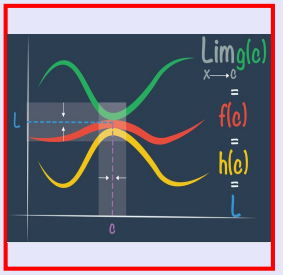
Math 261

Spring 2023

Lecture 1



Feb 19-8:47 AM

Some Review

1) Solve $3x - 8 = x + 14$

$3x - x = 14 + 8$

$2x = 22$

$x = \frac{22}{2}$ $\boxed{x = 11}$

Solution Set

1) $\{11\}$

2) Solve $2x^2 = 5x + 7$

$2x^2 - 5x - 7 = 0$

$(2x - 7)(x + 1) = 0$

By Zero-Product Rule

$2x - 7 = 0$ OR $x + 1 = 0$

$x = \frac{7}{2}$ $x = -1$

2) $\{-1, \frac{7}{2}\}$

Feb 6-8:50 AM

3) Use Quadratic formula to Solve

$2x^2 - 5x - 7 = 0$

$ax^2 + bx + c = 0$

$a = 2$

$b = -5$

$c = -7$

$b^2 - 4ac = (-5)^2 - 4(2)(-7) = 25 + 56 = 81$

Discriminant

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-5) \pm \sqrt{81}}{2(2)}$$

$$= \frac{5 \pm 9}{4}$$

$$x = \frac{5+9}{4} = \frac{14}{4} = \frac{7}{2}$$

$$x = \frac{5-9}{4} = \frac{-4}{4} = -1$$

3) $\left\{-1, \frac{7}{2}\right\}$

Feb 6-8:55 AM

Solve & graph $4x - 3 \leq 6(x+4) + 6$

$4x - 3 \leq 6x + 24 + 6$

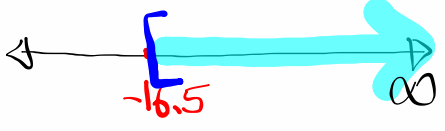
$4x - 3 \leq 6x + 30$

$4x - 6x \leq 30 + 3$

$-2x \leq 33$

$\frac{-2}{-2}x \geq \frac{33}{-2}$

$x \geq -16.5$



Interval notation

$[-16.5, \infty)$

Set-Builder notation

$\{x \mid x \geq -16.5\}$

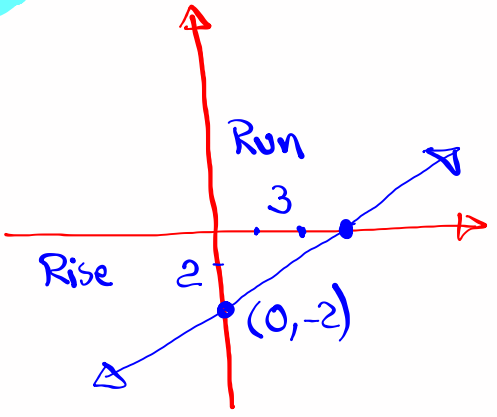
Feb 6-9:00 AM

Graph $y = \frac{2}{3}x - 2$.

Slope-Int. form

$y = mx + b$

$m = \frac{\text{Rise}}{\text{Run}} = \frac{2}{3}$



Feb 6-9:05 AM

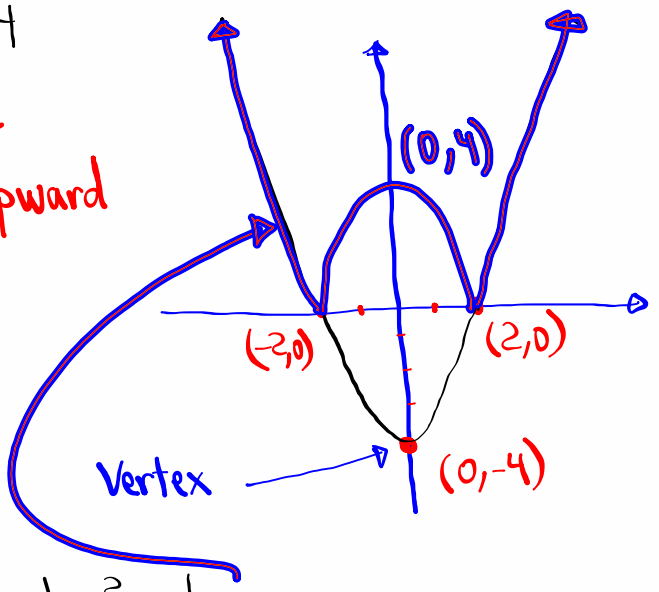
Graph $y = x^2 - 4$

Parabola

opens upward

Y-Int $(0, -4)$

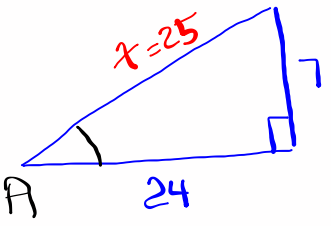
x-Int $(\pm 2, 0)$



Now graph $y = |x^2 - 4|$

Feb 6-9:07 AM

Consider the right triangle below:



1) find its hypotenuse

$24^2 + 7^2 = x^2 \rightarrow x = 25$

Pythagorean thm

2) find all six trig. functions for the marked angle

$\sin A = \frac{7}{25}$ $\quad \csc A = \frac{25}{7}$

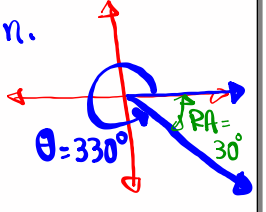
$\cos A = \frac{24}{25}$ $\quad \sec A = \frac{25}{24}$

$\tan A = \frac{7}{24}$ $\quad \cot A = \frac{24}{7}$

Feb 6-9:17 AM

$\theta = 330^\circ$

1) Draw θ in standard Position.



2) Give its Reference Angle.

θ is in QIV

3) find $\sin\theta = -\frac{1}{2}$ $\quad \csc\theta = -2$

$\sin 30^\circ = \frac{1}{2}$ $\quad \cos\theta = +\frac{\sqrt{3}}{2}$ $\quad \sec\theta = +\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

$\cos 30^\circ = \frac{\sqrt{3}}{2}$ $\quad \tan\theta = -\frac{\sqrt{3}}{3}$ $\quad \cot\theta = -\frac{3}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = -\sqrt{3}$

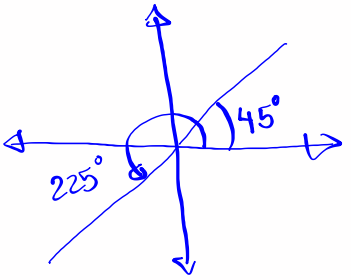
$\tan 30^\circ = \frac{\sqrt{3}}{3}$

Feb 6-9:23 AM

Solve $\tan x = 1$ in $[0°, 360°)$

R.A. $45°$

$\tan x > 0$ in QI, QIII



$\{45°, 225°\}$ Convert to Radians $\left\{\frac{\pi}{4}, \frac{5\pi}{4}\right\}$

$90° = \frac{\pi}{2}$ Rad.

Divide by 2

$45° = \frac{\pi}{4}$ Rad.

$225° = 5(45°)$

$= 5 \cdot \frac{\pi}{4} = \boxed{\frac{5\pi}{4}}$

Feb 6-9:30 AM

Simplify $\dfrac{x^2 - 10x + 24}{x^2 - 16}$

$= \dfrac{(x-6)(x-4)}{(x-4)(x+4)} = \boxed{\dfrac{x-6}{x+4}}$

Simplify $\dfrac{\frac{1}{x} - 1}{x - 1}$

LCD $= x$

$= \dfrac{x \cdot \frac{1}{x} - x \cdot 1}{x(x-1)}$

$= \dfrac{1 - x}{x(x-1)}$

$= \dfrac{-1(x-1)}{x(x-1)} = \boxed{\dfrac{-1}{x}}$

Feb 6-9:35 AM

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

Find $\dfrac{f(x+h) - f(x)}{h}$

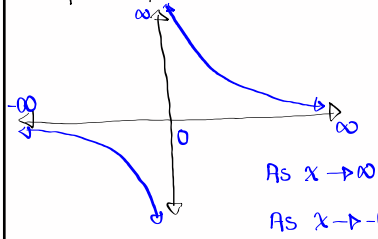
$= \dfrac{(x+h)^2 - 4 - (x^2 - 4)}{h}$

$= \dfrac{x^2 + 2xh + h^2 - 4 - x^2 + 4}{h}$

$= \dfrac{2xh + h^2}{h} = \dfrac{h(2x+h)}{h} = 2x + h$

Feb 6-9:41 AM

Graph displayed below belongs to $y = \frac{1}{x}$



As $x \to \infty$, $y \to 0$

As $x \to -\infty$, $y \to 0$

As $x \to 0$ from the right, $y \to \infty$

$x \to 0^+$

As $x \to 0$ from the left, $y \to -\infty$

$x \to 0^-$

1) Go to www.mymathclasses.com
2) Be familiar with office hours
3) Go to Math 261
4) find Study Guide 0, and do it.

Feb 6-9:46 AM