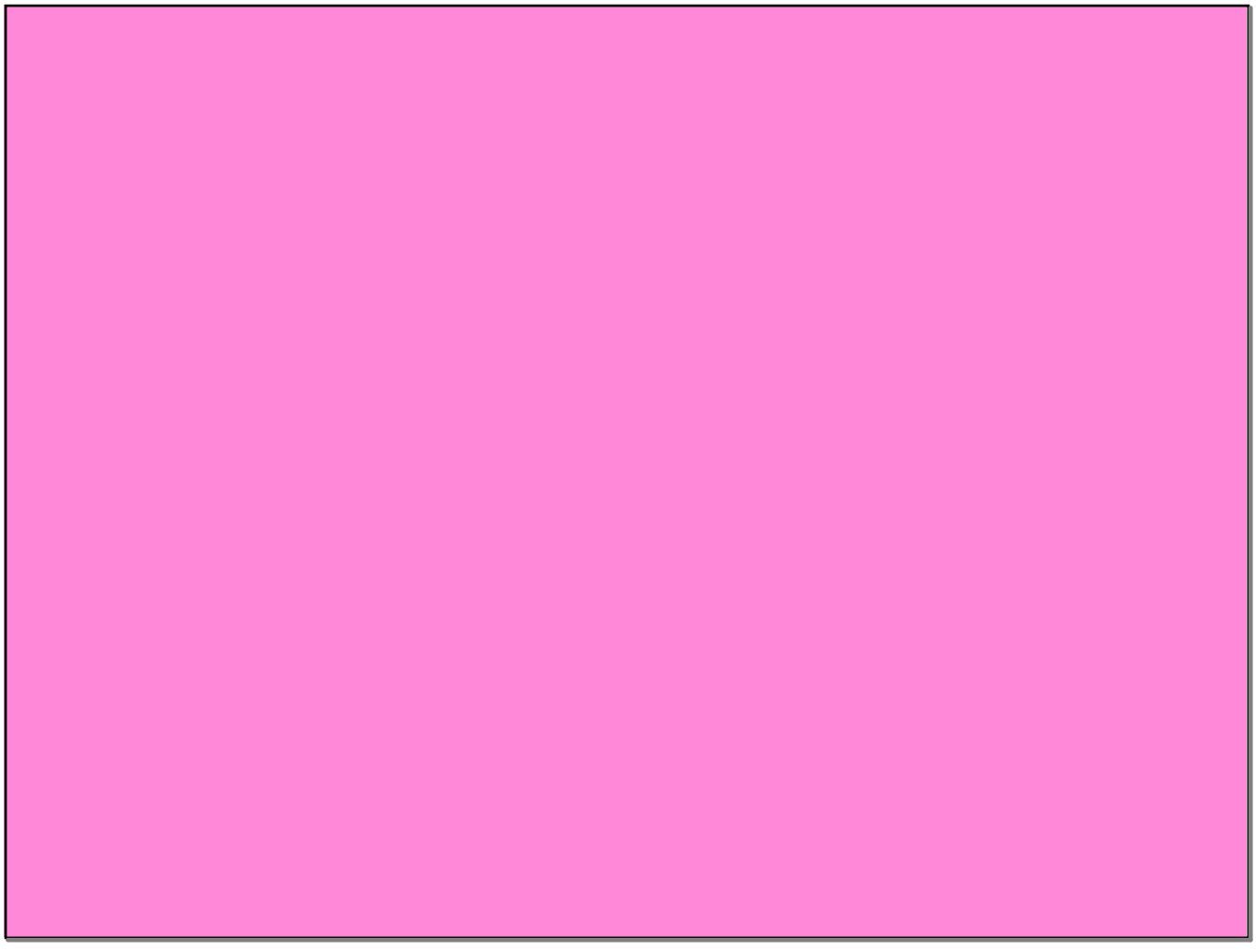
December 7, 2022



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Semester Review Day 2

Graph Transformations

Up c units $f(x)+c$

Down c units $f(x)-c$

Right c units $f(x-c)$

Left c units $f(x+c)$

Flip over x-axis $-f(x)$

$f(x)=-\frac{2}{7}[x+7]-4$

Left 7 Down 4

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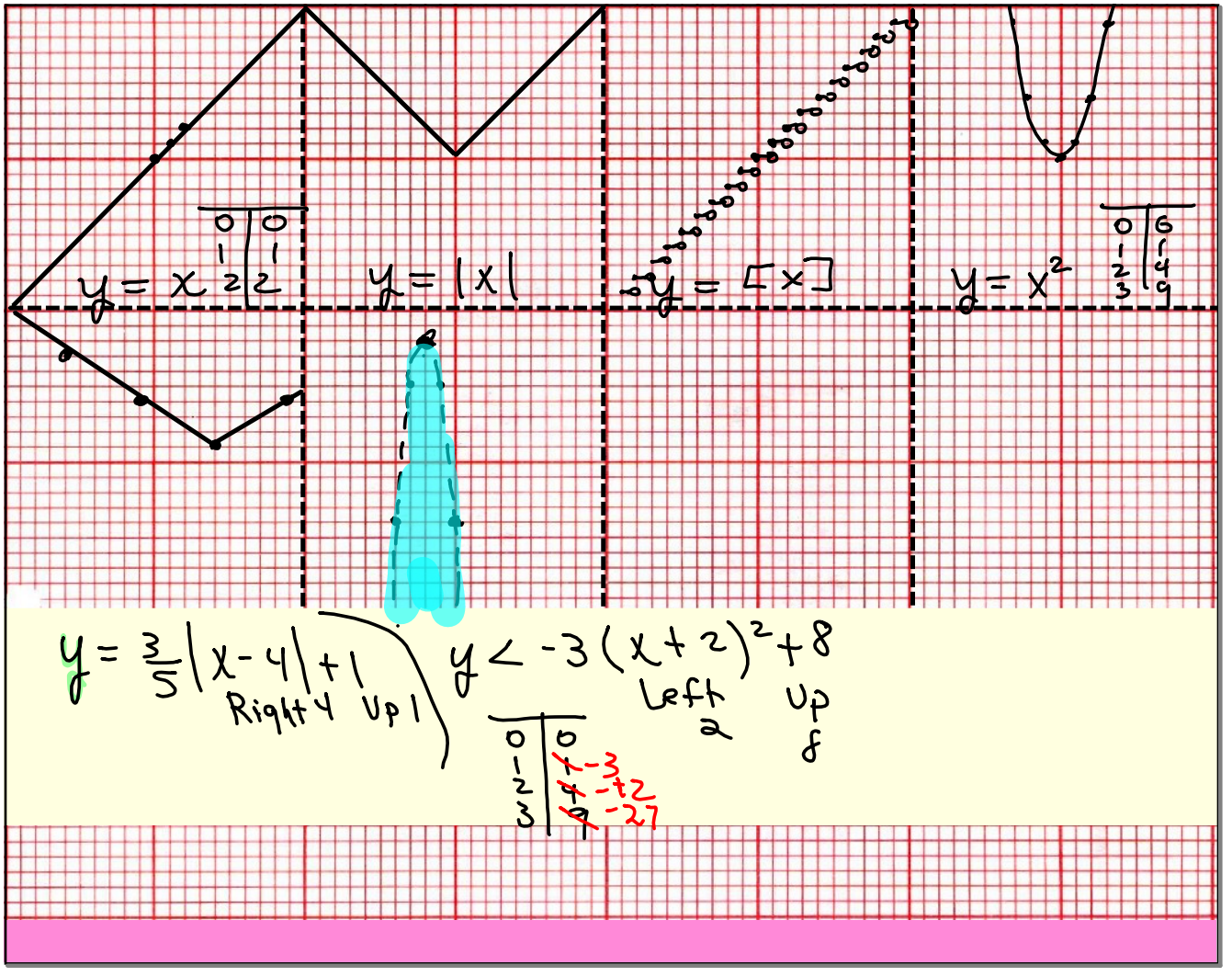


Cramer's Rule

$$2x - 3y = -13$$
$$5x + 2y = 34$$

$$x = \frac{\begin{vmatrix} -13 & -3 \\ 34 & 2 \end{vmatrix}}{\begin{vmatrix} 2 & -3 \\ 5 & 2 \end{vmatrix}} = \frac{-26 + 102}{4 + 15} = \frac{76}{19} = 4$$

$$y = \frac{\begin{vmatrix} 2 & -13 \\ 5 & 34 \end{vmatrix}}{\begin{vmatrix} 2 & -3 \\ 5 & 2 \end{vmatrix}} = \frac{68 + 65}{19} = \frac{133}{19} = 7$$

$(4, 7)$

Matrix Equations

$$2x + y + 7z = 49$$
$$4x - 3y - 9z = -27$$
$$8x + y + 5z = 75$$

$$[A]\begin{bmatrix} 2 & 1 & 7 \\ 4 & -3 & -9 \\ 8 & 1 & 5 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = [A]^{-1}\begin{bmatrix} 49 \\ -27 \\ 75 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 & 1 & 7 \\ 4 & -3 & -9 \\ 8 & 1 & 5 \end{bmatrix}^{-1} \cdot \begin{bmatrix} 49 \\ -27 \\ 75 \end{bmatrix}$$

Square Roots & Complex Numbers

$\sqrt{63} + \sqrt{28}$ ($9 \cdot 7$, $4 \cdot 7$)

$3\sqrt{7} + 2\sqrt{7}$

$= 5\sqrt{7}$

$\frac{7}{2\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{7\sqrt{3}}{6}$ ($\sqrt{3} \cdot \sqrt{3} = 3$)

$\frac{5+3\sqrt{2}}{6-4\sqrt{2}} \cdot \frac{(6+4\sqrt{2})}{(6+4\sqrt{2})}$ FOIL

FL: $12 \cdot 2 = 24$

$= \frac{30+20\sqrt{2}+18\sqrt{2}+24}{36-16 \cdot 2}$ ($16 \cdot 2 = 32$)

$= \frac{54+38\sqrt{2}}{4} = \frac{27+19\sqrt{2}}{2}$

$\sqrt{-18} = \sqrt{-1 \cdot 9 \cdot 2} = 3i\sqrt{2}$

$2i^{57} - 3i^{68}$

$\frac{57}{4} = 14.75$, $\frac{3}{4}$ $\quad 68 = 17 \cdot 4$

$i = i$

$i^2 = -1$

$i^3 = -i$

$i^4 = 1$

$2(-i) - 3(1)$

$-2i - 3$

$(7+5i)(4-2i)$

$28 - 14i + 20i + 10i^2$

$38 + 6i$

Solve $4x^2 - 6 = -5x$

$4x^2 + 5x - 6 = 0$

$(4x - 3)(x + 2) = 0$

$-3x \quad +8x$

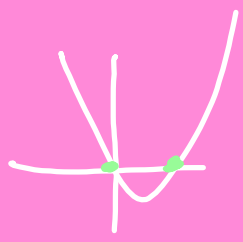
$4x - 3 = 0 \qquad x + 2 = 0$

$4x = 3 \qquad x = -2$

$x = 3/4$

Solve

1) Factor
2) Quadratic Formula
3) Complete Sq
4) Graph on calculator
   Find zeros.



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

$2x + 5x^2 - 9 = 0$

$a \quad b \quad c$

$5x^2 + 2x - 9 = 0$

$a \quad b \quad c$

Find vertex. #22

Vertex Form

$y = \frac{2}{3}(x-4)^2 + 1$

Vertex: $(4, 1)$

Line of symm. $x = 4$

Direction Up $(+2/3)$

Width Wide

Standard Form

$y = 2x^2 - 12x + 3$

Vertex: $x = \frac{-b}{2a}$

y = sub in x-coord

$x = \frac{12}{2(2)} = 3$

$y = 2(3)^2 - 12(3) + 3$

$= 18 - 36 + 3$

$= -15$

$(3, -15)$

Intercept Form

$y = a(x-p)(x-q)$

$x = \frac{p+q}{2}$

y = sub in x.

$y = 2(x-4)(x+6)$

$x-4=0 \quad x+6=0$

$x=4 \quad x=-6$

Vertex $\frac{4+-6}{2} = -1$

$y = 2(-1-4)(-1+6)$

$= -50$

$(-1, -50)$

Projectile Motion:

$$h(t) = \frac{1}{2}at^2 + V_0 t + S_0$$

$a = -9.8 \frac{m}{s^2}$ $a = -32 \frac{ft}{s^2}$