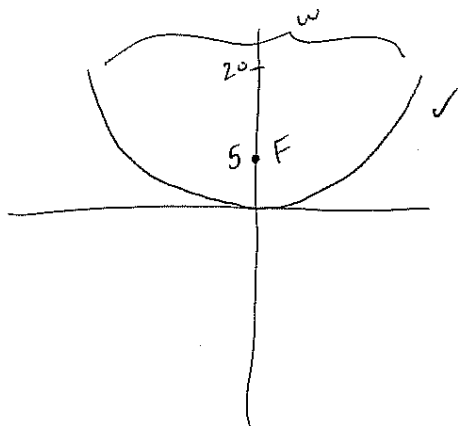


# Quiz 4A - Math 130

Name: Key

1. (2 points) A sound receiving dish used at outdoor sporting events is constructed in the shape of a paraboloid with its focus 5 inches from the vertex. Determine the width of the dish if the depth is to be 20 inches. Round to the nearest hundredth of an inch.



$$\Rightarrow p = 5$$

$$x^2 = 4py$$

$$x^2 = 20y \text{ is equation.}$$

We want the point where  $y = 20$

$$\Rightarrow x^2 = 20(20) = 400$$

$$\Rightarrow x = 20$$

So the width is

40 inches

2:53

3:02

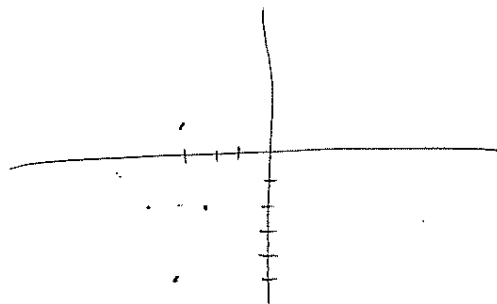
2. (2 points) Find the equation of the ellipse with vertices at  $(-3, 1)$  and  $(-3, -5)$  and a minor axis of length 2.

Center:  $(-3, -2)$

$$a = 3$$

$$b = 1$$

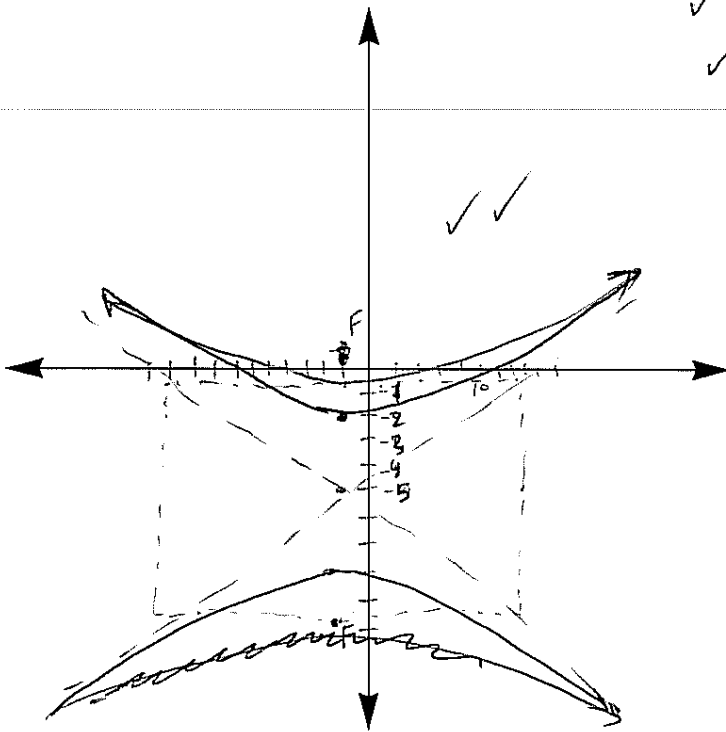
$$\frac{(x+3)^2}{1} + \frac{(y+2)^2}{9} = 1$$



3. (4 points) Find the center, vertices, and foci of the hyperbola

$$4y^2 - x^2 + 40y - 4x + 60 = 0$$

Sketch the graph.



$$4y^2 + 40y + 100 - x^2 - 4x + (-4) = 60$$

$$4(y^2 + 10y + 25) - 1(x^2 + 4x + 4) = 60$$

$$4(y+5)^2 - (x+2)^2 = 36$$

$$\frac{4(y+5)^2}{36} - \frac{(x+2)^2}{36} = 1$$

$$\frac{(y+5)^2}{9} - \frac{(x+2)^2}{36} = 1$$

$a=3$   $b=6$

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

$$c^2 = 45$$

$$c = 3\sqrt{5} \approx 6.6$$

- Center: ~~(-2, -5)~~ (-2, -5) ✓
- Vertices: ~~(-2, -2) & (-2, -8)~~ (-2, -2) & (-2, -8) ✓
- Foci: ~~(-2, -5 ± 3√5)~~ (-2, -5 ± 3√5) ✓

4. (2 points) Identify the following conics as a parabola, circle, ellipse, or hyperbola. Use each term exactly once.

- (a)  $9x^2 - 36x = 4y^2$  Hyperbola (since -)  $9x^2 - 36x - 4y^2 = 0$  ✓
- (b)  $y^2 - 3 = 4(2x + y)$  Parabola (only y is squared) ✓
- (c)  $x^2 - 2x = -2y(y + 3) + 20$  Ellipse (since + between  $x^2, 2y^2$ ) ✓
- (d)  $x^2 + 6x + y^2 - 4y = -6$  Circle ( $x^2, y^2$  have same coefficient) ✓