

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

$$x^2(x-2) - 1(x-2) = 0$$

$$(x^2 - 1)(x - 2) = 0$$

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

$$x = -1, 1, 2$$

$$10) \sqrt{2x + 6} = -8 \quad \text{can't = negative}$$

no solution