

Name \_\_\_\_\_

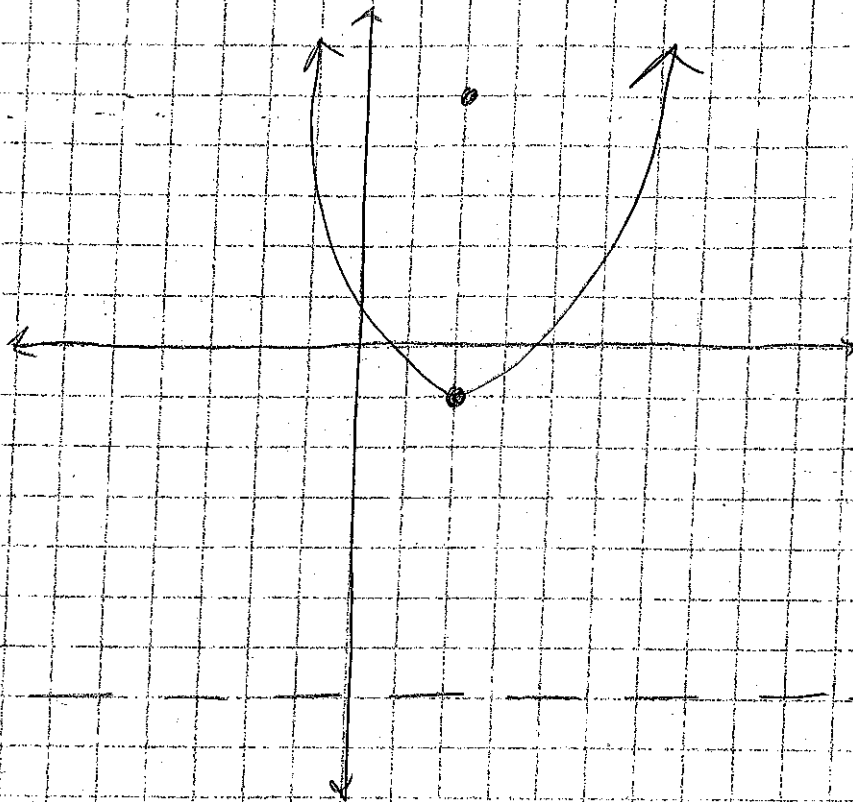
$$1) (x-2)^2 = 24(y+1)$$

vertical - up

vertex:  $(2, -1)$

focus:  $(2, 5)$

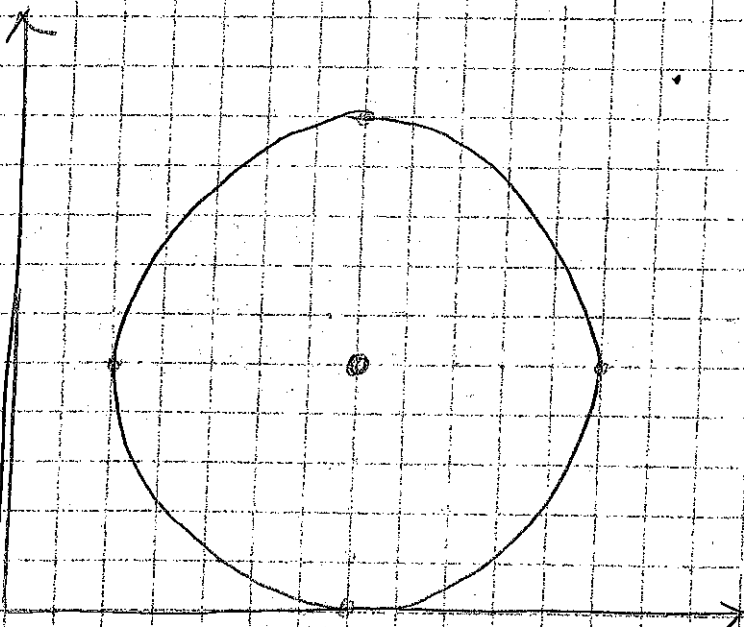
directrix:  $y = -7$



$$2) (x-7)^2 + (y-5)^2 = 25$$

center:  $(7, 5)$

radius: 5



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

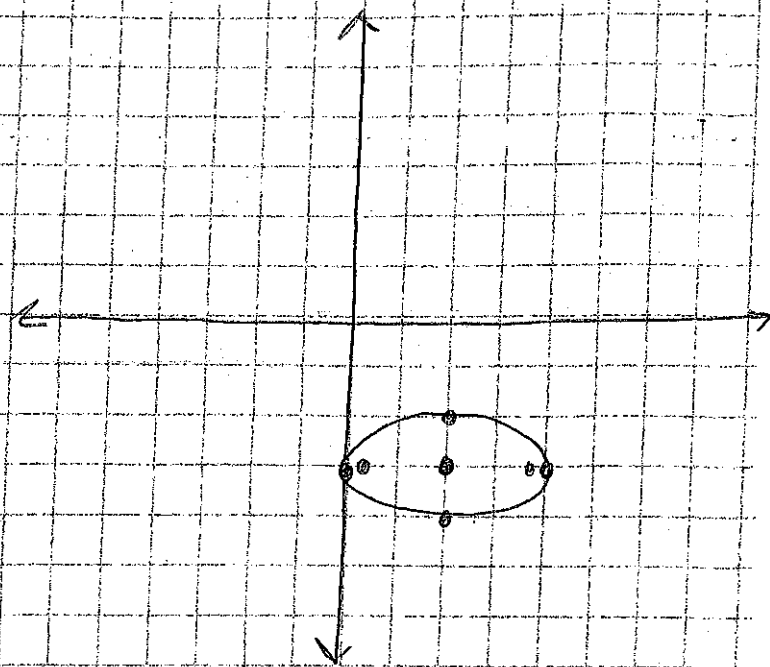
center:  $(2, -3)$

vertices:  $(0, -3)$   $(4, -3)$

covertices:  $(2, -2)$   $(2, -4)$

foci:  $(2 \pm \sqrt{3}, -3)$  or  $(.27, -3)$

$$c^2 = 4 - 1 = 3 \quad (3.73, -3)$$



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

center:  $(-4, 0)$

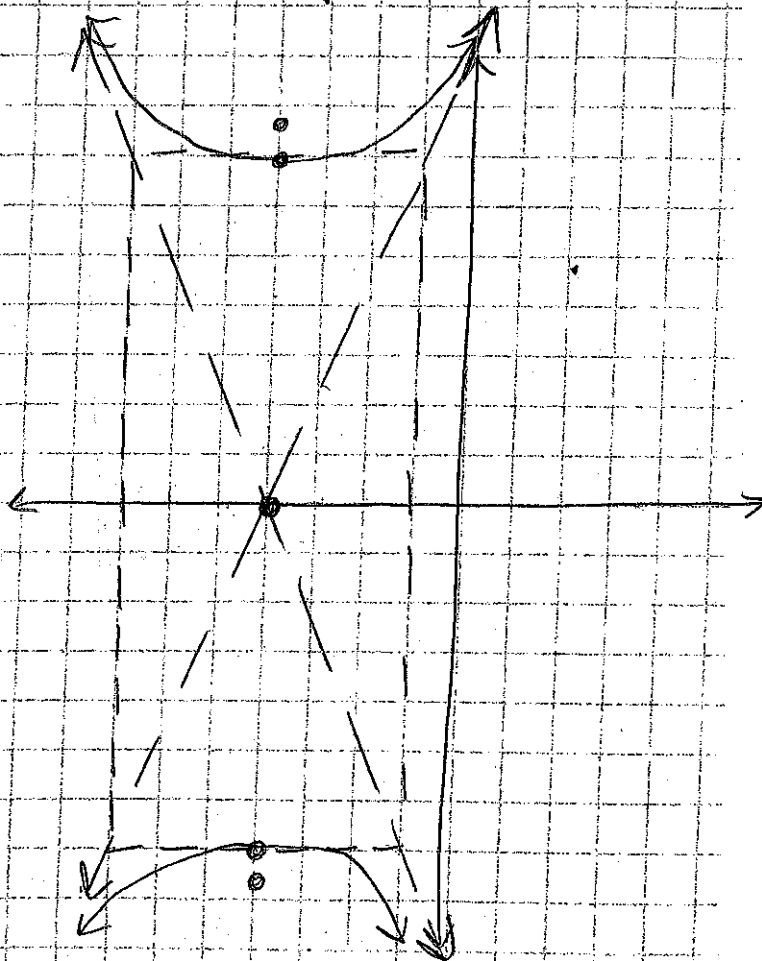
vertices:  $(-4, -7)$   $(-4, 7)$

foci:  $c^2 = 49 + 9 = 58$

$(-4 \pm \sqrt{58})$  or  $(-4, -7.6)$

$(-4, 7.6)$

Asymptotes:  $y = \pm \frac{7}{3}(x+4)$



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

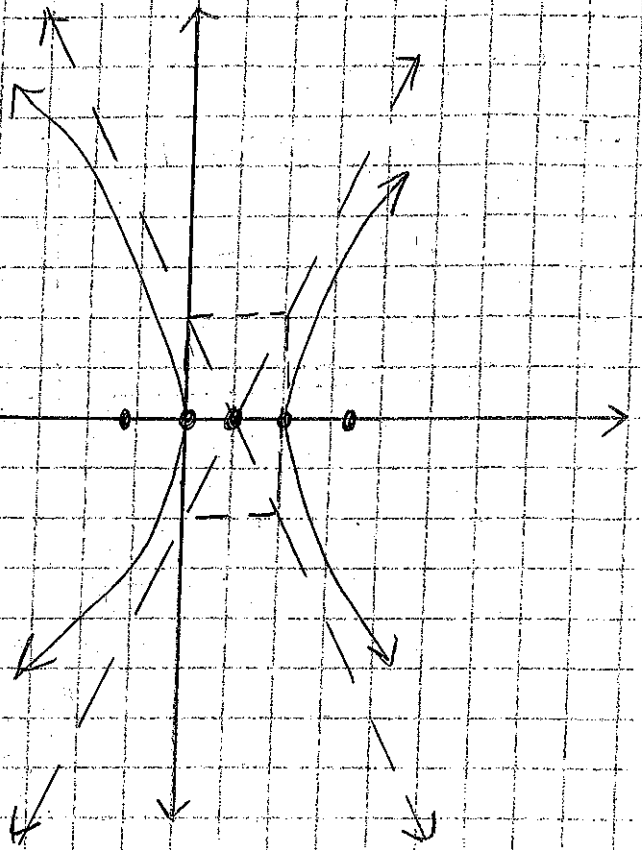
center:  $(1, 0)$

vertices:  $(0, 0)$   $(2, 0)$

foci:  $(1 \pm \sqrt{5}, 0)$  or  $(-1.24, 0)$

$(3.24, 0)$

Asymptotes:  $y = \pm \frac{2}{1}(x-1)$

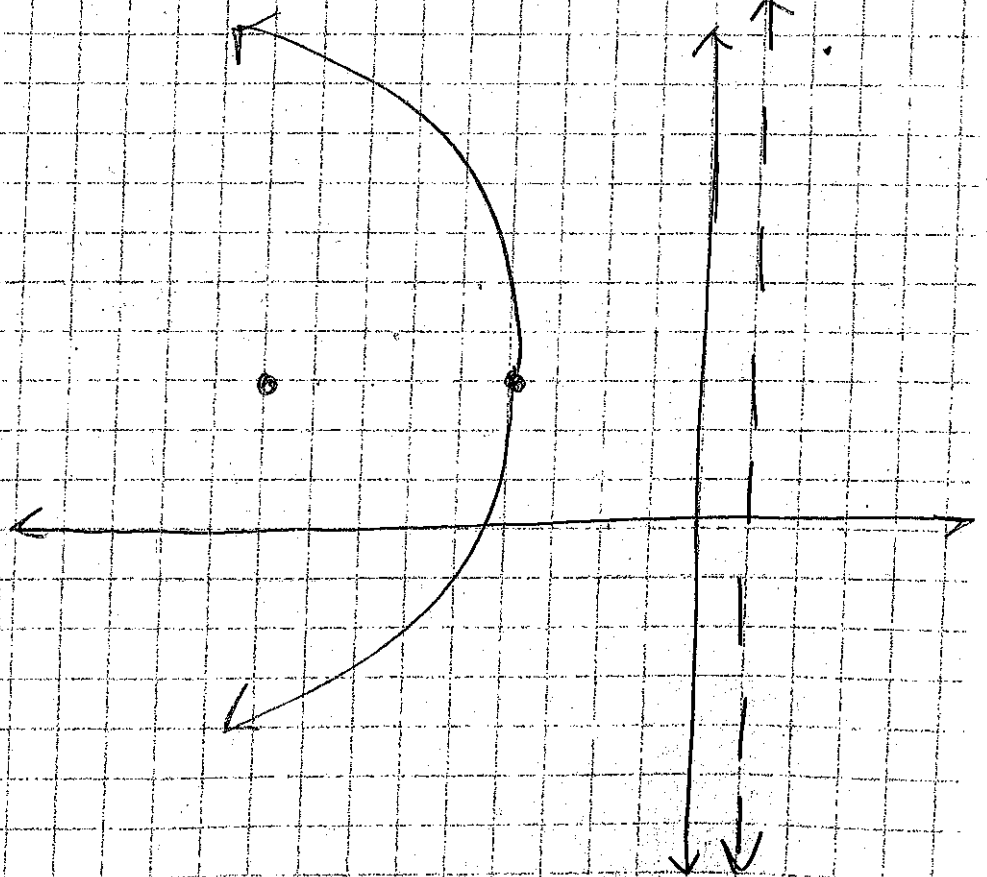


6)  $(y-3)^2 = -20(x+4)$

vertex:  $(-4, 3)$

focus:  $(-9, 3)$

directrix:  $x=1$

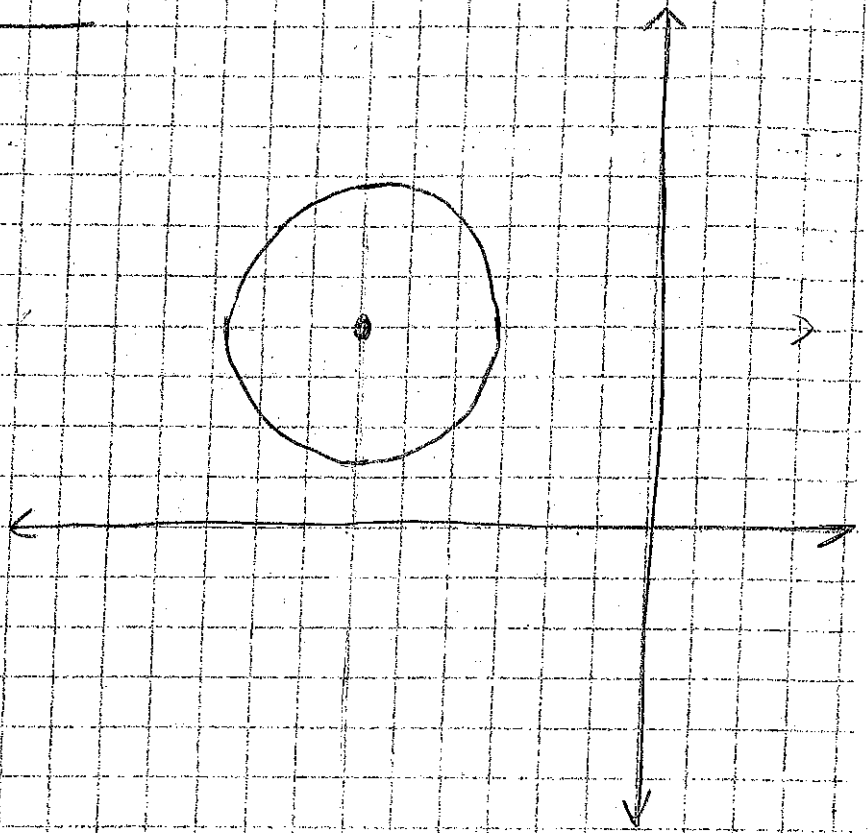


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$$7) (x+6)^2 + (y-4)^2 = 8$$

center:  $(-6, 4)$

radius:  $2\sqrt{2}$  or  $2.83$



$$8) \frac{(y+2)^2}{81} + \frac{x^2}{36} = 1$$

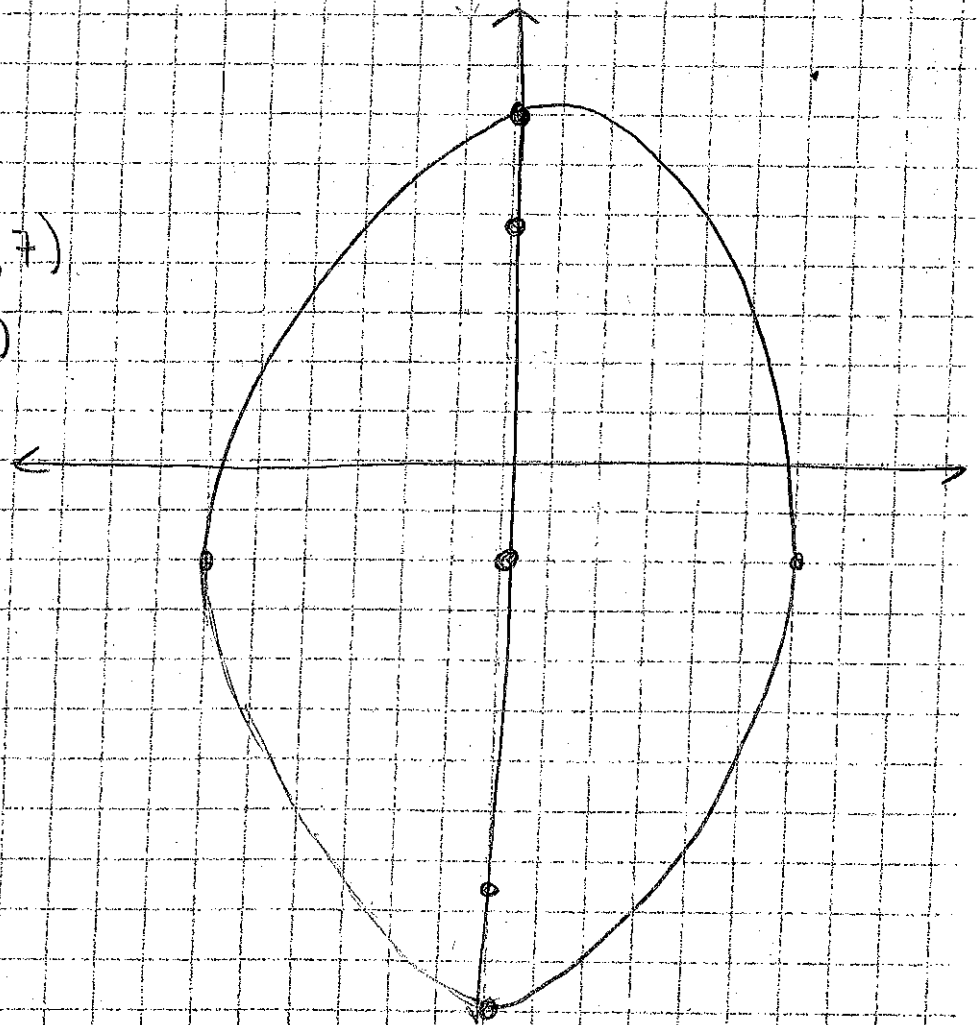
center:  $(0, -2)$

vertices:  $(0, -11)$   $(0, 7)$

covertices:  $(\pm 6, -2)$

foci:  $(0, -2 \pm 3\sqrt{5})$

or  
 $(0, -8.71)$   
 $(0, 4.71)$



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$$9) \frac{x^2}{64} + \frac{(y+3)^2}{16} = 1$$

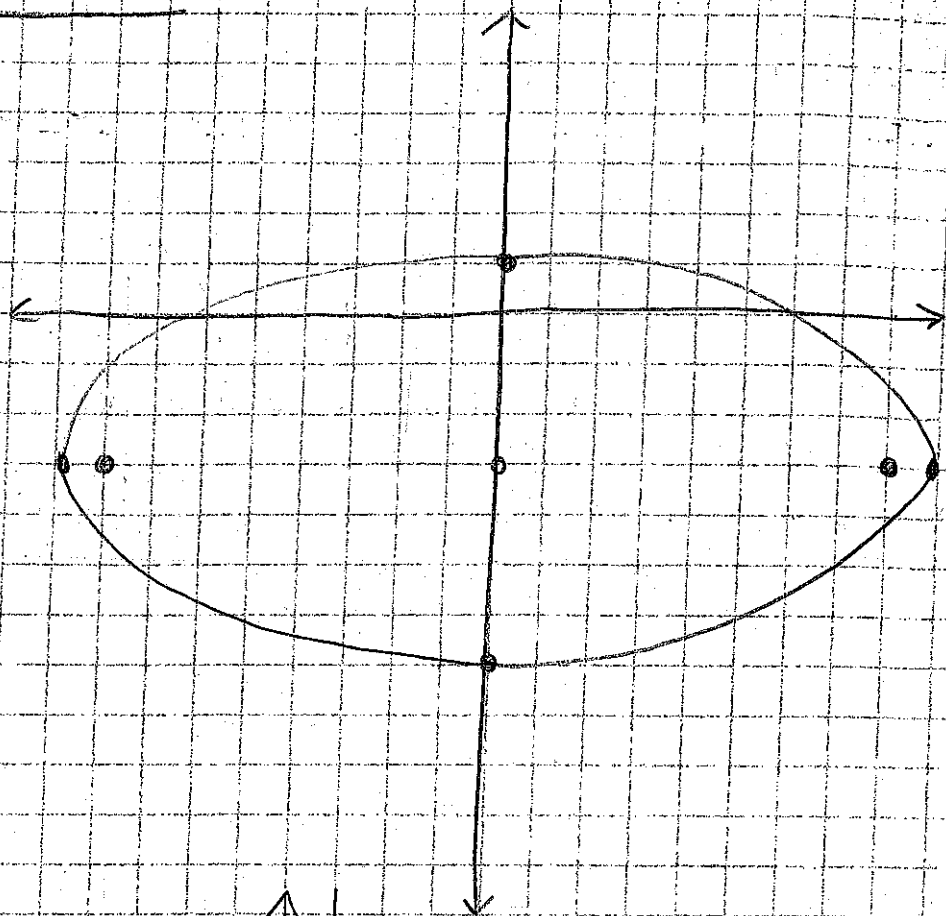
center:  $(0, -3)$

vertices:  $(\pm 8, -3)$

covertices:  $(0, -7)$   
 $(0, 1)$

foci:  $(\pm 4\sqrt{5}, -3)$

or  
 $(\pm 8.94, -3)$



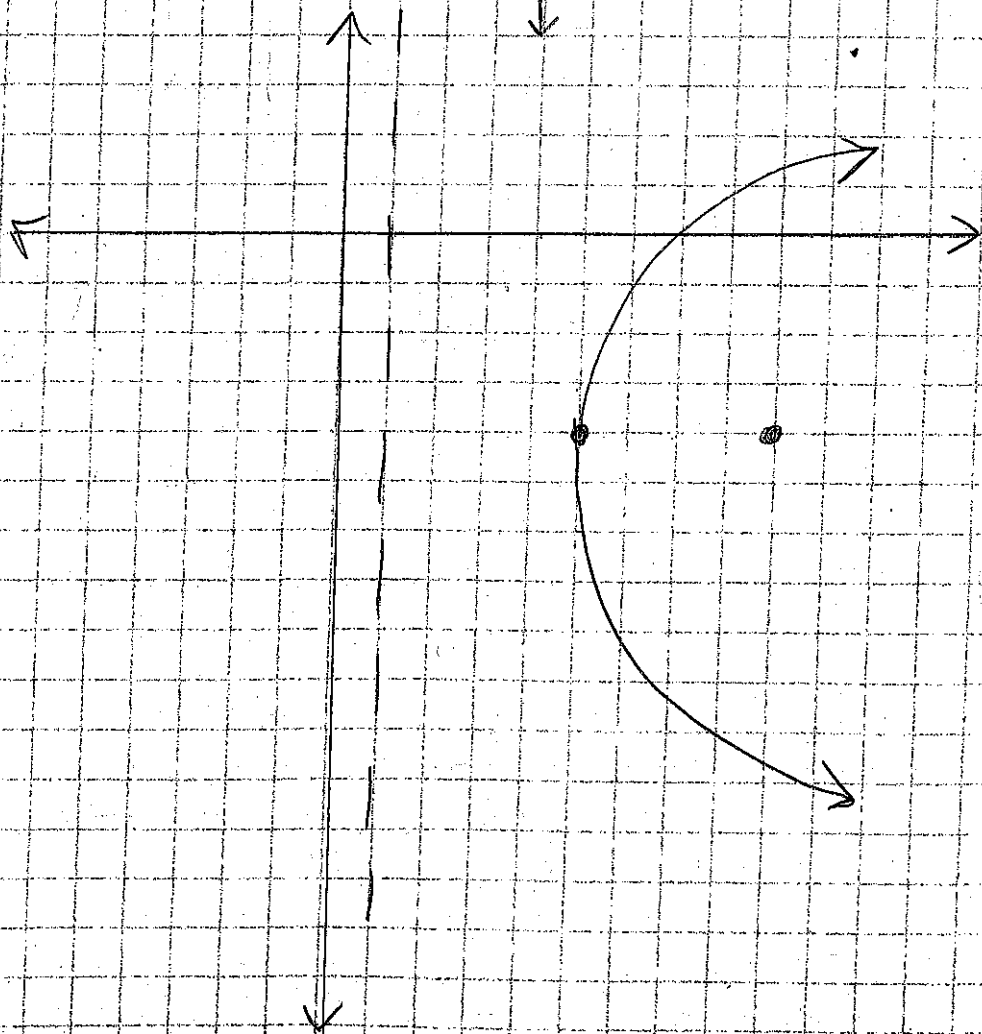
$$10) (y+4)^2 = 16(x-5)$$

$p=4$

vertex:  $(5, -4)$

focus:  $(9, -4)$

directrix:  $x=1$



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$$11) \frac{(x-2)^2}{20} + \frac{(y+5)^2}{9} = 1$$

Center:  $(2, -5)$

Vertices:  $(2 \pm 2\sqrt{5}, -5)$

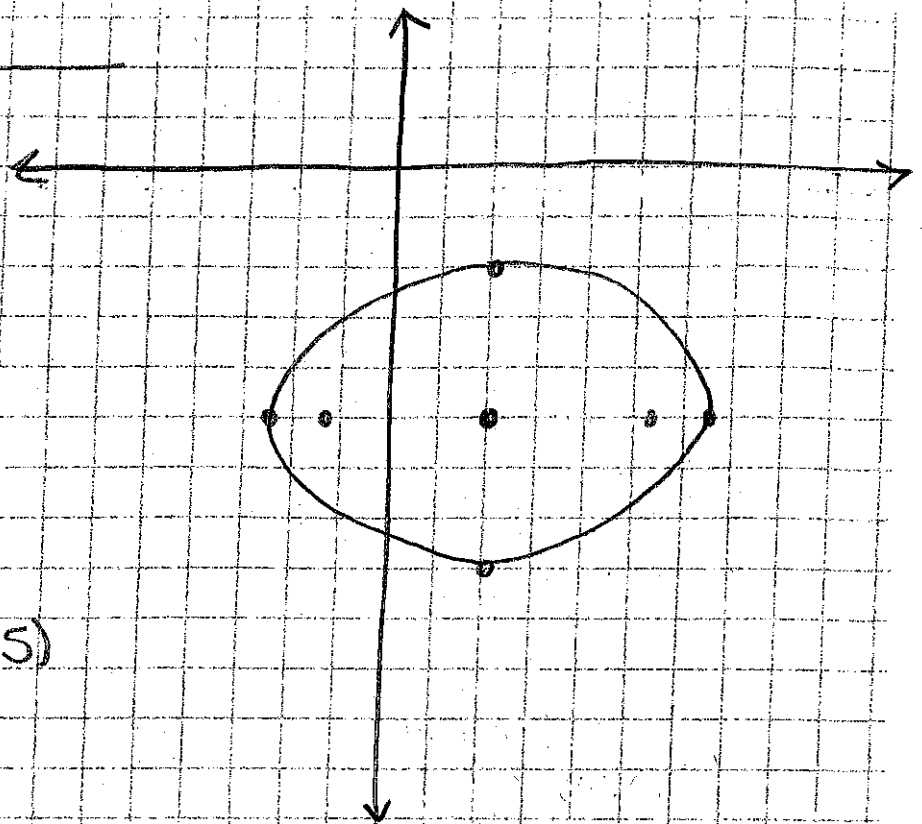
or  
 $(-2.47, -5)$

$(6.47, -5)$

Covertices:  $(2, -8)$   $(2, -2)$

Foci:  $(2 \pm \sqrt{11}, -5)$

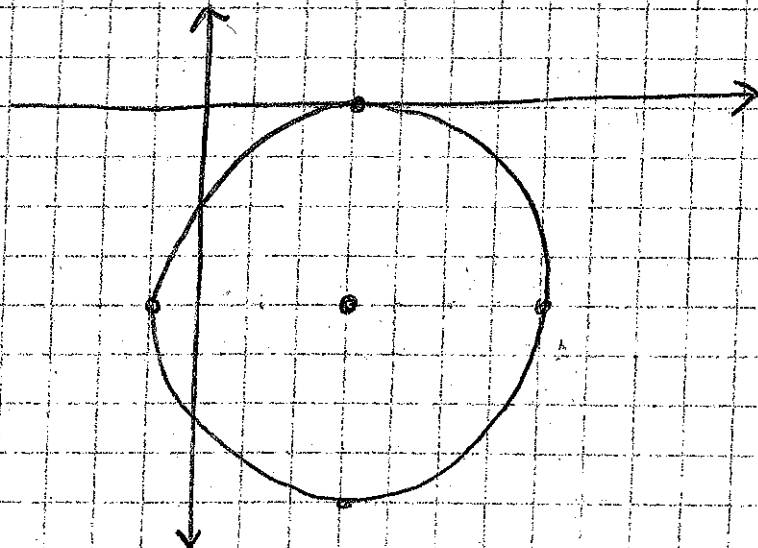
or  
 $(-1.32, -5)$   $(5.32, -5)$



$$12) (x-3)^2 + (y+4)^2 = 16$$

Center:  $(3, -4)$

Radius: 4



$$13) \frac{(y+7)^2}{4} - \frac{(x-4)^2}{36} = 1$$

Center:  $(4, -7)$

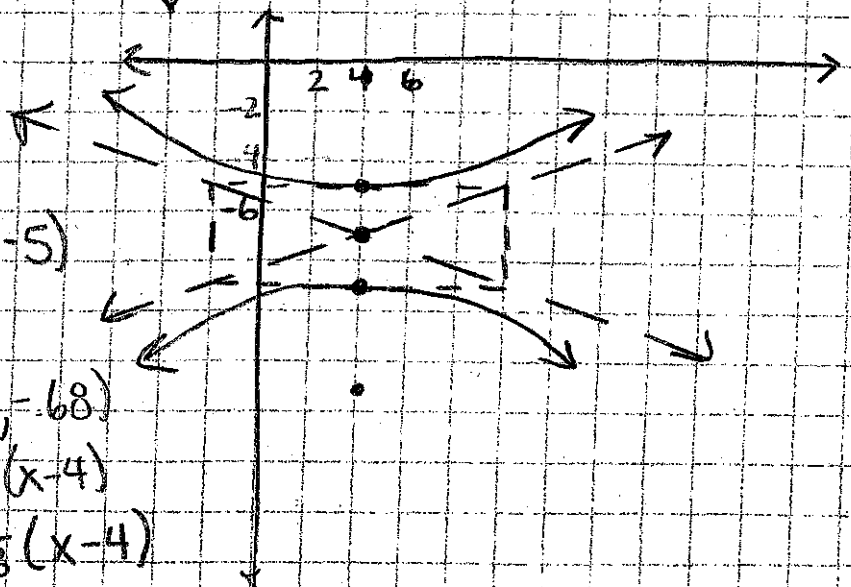
vertices:  $(4, -9)$   $(4, -5)$

foci:  $(4, -7 \pm 2\sqrt{10})$

or  
 $(4, -13.32)$  or  $(4, -6.68)$

asymptotes:  $y+7 = \pm \frac{2}{6}(x-4)$

$y+7 = \pm \frac{1}{3}(x-4)$



# Unit 1 Study Guide

14.  $x^2 + y^2 = 54$  at  $(3, 9)$

center:  $(0, 0)$

$$m = \frac{9-0}{3-0} = 3$$

$$\perp m = -\frac{1}{3}$$

$$9 = -\frac{1}{3}(3) + b$$

$$10 = b$$

$$y = -\frac{1}{3}x + 10$$

15. center:  $(5, -2)$

radius: 16

$$(x-5)^2 + (y+2)^2 = 256$$

16. D.  $(3, 0)$

17.  $(x-4)^2 + (y+3)^2 = 25$

center:  $(4, -3)$

radius: 5

18. vertex:  $(0, 0)$

directrix:  $x = 2$

$$p = -2, 4p = -8$$

$$y^2 = -8x$$

19.  $\frac{x^2}{25} - \frac{y^2}{4} = 1$

foci:  $(\pm\sqrt{29}, 0)$

asymptotes:

$$y = \pm \frac{2}{5}x$$

20.  $\frac{(x+4)^2}{16} + \frac{(y-2)^2}{25} = 1$

$$2a = 2(5) = 10$$

vertices:  $(-4, 7)(-4, -3)$

21.  $(y+4)^2 = -16(x+2)$

$$4p = -16, p = -4$$

$$2 \cdot p = -8$$

22.  $(x-2)^2 = 8(y+4)$

vertex:  $(2, -4)$

focus:  $(2, -2)$

directrix:  $y = -6$

23. center:  $(0, 0)$ , point:  $(0, -10)$

$$r = 10$$

$$x^2 + y^2 = 100$$

$$24. 3x^2 + 2y^2 = 72$$

$$\frac{x^2}{24} + \frac{y^2}{36} = 1$$

vertices:  $(0, \pm 6)$   
covertices:  $(\pm 2\sqrt{6}, 0)$   
foci:  $(0, \pm 2\sqrt{3})$

$$25. 2y^2 - 10x^2 = 40$$

$$\frac{y^2}{20} - \frac{x^2}{4} = 1$$

center:  $(0, 0)$   
vertices:  $(0, \pm 2\sqrt{5})$   
foci:  $(0, \pm 2\sqrt{6})$

$$26. \text{foci: } (-2, 4) (12, 4) \leftarrow c = 7$$

$$\text{vertices: } (2, 4) (8, 4) \leftarrow a = 3$$

$$\text{center: } (5, 4)$$

$$49 = 9 + b^2, \quad b^2 = 40$$

$$\frac{(x-5)^2}{9} - \frac{(y-4)^2}{40} = 1$$



$$27. \frac{(x+1)^2}{64} + \frac{(y-4)^2}{36} = 1$$

$$\text{vertices: } (-9, 4) (7, 4)$$

$$\text{covertices: } (-1, -2) (-1, 10)$$

$$\text{foci: } (-1 \pm 2\sqrt{7}, 4)$$

$$28. \text{vertex: } (3, 0)$$

$$\text{covertex: } (0, 2)$$

$$\text{center: } (0, 0)$$

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

$$30. \frac{(x-2)^2}{16} - \frac{(y+1)^2}{9} = 1$$

$$\text{vertices: } (-2, -1) (6, -1)$$

$$\text{asymptotes: } y+1 = \pm \frac{3}{4}(x-2)$$

$$29. (y+7)^2 = 12(x-3) \quad p=3$$

$$\text{vertex: } (3, -7)$$

$$\text{focus: } (6, -7)$$

$$\text{directrix: } x=0$$

31. center:  $(4, -5)$

radius:  $\sqrt{7}$

$$(x-4)^2 + (y+5)^2 = 7$$

35

32.  $x^2 + 4y^2 + 6x - 8y = 3$

ellipse

$$(x+3)^2 + 4(y-1)^2 = 3 + 9 + 4$$

$$\frac{(x+3)^2}{16} + \frac{(y-1)^2}{4} = 1$$

36

33.  $25y^2 - 16x^2 + 64x - 50y - 439 = 0$

hyperbola

$$25(y^2 - 2y + 1) - 16(x^2 - 4x + 4) = 439 + 25 - 64$$

$$\frac{(y-1)^2}{8} - \frac{(x-2)^2}{25} = 1$$

37

34.  $3x^2 + 3y^2 - 36x - 6y - 24 = 0$

circle

$$3(x^2 - 12x + 36) + 3(y^2 - 2y + 1) = 24 + 108 + 3$$

$$3(x-6)^2 + 3(y-1)^2 = 135$$

$$(x-6)^2 + (y-1)^2 = 45$$

38

39

$$35. 8y^2 - 64y - 16x = 0$$

parabola

$$8(y^2 - 8y + 16) = 16x + 128$$

$$(y - 4)^2 = 2(x + 8)$$

$$36. 16x^2 + 4y^2 - 96x + 8y + 84 = 0$$

ellipse

$$4x^2 + y^2 - 24x + 2y + 21 = 0$$

$$4(x^2 - 6x + 9) + (y^2 + 2y + 1) = -21 + 36 + 1$$

$$\frac{(x-3)^2}{4} + \frac{(y+1)^2}{16} = 1$$

$$37. x^2 + y^2 + 18x - 20y + 60 = 0$$

circle

$$x^2 + 18x + 81 + y^2 - 20y + 100 = -60 + 81 + 100$$

$$(x+9)^2 + (y-10)^2 = 121$$

$$38. x^2 + 8x - y + 20 = 0 - \text{parabola}$$

$$x^2 + 8x + 16 = y - 20$$

$$(x+4)^2 = y - 20$$

$$39. x^2 - y^2 - 18x - 4y - 109 = 0 - \text{hyperbola}$$

$$(x^2 - 18x + 81) - (y^2 + 4y + 4) = 109 + 81 - 4$$

$$\frac{(x-9)^2}{186} - \frac{(y+2)^2}{186} = 1$$