April 22, 2022

SEMESTER REVIEW

Factoring

2 terms

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

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

$a^2 + b^2 =$ not factorable

$a^3 - b^3 = (a-b)(a^2+ab+b^2)$

$a^3 + b^3 = (a+b)(a^2-ab+b^2)$

$x^3 - 27 = (x-3)(x^2+3x+9)$

3 terms
UNFOIL

$x^2 + 3x - 28$

$(x-4)(x+7)$

4 terms
GROUPING

$x^3 + 9x^2 - 5x - 20$

SEMESTER REVIEW

Factoring

2 terms

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

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

$a^2 + b^2 =$ not factorable

$a^3 - b^3 = (a-b)(a^2+ab+b^2)$

$a^3 + b^3 = (a+b)(a^2-ab+b^2)$

$x^3 - 27 = (x-3)(x^2+3x+9)$

3 terms
UNFOIL

$x^2 + 3x - 28$

$(x-4)(x+7)$

4 terms
GROUPING

$x^3 + 4x^2 - 5x - 20$

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

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

$(x+3)^3 + 2(x+3)^2 - 5(x+3)$

$(x+3)\left[(x+3)^2 + 2(x+3) - 5\right]$

Synthetic Division

$\frac{x^3 - 3x^2 + 6}{x^1 + 2}$

$-2 \;|\; 1 \quad -3 \quad 0 \quad 6$

$+ \quad 0 \quad -2 \quad 10 \quad -20$

$3/7 \;|\; 1 \quad -5 \quad 10 \quad -14$

$7\overline{|\,3\,|}$

$x^2 - 5x + 10 - \frac{14}{x+2}$

Rules of Exponents & Roots

Simplify

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

$$\frac{(2^{2}x^{8}y^{-14})\cdot(2^{-4}x^{+12}y^{-8})}{2^{3}x^{7}y^{-5}}$$

$$\frac{2^{-2}x^{20-7}y^{-22}}{2^{3+2}x^{7}y^{-5+22}}$$

$$\frac{x^{13}}{2^{5}y^{17}}$$

$$(x^{a})^{b}=x^{ab}$$

$$x^{a}\cdot x^{b}=x^{a+b}$$

$$6^{-5}\cdot 6^{3}=6^{-2}=\frac{1}{6^{2}}=\frac{1}{36}$$

$$9^{3/2}=\sqrt{9}^{3}=3^{3}=27$$

$$\sqrt[b]{x^{a}}=x^{a/b}$$

$\sqrt{12}$ → $4\cdot 3$ → $2\sqrt{3}$

$\sqrt[4]{48a^{17}b^{26}c^{22}}$ (4: even; a^{17}: even)

$16\cdot 3$

$2a^{4}b^{6}c^{5}\sqrt[4]{3a^{1}b^{2}c^{2}}$

$2^{4}=16$

$3^{4}=81$

When to add abs value ⇒ Even Root – Even Power Inside – Odd power outside

Solving Roots

1) Isolate one root
2) Square both sides
3) Repeat

Solve for x.

$$\sqrt{x+4} - \sqrt{x-4} = 2$$

$$\left(\sqrt{x+4}\right)^2 = \left(2 + \sqrt{x-4}\right)^2$$

FOIL!

$$x+4 = \left(2+\sqrt{x-4}\right)\left(2+\sqrt{x-4}\right)$$

$$x+4 = 4 + 2\sqrt{x-4} + 2\sqrt{x-4} + x-4$$

Clean up!

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

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

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

$$(1)^2 = \left(\sqrt{x-4}\right)^2$$

$$1 = x-4$$

$$5 = x$$

Check!

Check:

$$\sqrt{9} - \sqrt{1} = 2$$

$$3 - 1 = 2$$

$$2 = 2 \checkmark$$

#19 Function Operations

$f(x) = x^2 - 4$ $\quad g(x) = \sqrt{2x+3}$

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

$g[f(7)]$

$f(7) = 7^2 - 4 = 45$

$g(45) = \sqrt{2(45)+3} = \sqrt{93}$

$(f \circ g)(x)$

$= (\sqrt{2x+3})^2 - 4$

$= 2x + 3 - 4$

$= \boxed{2x - 1}$

19(c) $f^{-1}(x)$

Inverse - switch x + y coord.

$f(x) = 4x - 7$

$y = 4x - 7$

$x = 4y - 7$

$\frac{x+7}{4} = \frac{4y}{4}$

$\boxed{\frac{x+7}{4} = f^{-1}}$

1) Switch x + y

2) Solve for y

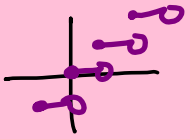
April 22, 2022

Linear Graph

$y = x$

$y = |x|$

$y = [x]$ Greatest Integer

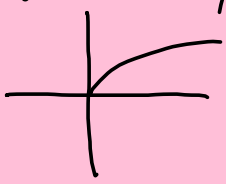


$y = x^2$ parabola

x	y
0	0
1	1
2	4
3	9

$y = \sqrt{x}$

x	y
0	0
1	1
4	2
9	3

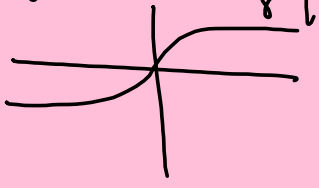


$y = x^3$ sqrtabolas

x	y
0	0
1	1
2	8

$y = \sqrt[3]{x}$

x	y
0	0
1	1
8	2



$y = \frac{1}{x}$

$y = \frac{1}{x^2}$