

Lesson 87- Ellipse Day 3.notebook

April 10, 2018

Lesson 87 Objective: SWBAT graph and write equations of an ellipse.

Kickoff- Identify each equation and any key features of the graph of the equation

$$(x - h)^2 = 4p(y - k) \quad \text{Vertical parabola}$$

$$(y - k)^2 = 4p(x - h) \quad \text{Horizontal parabola}$$

$$\frac{(x - h)^2}{a^2} + \frac{(y - k)^2}{b^2} = 1 \quad \text{Circle}$$

$$\frac{(y - k)^2}{a^2} + \frac{(x - h)^2}{b^2} = 1 \quad \text{Center and radius}$$

Focus
directrix
Vertex
LOS

horizontal ellipse
vertical ellipse

foci (2), (4) **vertices**, **center**, **major axis** is **minor axis**, $a^2 = b^2 + c^2$

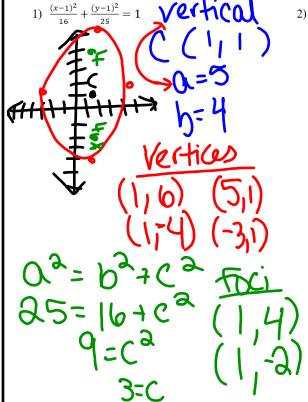
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$$\frac{(x - h)^2}{a^2} + \frac{(y - k)^2}{b^2} = 1 \quad \text{Horizontal Major Axis}$$

$$\frac{(x - h)^2}{b^2} + \frac{(y - k)^2}{a^2} = 1 \quad \text{Vertical Major Axis}$$

Directions: Identify the vertices, foci and center of the ellipse. Then sketch its graph.

1) $\frac{(x - 1)^2}{16} + \frac{(y - 1)^2}{25} = 1$ 2) $18(x - 3)^2 + 50(y - 1)^2 = 450$



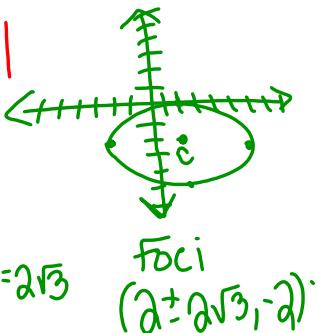
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3) $(x - 2)^2 + (y + 2)^2 = 16$

4) $\frac{(x+1)^2}{9} + \frac{y^2}{49} = 1$

$$\frac{(x-2)^2}{16} + \frac{(y+2)^2}{4} = 1$$

C: (2, -2)
a: 4 **b:** 2
 $b^2 = 4 + c^2$
 $16 = 4 + c^2$
 $c^2 = 12$
 $c = 2\sqrt{3}$



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5) Vertices: (1, 12), (1, -8)
6) Foci: (-1, 2), (1, -2)
Vertices: (-6, 1), (-6, -4)

vertical
center (1, 1)
a: 10
b: 6
 $a^2 = b^2 + c^2$
 $100 = 36 + c^2$
 $c^2 = 64$
 $c = 8$

horizontal
center (-6, 1)
a: 2
b: 5
 $a^2 = b^2 + c^2$
 $4 = 25 + c^2$
 $c^2 = -21$
 $c = \sqrt{-21}$

$\frac{(x-1)^2}{36} + \frac{(y-1)^2}{100} = 1$
 $\frac{(x+6)^2}{4} + \frac{(y-1)^2}{25} = 1$

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Directions: Use the information provided to write the standard form equation of each ellipse. Then determine the center, a, and b values, foci and determine if the ellipse has a horizontal or vertical major axis.

7) $x^2 + 16y^2 + 2x - 96y + 129 = 0$
 $8) 4x^2 + 9y^2 + 32x - 36y + 64 = 0$

$(x^2 + 2x) + (16y^2 - 96y) = -129$
 $(x+1)^2 + 16(y^2 - 6y) = -124$
 $(x+1)^2 + 16(y-3)^2 = 16$

$\frac{(x+1)^2}{16} + \frac{(y-3)^2}{1} = 1$

$4x^2 + 32x + 9y^2 - 36y + 64$
 $4(x^2 + 8x) + 9(y^2 - 4y) = -64$
 $4(x+4)^2 + 9(y-2)^2 = -64$

$\frac{4(x+4)^2}{36} + \frac{9(y-2)^2}{36} = -1$
 $\frac{(x+4)^2}{9} + \frac{(y-2)^2}{4} = -1$

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