

## HW38: Unit 5 Test Review (Conics, Matrices, Systems)

Graph the conic. Identify all the important parts listed below:

a. **circles**: center & radius

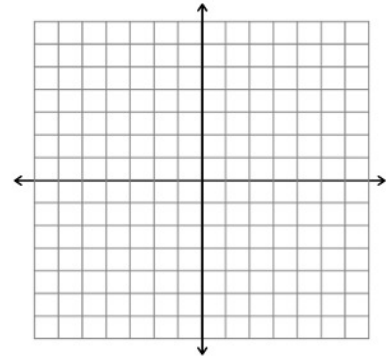
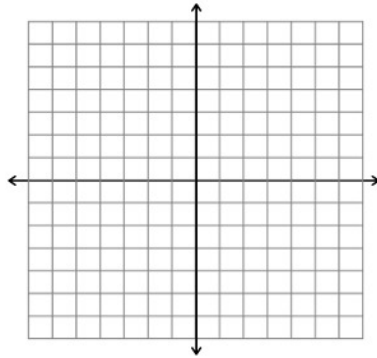
b. **hyperbola**: center, foci, & asymptotes

c. **ellipse**: center & foci

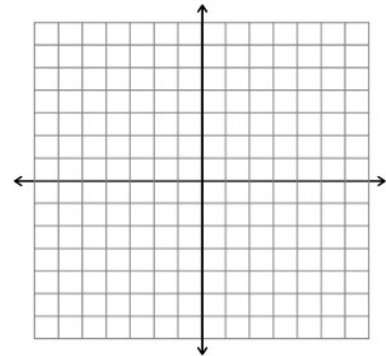
d. **parabola**: vertex, focus, & directrix

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

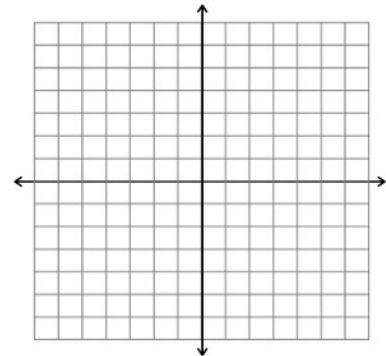
2.  $\frac{(x-3)^2}{4} - \frac{(y+2)^2}{16} = 1$



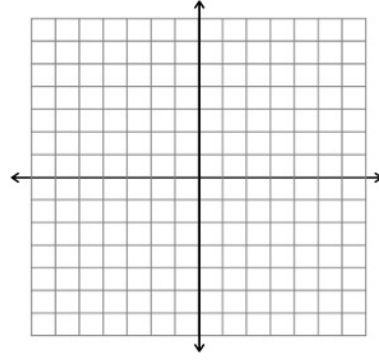
3.  $\frac{(x+1)^2}{25} + \frac{(y-3)^2}{9} = 1$



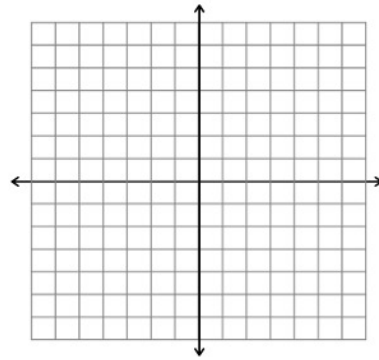
4.  $25x^2 + y^2 + 100x - 2y + 76 = 0$



5.  $9x^2 - 16y^2 - 36x - 64y + 116 = 0$

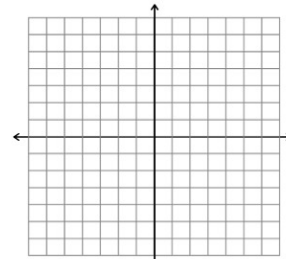


6.  $y^2 - 2y + 12x - 35 = 0$

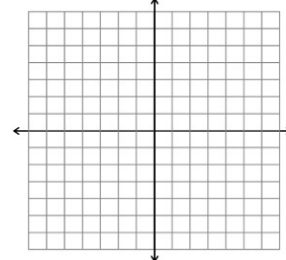


**Write the equations in standard form for the following conics.**

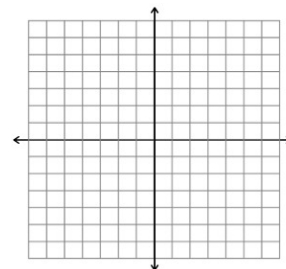
7. a parabola with focus  $(4, 5)$  and directrix:  $y = -1$



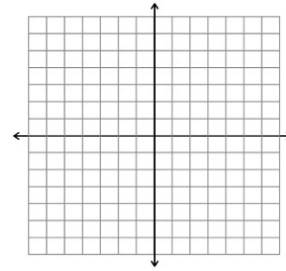
8. a hyperbola with foci  $(-4, 5)$  and  $(2, 5)$  and vertices  $(-3, 5)$  and  $(1, 5)$



9. an ellipse with endpoints of the major axis  $(-8, 2)$  and  $(10, 2)$  and foci  $(-4, 2)$  and  $(6, 2)$ .



10. an ellipse with foci  $(4, 2)$  and  $(4, -6)$  and major axis of length 10.



11. Write the equation of a circle with center  $(2, -4)$  and  $(-1, 2)$  is a point on the circle.

**Identify the conic. Write the equation of the conic in standard form.**

12.  $2x^2 + 2y^2 + 12x + 4y + 12 = 0$

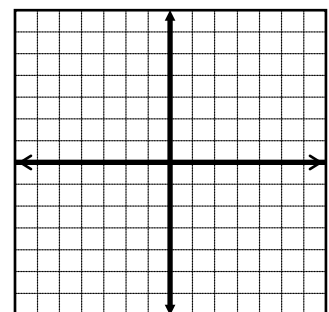
13.  $y^2 + 2y + 12x - 23 = 0$

14.  $4x^2 + 25y^2 - 24x + 100y + 36 = 0$

15.  $4x^2 - 25y^2 - 32x + 164 = 0$

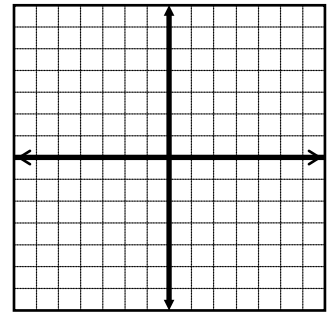
16. Use point plotting to graph the plane curve defined by the parametric equations below. Show and complete table. Use arrows to show the orientation of the plane curve.

$$x = t^2 + 1 \quad y = 3t \quad -2 \leq t \leq 2$$



17. Eliminate the parameter ( $t$ ) and find a rectangular equation for the plane curve. Graph the plane curve and use arrows to show the orientation of the plane curve.

$$x = 2t - 4 \quad y = 4t^2 \quad -\infty < t < \infty$$



**Use Gaussian elimination to solve.**

18. 
$$\begin{aligned} x + y + z &= -10 \\ x - y + 4z &= -23 \\ 5x + y + z &= -26 \end{aligned}$$

19. 
$$\begin{aligned} x - 2y + z &= -10 \\ 2x - 5y + 3z &= 4 \\ 2x - 3y + z &= 0 \end{aligned}$$

**Use Cramer's Rule to solve.**

20.  $11x = 1 - 3y$   
 $2y = 4 - 5x$

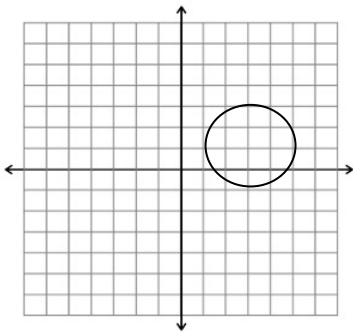
21.  $3x + 2y - z = 23$   
 $x - 4y + 5z = 5$   
 $4x + y + z = 31$

**Solve the system.**

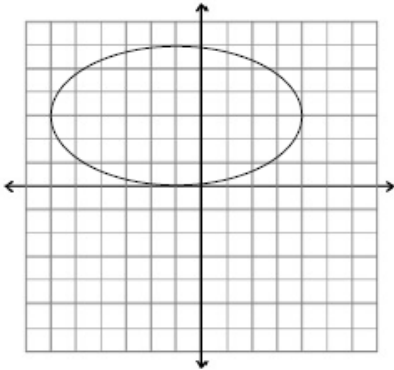
22.  $3x^2 - 2y^2 = 1$   
 $4x - y = 3$

23.  $3x^2 - 2y^2 = -5$   
 $2x^2 = y^2 - 2$

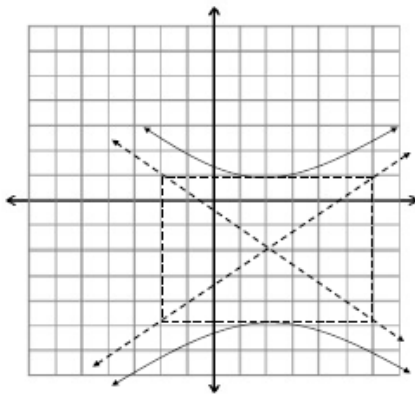
1.  $C(3, 1) \quad r = 2$



3.  $C(-1, 3)$  foci  $(3, 3)$  &  $(-5, 3)$



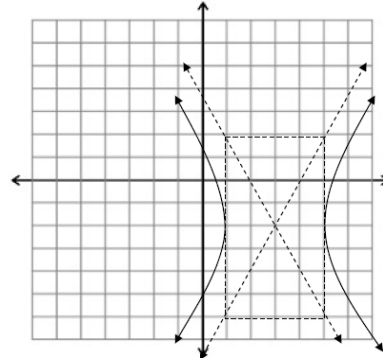
5.  $C(2, -2)$  foci  $(2, -7)$  &  $(2, 3)$   
 Asym:  $y + 2 = \pm \frac{3}{4}(x - 2)$



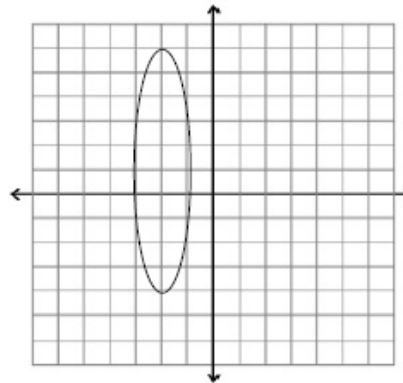
7.  $(x - 4)^2 = 12(y - 2)$

## Answers

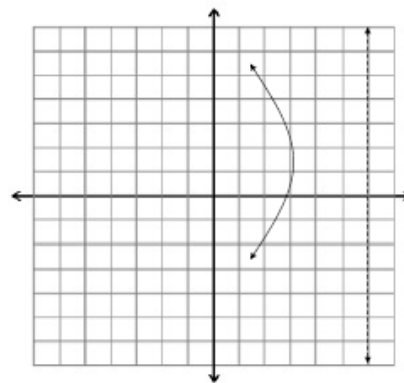
2.  $C(3, -2)$ ; foci  $(3 \pm 2\sqrt{5}, -2)$ ;  
 Asym:  $y + 2 = \pm 2(x - 3)$



4.  $C(-2, 1)$  foci  $(-2, 1 \pm 2\sqrt{6})$



6.  $V(3, 1)$ ; focus  $(0, 1)$ ; directrix  $x = 6$



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

9.  $\frac{(x-1)^2}{81} + \frac{(y-2)^2}{56} = 1$

10.  $\frac{(x-4)^2}{9} + \frac{(y+2)^2}{25} = 1$

11.  $(x-2)^2 + (y+4)^2 = 45$

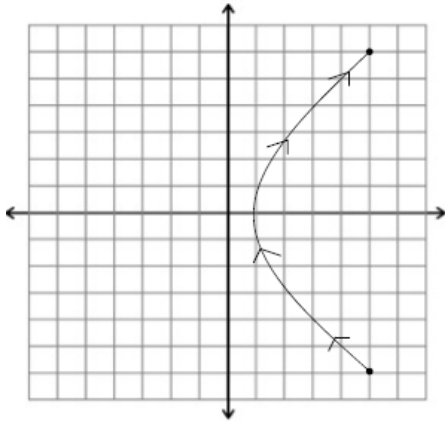
12. Circle:  $(x+3)^2 + (y+1)^2 = 4$

13. Parabola:  $(y+1)^2 = -12(x-2)$

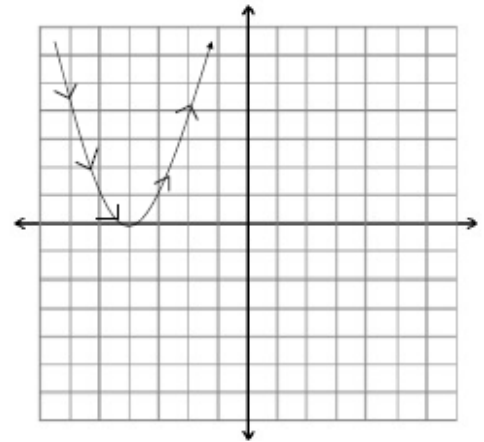
14. Ellipse:  $\frac{(x-3)^2}{25} + \frac{(y+2)^2}{4} = 1$

15. Hyperbola:  $\frac{y^2}{4} - \frac{(x-4)^2}{25} = 1$

16.



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



18.  $(-4, -1, -5)$

19. No Solution

20.  $\left(-\frac{10}{7}, \frac{39}{7}\right)$

21.  $(6, 4, 3)$

22.  $(1, 1), \left(\frac{19}{29}, -\frac{11}{29}\right)$

23.  $(1, 2), (1, -2), (-1, -2), (-1, 2)$