

Matching: For #1 – 9, match each equation to its graph. No item will be used more than once.

Equations:

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

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

3) $(x-3)^2 + y^2 = 49$

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

5) $\frac{x^2}{49} + \frac{(y-2)^2}{36} = 1$

6) $x^2 + (y-3)^2 = 49$

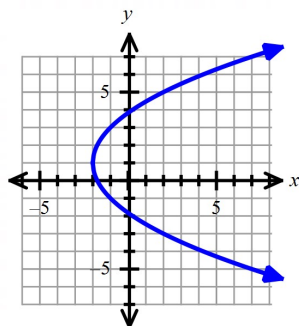
7) $(y-1)^2 = 4(x+2)$

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

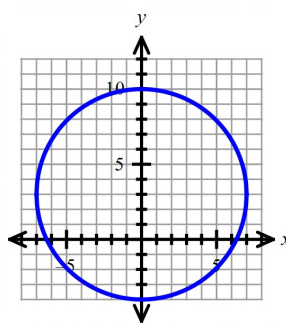
9) $(y-1)^2 = -4(x+2)$

Graphs:

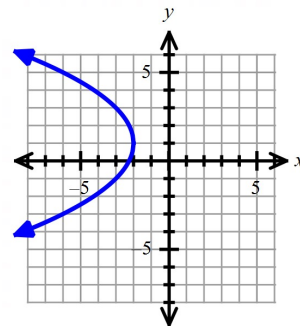
A)



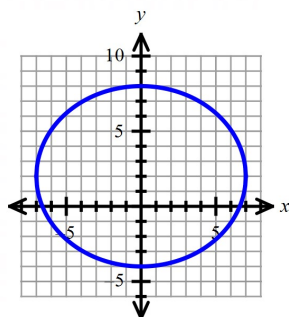
B)



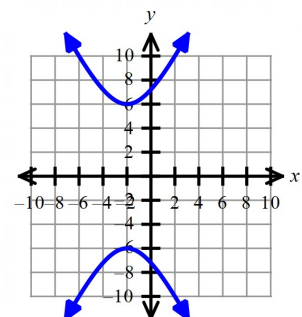
C)



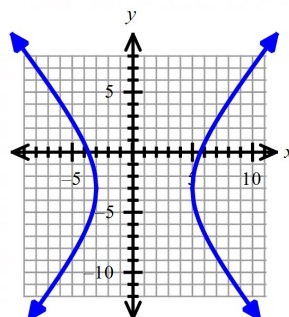
D)



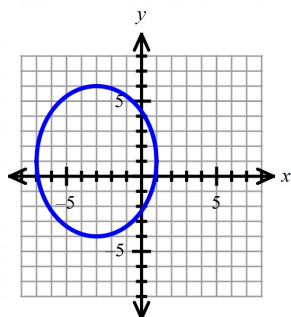
E)



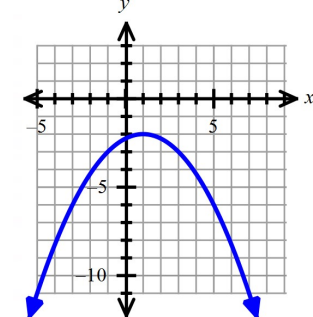
F)



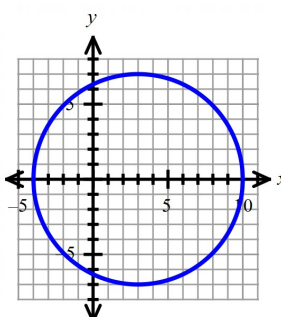
G)



H)



I)



For #10 – 13, identify each conic as a circle, ellipse, hyperbola, or parabola.

10) $5x^2 - 8x + 10y^2 + 30y = 150$

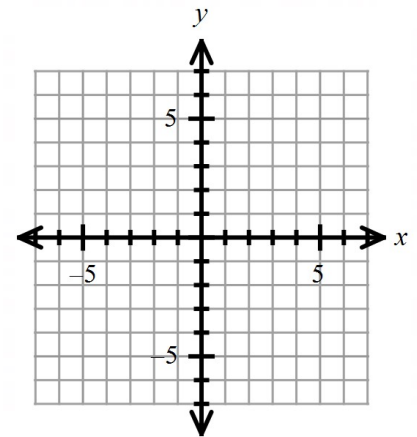
11) $x^2 + 3x = y^2 - 2y + 18$

12) $18y^2 + 5x = -18x^2 + 36$

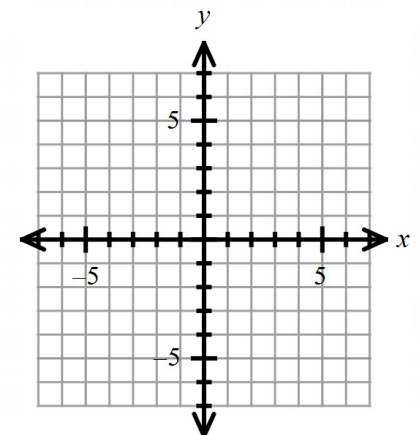
13) $3x^2 - 2y = 9x + 11$

For #14 – 16, Identify the type of conic; write in standard form; find the coordinates of the center and foci (if applicable), find the radius (if applicable), and graph on the provided coordinate system. **If needed, round to 3 decimal places.**

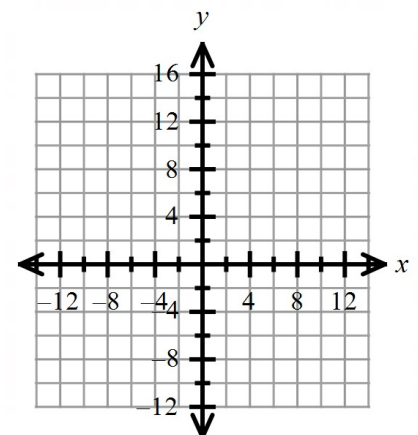
14) $4x^2 + 9y^2 + 16x = 20$



15) $7x^2 - 14x + 7y^2 - 28y = 21$

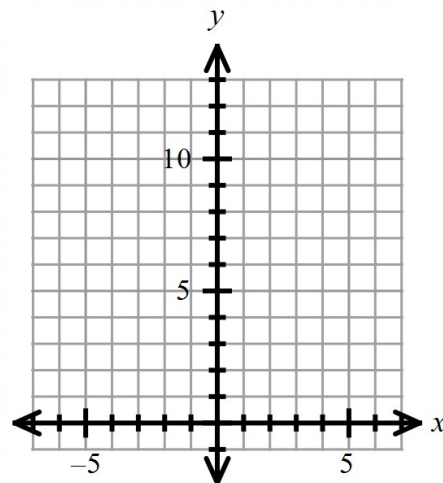


16) $121x^2 + 25y^2 - 150y - 2800 = 0$

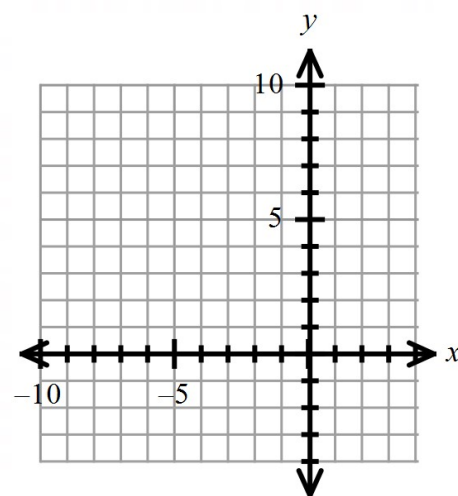


For #17 – 18: For each parabola given, write in standard form, find the coordinates of the vertex and focus, write the equation of the directrix, find the length of the latus rectum, and graph on the provided coordinate system. As needed, round to 3 decimal places.

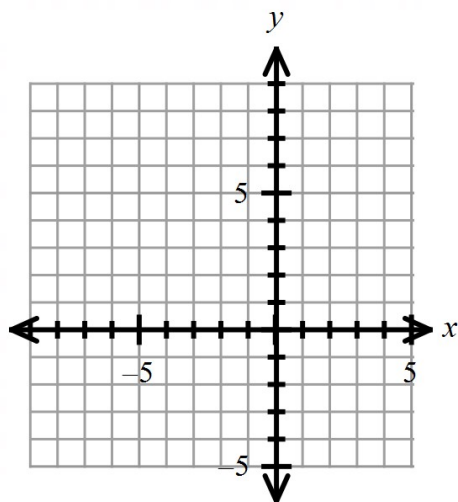
17) $y^2 - 12y - 12x = 0$



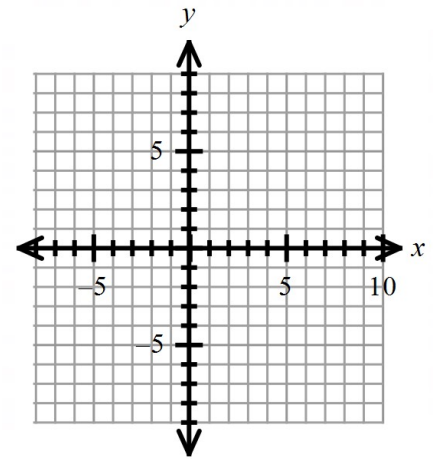
18) $3x^2 + 24x + 15y + 3 = 0$



19) Consider the hyperbola given. Write the equation in standard form, find the coordinates of the center and foci, write the equations of the asymptotes in (h, k) form, and graph on the provided coordinate system. $36(y - 3)^2 - 9(x + 2)^2 = 144$. If needed, round to 3 decimal places.



20) Consider the hyperbola given. Write the equation in standard form, find the coordinates of the center and foci, write the equations of the asymptotes in (h, k) form, and graph on the provided coordinate system.
 $4(x - 1)^2 - 25y^2 = 100$. If needed, round to 3 decimal places.



For #21 – 24, write the equation in standard form that meets the given requirements.

21) Ellipse; foci: $(5, 0), (-5, 0)$; y -intercepts: $(0, 3), (0, -3)$

22) Ellipse; endpoints of the major axis: $(12, -4)$ and $(-2, -4)$; endpoints of minor axis: $(5, -8)$ and $(5, 0)$

23) Parabola; vertex: $(2, -3)$; Focus: $(-1, -3)$

24) Hyperbola; foci: $(0, -7), (0, 7)$; vertices: $(0, -5), (0, 5)$

For #25 – 26, write the equation in standard form for the described conic.

25) Hyperbola; endpoints of transverse axis: $(4, 0)$, $(-4, 0)$; asymptote: $y = \frac{5}{4}x$

26) Parabola; focus at $(3, -4)$ and directrix at $y = -6$.

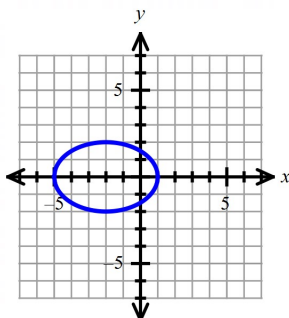
27) A tunnel has the shape of a semi-ellipse that is 16ft high at the center, and 36ft across the base. At most how high should a passing truck be, if it is 12ft wide, for it to be able to fit through the tunnel? If needed, round to 3 decimal places.

28) A satellite dish has a shape called a paraboloid, where each cross-section is a parabola; since radio signals will bounce off the surface of the dish to the focus, the receiver should be placed at the focus. How far should the receiver be from the vertex, if the dish is 12ft across and 4.5ft deep at the vertex?

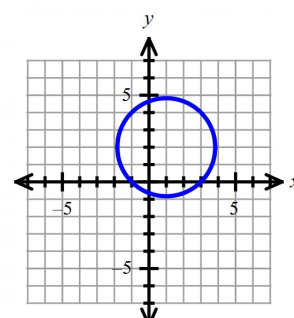
Answers:

- 1) G 2) F 3) I 4) E 5) D 6) B 7) A 8) H
 9) C 10) ellipse 11) hyperbola 12) circle 13) parabola

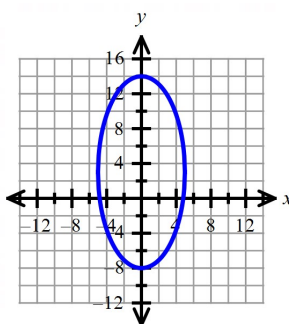
- 14) ellipse; $\frac{(x+2)^2}{9} + \frac{y^2}{4} = 1$;
 center: $(-2, 0)$
 foci $(0.236, 0)$; $(-4.236, 0)$



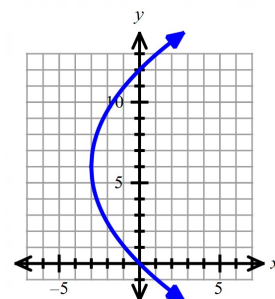
- 15) circle; radius ≈ 2.828
 $(x - 1)^2 + (y - 2)^2 = 8$



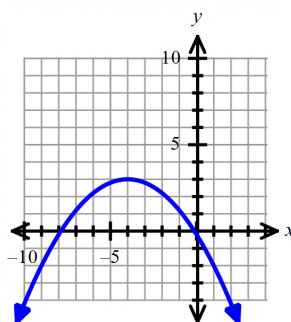
- 16) ellipse; $\frac{x^2}{25} + \frac{(y-3)^2}{121} = 1$
 Center $(0, 3)$
 Foci $(0, 12.798)$; $(0, -6.798)$



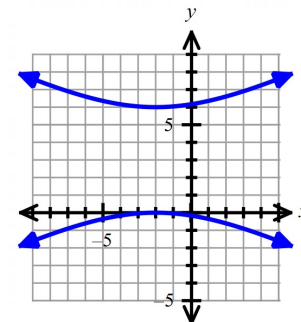
- 17) parabola; vertex $(-3, 6)$
 $(y - 6)^2 = 12(x + 3)$
 focus $(0, 6)$
 Directrix: $x = -6$
 Length of $lr = 12$



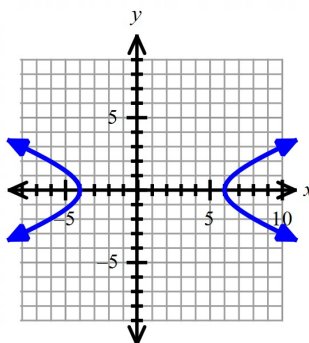
- 18) parabola; vertex $(-4, 3)$
 $(x + 4)^2 = -5(y - 3)$
 Focus $(-4, 1.75)$
 Directrix: $y = 4.25$
 Length of $lr = 5$



- 19) hyperbola; center $(-2, 3)$
 $\frac{(y-3)^2}{9} - \frac{(x+2)^2}{36} = 1$
 foci $(-2, 9.708)$; $(-2, -3.708)$
 asympt: $y = \pm \frac{1}{2}(x + 2) + 3$



- 20) hyperbola; center $(1, 0)$
 $\frac{(x-1)^2}{25} - \frac{y^2}{4} = 1$
 Foci: $6.385, 0$; $(-4.385, 0)$
 Asympt: $y = \pm \frac{2}{5}(x - 1)$



21) $\frac{x^2}{34} + \frac{y^2}{9} = 1$

22) $\frac{(x-5)^2}{49} + \frac{(y+4)^2}{16} = 1$

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

24) $\frac{y^2}{25} - \frac{x^2}{24} = 1$

25) $\frac{x^2}{16} - \frac{y^2}{25} = 1$

26) $(x - 3)^2 = 4(y + 5)$

27) must be less than 15.085 feet tall

28) 2 feet away from the vertex