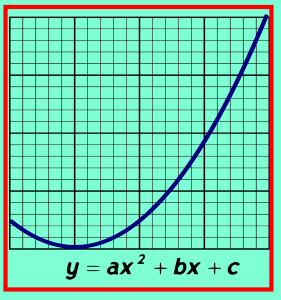
Math 125

Fall 2021

Lecture 4

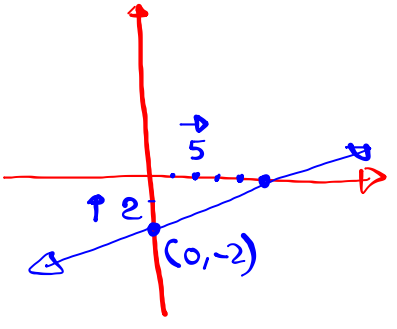


Class Qz 2

① Graph $y = \frac{2}{5}x - 2$

$m = \frac{2}{5}$

Y-Int $(0,-2)$



② Simplify: $(x+3)(x-5)+15$

$= x^2 - 5x + 3x - 15 + 15 = x^2 - 2x$

Simplify / Evaluate:

1) $x^2 - 4x - 20$ for $x = -2$.

$= (-2)^2 - 4(-2) - 20 = 4 + 8 - 20 = 12 - 20 = \boxed{-8}$

2) $(-4x^3)^3 = (-4)^3 (x^3)^3 = -64x^{3 \cdot 3} = \boxed{-64x^9}$

Monomial
Deg. = 9
Coef. = −64

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

$= 4x^2 + 6x - 6x - 9 - 3x^2 + 9$

$= 4x^2 - 3x^2 = 1x^2 = \boxed{x^2}$

Monomial
Deg. = 2, Coef. = 1

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1) Solve: $5(2x-3) - 4(3x-2) = -2(x+1) - 5$

$10x - 15 - 12x + 8 = -2x - 2 - 5$

$-2x - 7 = -2x - 7$

$-2x + 2x = -7 + 7$

$0 = 0$

True (No Variable)

All real numbers

$\mathbb{R}$

2) Solve and graph

$5x - 12 > 7(x-2) + 1$

$5x - 12 > 7x - 14 + 1$

$5x - 12 > 7x - 13$

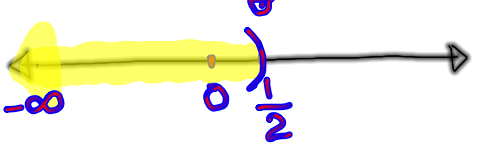
$5x - 7x > -13 + 12$

$-2x > -1$

Divide by -2

$\frac{-2}{-2}x < \frac{-1}{-2}$

$x < \frac{1}{2}$



Factor Completely

1) $5x^2 - 15x = \boxed{5x(x - 3)}$

2) $4x^3 - 8x^2 + 10x = \boxed{2x(2x^2 - 4x + 5)}$

3) $x^2 - 4x - 32 = \boxed{(x + 4)(x - 8)}$

FOIL to Verify

$1 \cdot 32$

$2 \cdot 16$

$\boxed{4 \cdot 8}$

Zero-Product Rule / Zero-Factor Property: If $A \cdot B = 0$, then $A = 0$ or $B = 0$ (maybe both)

Solve $(5x - 4)(x + 8) = 0$

Right-hand Side $= 0$, Left-hand Side is Factored

So $5x - 4 = 0$ OR $x + 8 = 0$

$5x = 4$

$\boxed{x = \frac{4}{5}}$

$\boxed{x = -8}$

$\left\{-8, \frac{4}{5}\right\}$

Solve $(2x-5)(2x+5)(x-10)=0$

RHS = 0

LHS is factored

Using Zero-Factor Property

$2x-5=0$ OR $2x+5=0$ OR $x-10=0$

$2x=5$ $\quad 2x=-5$ $\quad x=10$

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

$\left\{\pm\frac{5}{2}, 10\right\}$

Solve $(x-3)(x+3)(2x-1)(2x+1)=0$ ✓ ✓

RHS = 0

LHS Factored

$x-3=0$ $\quad x+3=0$ $\quad 2x-1=0$ $\quad 2x+1=0$

$x=3$ $\quad x=-3$ $\quad 2x=1$ $\quad 2x=-1$

$x=\frac{1}{2}$ $\quad x=\frac{-1}{2}$

Solution Set $\left\{\pm 3, \pm\frac{1}{2}\right\}$

Solve $x^2+8x+15=0$

1·15

3·5

RHS = 0

LHS not factored

$(x+3)(x+5)=0$

Verify by FOIL method

Using Zero-Product Rule

$x+3=0$ OR $x+5=0$

$x=-3$ $\quad x=-5$

Solution Set $\{-5,-3\}$

Solve $x^2 + 2x = 24$

First, we make RHS=0 $\quad x^2+2x-24=0$

Now, factor the LHS $\quad (x+6)(x-4)=0$

Foil to Verify

Choices:

1·24 2·12 3·8 (4·6)

Using Zero-Product Rule $\quad x+6=0$ OR $x-4=0$

$x=-6 \qquad x=4$

$\{-6, 4\}$

Solve

$x^2 = 20x - 64$

$x^2 - 20x + 64 = 0$

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

FOIL to Verify

1·64
2·32
4·16
8·8

Using Zero-Product Rule $\quad x-4=0$ OR $x-16=0$

$x=4 \qquad x=16$

Solution Set $\{4, 16\}$

Class Qz 3

1) Simplify: $(3x+5)(3x-5)-25$

$= 9x^2 - \cancel{15x} + \cancel{15x} - 25 - 25 = \boxed{9x^2 - 50}$

2) Factor: $5x^3y^2 - 20xy^4$

$= 5xy^2(x^2 - 4y^2) = \boxed{5xy^2(x+2y)(x-2y)}$

3) Factor: $x^2 - 6x + 9$

$1 \cdot 9$

$3 \cdot 3$

$= (x-3)(x-3) = \boxed{(x-3)^2}$