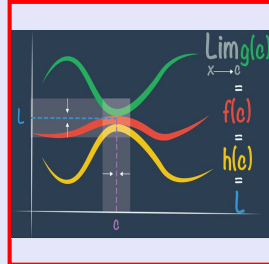


Calculus I

Lecture 1



Feb 19-8:47 AM

Some Review

1) Given $a=2$, $b=-12$, and $c=9$ a) Evaluate $b^2 - 4ac$

$$=(-12)^2 - 4(2)(9) = 144 - 72 = 72$$

a) 72b) Find $\sqrt{b^2 - 4ac} = \sqrt{72} = \sqrt{36 \cdot 2}$

$$= \sqrt{36} \sqrt{2} = 6\sqrt{2}$$

b) $6\sqrt{2}$ c) Simplify $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-12) \pm 6\sqrt{2}}{2(2)}$

$$= \frac{12 \pm 6\sqrt{2}}{4}$$

$$= \frac{2(6 \pm 3\sqrt{2})}{4}$$

$$= \frac{6 \pm 3\sqrt{2}}{2}$$

c) $\frac{6 \pm 3\sqrt{2}}{2}$

Feb 10-8:56 AM

Solve and graph

$$4(x-2) + 2(x-4) < x-8$$

$$4x-8 + 2x-8 < x-8$$

$$6x-16 < x-8$$

$$6x-x < -8+16$$

$$5x < 8$$

$$x < \frac{8}{5} \quad x < 1.6$$

$x < \frac{8}{5}$

Interval Notation $(-\infty, \frac{8}{5})$

Set-Builder Notation $\{x \mid x < \frac{8}{5}\}$
 Such that

Feb 10-9:08 AM

Solve & Graph

$$|2x-5| \leq 3$$

Solve $|2x-5|=3$

$$2x-5=3 \quad \text{OR} \quad 2x-5=-3$$

$$2x=8 \quad \quad \quad 2x=2$$

$$\boxed{x=4} \quad \quad \quad \boxed{x=1}$$

I.N. $\Rightarrow [1,4]$ S.B.N. $\{x \mid 1 \leq x \leq 4\}$ Such that

Solve $-3 \leq 2x-5 \leq 3$

Add 5

$$-3+5 \leq 2x-5+5 \leq 3+5$$

$$2 \leq 2x \leq 8$$

Divide by 2

$$\frac{2}{2} \leq \frac{2}{2}x \leq \frac{8}{2} \quad \boxed{1 \leq x \leq 4}$$

Feb 10-9:14 AM

Given $y = \frac{3}{2}x - 6$ → Slope-Int Form
 $y = mx + b$

1) Complete the chart below

x	y
0	-6
4	0

Slope $m = \frac{3}{2}$
 Y-Int $(0, -6)$

2) Use the chart to draw.

$x=0 \rightarrow y = \frac{3}{2}(0) - 6 = 0 - 6 = -6$
 $y=0 \quad 0 = \frac{3}{2}x - 6 \rightarrow \frac{3}{2}x = 6 \quad 3x = 12 \quad x = 4$

Feb 10-9:21 AM

Draw a Circle with center at $(3, 0)$
 with radius 2.

Discuss its
 Domain & Range.

x -values y -values

$1 \leq x \leq 5$ $-2 \leq y \leq 2$
 $[1, 5]$ $[-2, 2]$

Feb 10-9:28 AM

Simplify

$$1) 4x^3 \cdot (-3x^4) = 4(-3)x^3 \cdot x^4 = -12x^{3+4} = \boxed{-12x^7}$$

Monomial

$$2) (2x - 3)(2x + 3) = 4x^2 + \cancel{6x} - \cancel{6x} - 9$$

FOIL

$$= \boxed{4x^2 - 9}$$

Binomial

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

$$= 9x^2 - 15x - 15x + 25$$

$$= \boxed{9x^2 - 30x + 25} \text{ Trinomial}$$

Feb 10-9:34 AM

Factor completely

$$1) \underline{6}x^2 - \underline{10}x = \underline{2}x(3x - 5)$$

GCF

$$2) 5x(2x+3) - 1(2x+3) = (2x+3)(5x-1)$$

$$3) \overset{\uparrow}{x^2} - 10x + 25 = (x-5)(x-5)$$

LC=1

$$= (x-5)^2$$

$$4) 3x^2 - 5x - 8 = 3x^2 + 3x - 8x - 8$$

$$= 3x(x+1) - 8(x+1)$$

$$= (x+1)(3x-8)$$

Product = -24
Sum = -5

1, 24
2, 12
3, 8

Feb 10-9:42 AM

Solve

$$1) 3x + 5 = 0$$

$$3x = -5 \quad \boxed{x = -\frac{5}{3}} \quad \left\{-\frac{5}{3}\right\}$$

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

$$x(2x - 5) = 0 \quad x = 0 \quad 2x - 5 = 0$$

$$\text{Zero-factor Prop.} \quad \boxed{x = 0} \quad \boxed{x = \frac{5}{2}}$$

$$3) x^2 - x - 6 = 0 \quad \left\{0, \frac{5}{2}\right\}$$

$$(x - 3)(x + 2) = 0$$

$$x - 3 = 0 \quad x + 2 = 0 \quad \left\{-2, 3\right\}$$

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

$$4) 2x^2 + 7x = 9$$

$$2x^2 + 7x - 9 = 0$$

$$(2x + 9)(x - 1) = 0 \quad \left\{1, -\frac{9}{2}\right\}$$

$$2x + 9 = 0 \quad \text{OR} \quad x - 1 = 0 \quad \left\{-\frac{9}{2}, 1\right\}$$

$$x = -\frac{9}{2} \quad x = 1$$

Feb 10-10:12 AM

$$ax^2 + bx + c = 0 \quad ; a \neq 0$$

Quadratic Equation

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \text{Quadratic Formula}$$

$$b^2 - 4ac \quad \text{Discriminant}$$

$$\text{Solve} \quad 4x^2 - 20x + 25 = 0$$

$$\begin{array}{ccc} \uparrow & \uparrow & \uparrow \\ a=4 & b=-20 & c=25 \end{array}$$

$$b^2 - 4ac = (-20)^2 - 4(4)(25) = 0$$

$$\left\{\frac{5}{2}\right\}$$

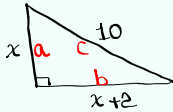
Do not use 0 for Zero.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-20) \pm \sqrt{0}}{2(4)}$$

$$= \frac{20 \pm 0}{8} = \frac{20}{8} = \frac{5}{2}$$

Feb 10-10:22 AM

Find x



Triangle
Right Triangle

$a^2 + b^2 = c^2$ Pythagorean Formula

Legs Hypotenuse

Solve

$$x^2 + (x+2)^2 = 10^2$$

$$x^2 + (x+2)(x+2) = 100$$

$$x^2 + x^2 + 2x + 2x + 4 - 100 = 0$$

$$2x^2 + 4x - 96 = 0$$

Divisible by 2

$$x^2 + 2x - 48 = 0$$

$a=1$ $b=2$ $c=-48$

$$b^2 - 4ac = 2^2 - 4(1)(-48)$$

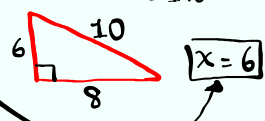
$$= 4 + 192$$

$$= 196$$

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

$$= \frac{-(2) \pm \sqrt{196}}{2(1)} = \frac{-2 \pm 14}{2}$$

$$x = \frac{-2 + 14}{2} = \frac{12}{2} = 6$$

$$x = \frac{-2 - 14}{2} = \frac{-16}{2} = -8$$


$x = 6$

Feb 10-10:29 AM

Complete the charts below for $y = x^2$

Graph?

Parabola

x	y
1.5	2.25
1.7	2.89
1.9	3.61
1.99	3.9601

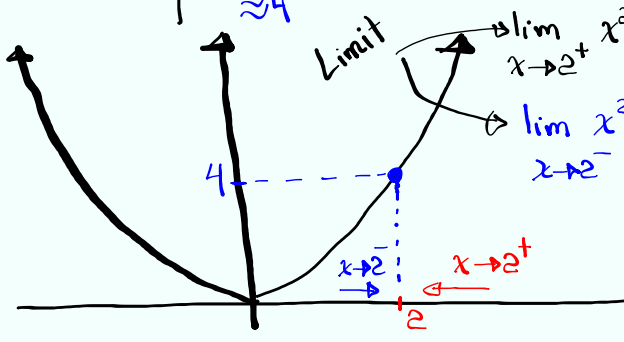
x	y
2.5	6.25
2.3	5.29
2.1	4.41
2.01	4.0401

$2 \approx 1.9999$ $3.99960001 \approx 2.0001$ $4.00040001 \approx 4$

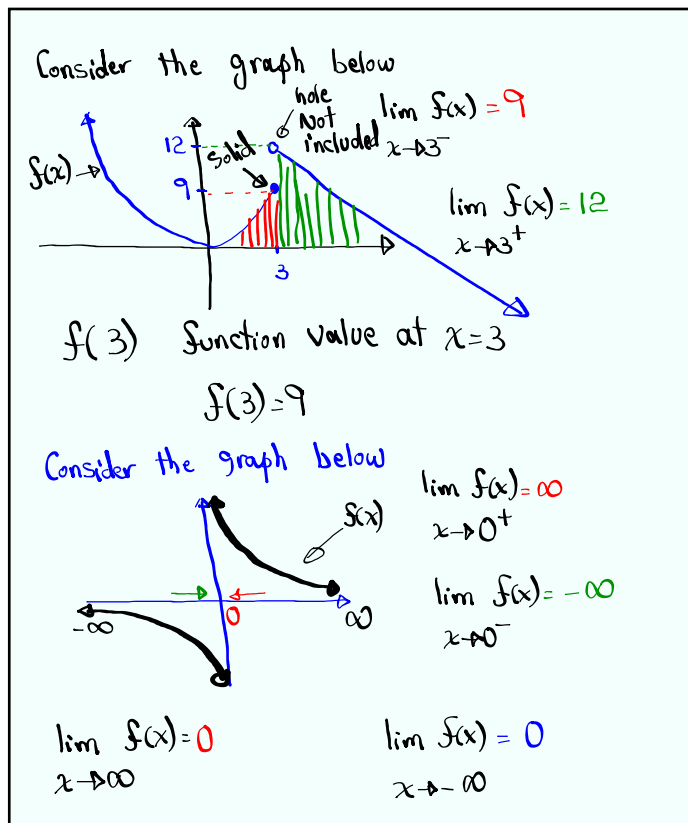
Limit

$\lim_{x \rightarrow 2^+} x^2 = 4$

$\lim_{x \rightarrow 2^-} x^2 = 4$



Feb 10-10:40 AM



Feb 10-10:51 AM

Class QZ 1 Box Your Final Answer.

1) Solve $3(x-1) - 5(x+2) = -13$

$$3x - 3 - 5x - 10 = -13$$

$$-2x - 13 = -13$$

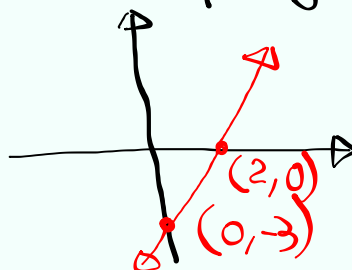
$$-2x = 0$$

$$\boxed{x=0}$$

{0}

2) Graph $3x - 2y = 6$ after completing the chart below:

x	y
0	-3
2	0



Feb 10-11:10 AM