

Pre-Calc CH8 Review

On all conic section problems show your work by sketching the graph!

1. Find the vertex, focus, and directrix of the parabola with the following equation.

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

2. Find the vertex, focus, and directrix of the parabola with the following equation.

$$4x^2 + 8x - y - 6 = 0$$

3. Find the equation for the conic in standard form.

$$\text{vertex } (-3, 5), \text{ directrix } y = 1$$

4. Find the equation for the conic in standard form.

$$\text{focus } (4, 3), \text{ directrix } x = 2$$

5. Find the equation for the conic in standard form.

$$\text{major axis length} = 8 \text{ and minor axis endpoints } (-3, 4) \text{ and } (-3, 2)$$

6. Find the equation for the conic in standard form.

$$\text{minor axis length} = 2 \text{ and major axis endpoints } (-7, -6) \text{ and } (-7, 12)$$

7. Sketch the conic with the given equation. Show and label the center, vertices, foci, and endpoints of the minor axis.

$$x^2 + 4x + 3y^2 - 5 = 0$$

8. Sketch the conic with the given equation. Show and label the center, vertices, foci, and endpoints of the minor axis.

$$25x^2 - 50x + 4y^2 + 24y - 39 = 0$$

9. Find the vertices and foci of the conic with the following equation.

$$\frac{(y+4)^2}{30} - \frac{(x-3)^2}{45} = 1$$

10. Find the vertices and foci of the conic with the following equation.

$$\frac{(x-2)^2}{14} - \frac{(x+5)^2}{26} = 1$$

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11. Find the equation for the conic in standard form.
center $(0,0)$, foci $(0, \pm 6)$, vertices $(0, \pm 5)$

12. Find the equation for the conic in standard form.
foci $(0, \pm 4)$, conjugate axis length=3

13. Plot the points $(-3, 5, 2)$ and $(4, 7, 4)$. Then find the midpoint between them.

14. Sketch a graph of the following equation. Label all intercepts.
 $3x - 2y + z = 6$

15. Sketch a graph of the following equation. Label all intercepts.
 $3x + 4y + 6z = 24$

16. Given the vectors $\vec{a} = \langle 5, -2, 7 \rangle$ and $\vec{b} = \langle 0, 6, 1 \rangle$ determine
 - a. $\vec{a} + \vec{b}$
 - b. $\vec{b} - \vec{a}$
 - c. $\vec{a} \cdot \vec{b}$

17. Write a vector equation of the line through $A(4, -2, 3)$ and $B(-1, 1, 0)$.

18. Write a vector equation of the line through $A(-8, 1, 6)$ and $B(3, 4, 9)$.

19. Write the parametric form of the line through the point $P_0(-1, 0, 3)$ in the direction of $\vec{v} = \langle -3, 1, -2 \rangle$.

20. Write the parametric form of the line through the point $P_0(5, 3, 1)$ in the direction of $\vec{v} = \langle 1, 1, 3 \rangle$.

21. A rocket soon after takeoff is headed west and is climbing at a 42° angle relative to flat ground with an airspeed of 4,500mph. If the wind is out of the northwest at 70mph, calculate a vector \mathbf{v} that represents the plane's velocity relative to the point of takeoff.