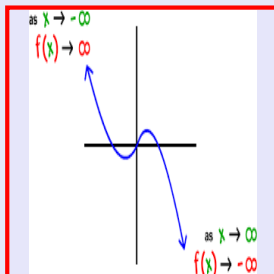


Math 245
Spring 2022
Lecture 9



$$y = |x - 3|$$

Y-Int $\rightarrow x=0$

$$y = |0 - 3| = |-3| = 3$$

$\rightarrow (0, 3)$

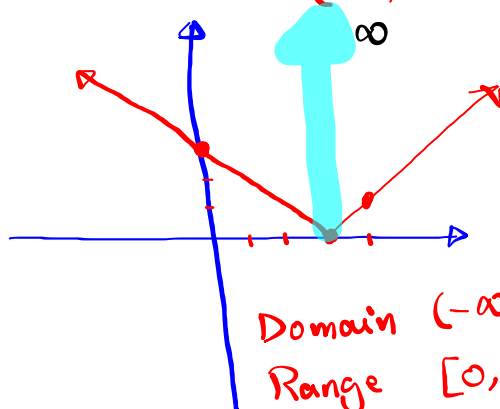
X-Int $\rightarrow y=0$

$$|x - 3| = 0$$

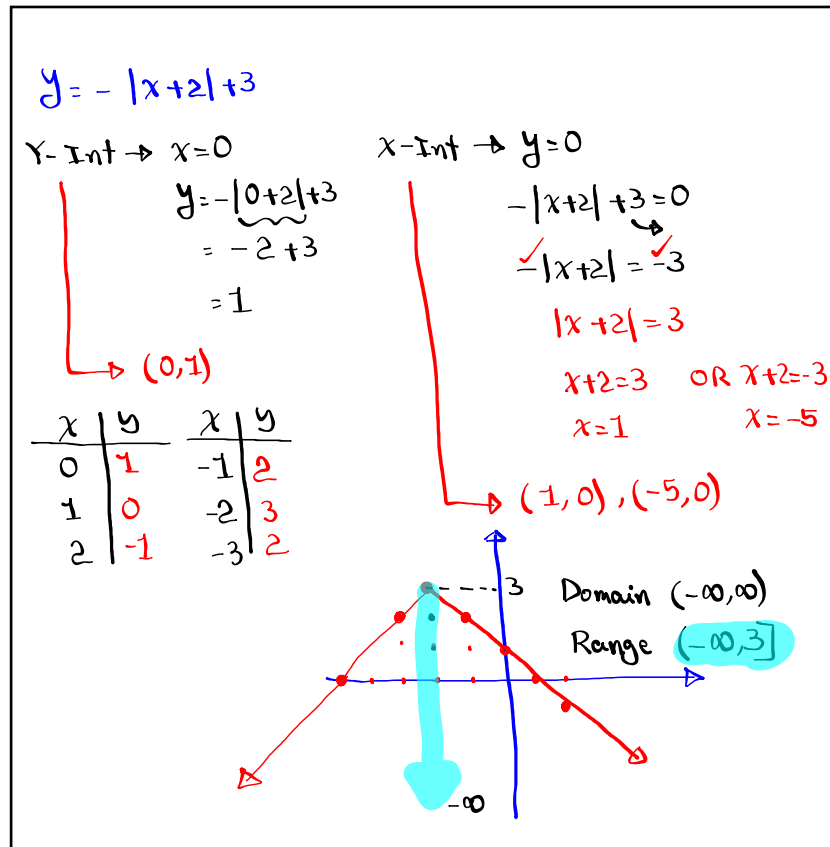
$$x - 3 = 0 \quad x = 3$$

$\rightarrow (3, 0)$

x	y
✓ 0	3
1	2
2	1
✓ 3	0
✓ 4	1
5	2



Domain $(-\infty, \infty)$
 Range $[0, \infty)$



Consider the interval notation $(-2, 3]$

1) Graph



2) write in Set-Builder notation $\{x | -2 < x \leq 3\}$

Consider the S.B.N. $\{x | x \geq -3\}$

1) Graph



2) write in interval notation. $[-3, \infty)$

Given $(x-2)^2 + (y+4)^2 = 25$

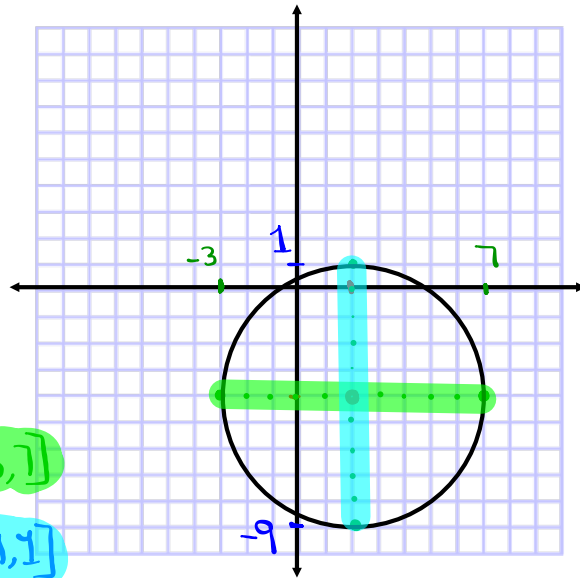
1) Center $(2, -4)$

2) Radius 5

3) Draw

4) Domain $-3 \leq x \leq 7 \Rightarrow [-3, 7]$

5) Range $-9 \leq y \leq 1 \Rightarrow [-9, 1]$



Factoring with Special Binomials:

Two-Terms

$$A^2 + B^2 \quad \text{Prime}$$

$$A^2 - B^2 = (A+B)(A-B) \quad \text{Difference of two squares.}$$

$$\begin{aligned} 25x^2 - 49 &= (5x)^2 - (7)^2 \\ &= (5x + 7)(5x - 7) \end{aligned}$$

$$81x^3 - 64xy^2 = x(81x^2 - 64y^2)$$

$$\begin{aligned} \text{GCF} & \quad = x[(9x)^2 - (8y)^2] \\ & \quad = x(9x - 8y)(9x + 8y) \end{aligned}$$

$$A^3 + B^3 = (A + B)(A^2 - AB + B^2)$$

Sum/Difference of two cubes

$$A^3 - B^3 = (A - B)(A^2 + AB + B^2)$$

$$x^3 - 64 = x^3 - 4^3 = (x - 4)(x^2 + 4x + 16)$$

↑ opposite
↑
↓
↓
Product
Product

$$2x^3 + 250 = 2(x^3 + 125)$$

$$= 2(x^3 + 5^3) = 2(x + 5)(x^2 - 5x + 25)$$

↑ opposite
↑
↓
↓
Product
Product

Factor **completely** → $x^4 - 29x^2 + 100 =$

Trinomial

$$(x^2 - 4)(x^2 - 25) =$$

1, 100

2, 50

4, 25

5, 20

10, 10

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

Factor Completely: $x^6 - 26x^3 - 27 =$

Trinomial

1, 27

3, 9

$$(x^3 - 27)(x^3 + 1) =$$

$$(x-3)(x^2+3x+9)(x+1)(x^2-x+1)$$

SG 4 ✓

Simplify

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

$$\text{Simplify: } \frac{3}{x^2 - 9} - \frac{2}{x^2 + 8x + 15}$$

$$= \frac{3(x+5)}{(x+3)(x-3)(x+5)} - \frac{2(x-3)}{(x+3)(x+5)(x-3)}$$

$$= \frac{3(x+5) - 2(x-3)}{(x+3)(x-3)(x+5)} = \frac{3x+15-2x+6}{(x+3)(x-3)(x+5)}$$

Start of SG 5

$$= \frac{x + 21}{(x+3)(x-3)(x+5)}$$