

SEMESTER 2 REVIEW

Factoring - Pull out common factor

2 terms

$$a^2 - b^2 = (a-b)(a+b)$$

$$x^2 - 36 = (x+6)(x-6)$$

conjugates!

$$a^2 + b^2 = \text{not factorable}$$

$$x^2 + 9 = x^2 + 9$$

3 terms

UnFOIL

$$\frac{1}{4} \frac{12}{3}$$

$$2x^2 - 5x - 12$$

$$(2x+3)(x-4)$$

$$+3x - 8x$$

4 terms

Grouping

$$(5x^3 - 20x^2 - 7x + 28)$$

$$5x^2(x-4) - 7(x-4)$$

$$(x-4)(5x^2-7)$$

$$x^3 \pm \# = \text{Square-multiply-Square}$$

$$x^3 + 343 = (x+7)(x^2-7x+49)$$

uncube

Synthetic Division = must be dividing by $x \pm \#$

switch signs

$$4x^3 - 6x + 1$$

$$x+2$$

$$-2$$

$$\begin{array}{r|rrrr} 4 & 0 & -6 & 1 \\ + & -8 & 16 & -20 \\ \hline & 4 & -8 & 10 & -19 \end{array}$$

$$= 4x^2 - 8x + 10 - \frac{19}{x+2}$$

EXPONENT RULES

$$x^3 \cdot x^{11} = x^{14}$$

$$2^5 \cdot 2^3 = 2^8$$

$$\frac{(3x^2y^{-2})^4 (3x^2y)^{-3}}{3^5 x^{-4} y^7}$$

$$\frac{(3^4 x^8 y^{-8})(3^{-6} x^3 y^{-3})}{3^5 x^{-4} y^7}$$

$$\frac{\cancel{3^{-2}} x^{11+4} y^{-11}}{3^{5+2} \cancel{x^{-4}} y^{7+11}}$$

$$\frac{x^{15}}{3^7 y^{18}}$$

$$a^m \cdot a^n = a^{m+n} \quad \frac{a^m}{a^n} = a^{m-n}$$

$$(a^m)^n = a^{m \cdot n}$$

$$a^0 = 1$$

$$a^{-n} = \frac{1}{a^n}$$

$$\frac{1}{a^{-p}} = a^p$$

$$\sqrt[n]{a^m} = a^{m/n}$$

$$\sqrt[3]{a^2} = a^{2/3}$$

Simplifying Roots

$$\sqrt[2]{x^2 y^3} \cdot \sqrt[3]{x^2 y} = \sqrt[6]{x^6 y^9} \cdot \sqrt[6]{x^4 y^2}$$

$$\sqrt[6]{x^{10} y^{11}} = \sqrt[6]{x^6 y^6} \sqrt[6]{x^4 y^5} = x y \sqrt[6]{x^4 y^5}$$

Add Abs Value if = Even - Even - Odd
Index Power Power
Inside Outside

$$\sqrt[4]{x^{10} y^{22}} = x^2 y^5 \sqrt[4]{x^2 y^2}$$

Evaluate.

$$125^{2/3} = \sqrt[3]{125^2}$$

$$= 5^2$$

$$= \boxed{25}$$

$$7^{-2} = \frac{1}{7^2} = \frac{1}{49}$$

$$\sqrt{2x+3} - \sqrt{x+1} = 1$$

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

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

$$2x+3 = x+1 + \sqrt{x+1} + \sqrt{x+1} + 1 \leftarrow \text{clean up}$$

$$2x+3 = x+2 + 2\sqrt{x+1}$$

$$-x-2 \quad -x-2$$

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

FOIL

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

$$x^2 + 2x + 1 = 4x + 4$$

$$-4x-4$$

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

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

$$x=3 \quad x=-1$$

Check answers in
original problem!

Solve for x.

1) Isolate one root

2) Square both sides

3) Repeat steps 1+2

Check:

$$x=3 \quad \sqrt{9} - \sqrt{4} = 1$$

$$3 - 2 = 1 \checkmark$$

$$x=-1 \quad \sqrt{1} - \sqrt{0} = 1$$

$$1 - 0 = 1 \checkmark$$

19 $f(x) = 3x+7$ $g(x) = \frac{4x-1}{2x+5}$

$$\begin{aligned} (g \circ f)(x) &= g[f(x)] \\ &= \frac{4(3x+7)-1}{2(3x+7)+5} \\ &= \frac{12x+28-1}{6x+14+5} \\ &= \frac{12x+27}{6x+19} \end{aligned}$$

Find $f^{-1}(x)$.

$$f(x) = 2\sqrt[3]{x+1} - 4$$

$$y = 2\sqrt[3]{x+1} - 4$$

$$x = 2\sqrt[3]{y+1} - 4$$

$$\frac{x+4}{2} = \frac{2\sqrt[3]{y+1}}{2}$$

$$\left(\frac{x+4}{2}\right)^3 = \left(\sqrt[3]{y+1}\right)^3$$

$$\left(\frac{x+4}{2}\right)^3 = y+1$$

$$\left(\frac{x+4}{2}\right)^3 - 1 = y$$

- 1) Switch x 's & y 's
- 2) Solve for y .





