ANSWERS!

DIRECTIONS: For #1, find the **distance** between the given points and the **midpoint** of the segment defined by the points.

1. $(2,-3),(8,-5)$ Distance $\mathbf{2\sqrt{10}}$ Midpoint $\mathbf{(5,-4)}$

DIRECTIONS: For #2, find the **coordinates of *Z*** given that *M* is the midpoint of $\overline{YZ}$.

2. $Y(5,1), M(-2,4)$ *Z* $\mathbf{(-9,7)}$

DIRECTIONS: For #3, write an **equation** of the circle (in standard form) with the given center and radius.

3. $(3,-7)$; radius $= 5$ $\mathbf{(x-3)^2+(y+7)^2=25}$

DIRECTIONS: For #4, write the following **equation** in the standard form of a circle, then identify the **center** and the **radius**.

4. $x^2+y^2+6x-8y-39=0$ Equation $\mathbf{(x+3)^2+(y-4)^2=64}$

Center $\mathbf{(-3,4)}$ Radius $\mathbf{8}$

DIRECTIONS: For #5-6, respond in the provided blanks.

5. A parabola has its vertex at $(-4,2)$ and directrix of $y=5$. Identify the **focus** of this parabola.

$\mathbf{(-4,-1)}$

6. A parabola has its vertex at $(5,-1)$ and focus at $(9,-1)$. Identify the **directrix** of this parabola.

$\mathbf{x=1}$

DIRECTIONS: For #7, **rewrite the equations** in the standard form for parabolas. Then identify the **vertex**, **focus**, **directrix**, and **axis of symmetry** for the parabola.

7. $y^2 + 12x - 10y + 37 = 0$

Equation $\mathbf{x + 1 = -\frac{1}{12}(y - 5)^2}$

Vertex $\mathbf{(-1, 5)}$ Focus $\mathbf{(-4, 5)}$

Directrix $\mathbf{x = 2}$ Axis $\mathbf{y = 5}$

DIRECTIONS: For #8, **write an equation** for an ellipse with the given intercepts.

8. *x*-intercepts: ± 8 ; y-intercepts: ± 7 $\mathbf{\frac{x^2}{64} + \frac{y^2}{49} = 1}$

DIRECTIONS: For #9, **write an equation** for an ellipse with the given foci and sum of focal radii.

9. Foci: $(2, 1), (2, 7)$; sum of focal radii $= 8$ $\mathbf{\frac{(x-2)^2}{7} + \frac{(y-4)^2}{16} = 1}$

DIRECTIONS: For #10, **rewrite the equation** in the standard form for ellipses. Then identify the **center**, direction of the **major axis**, **verticies**, **co-verticies**, and **foci**.

10. $4x^2 + 25y^2 + 16x - 150y + 141 = 0$

Equation $\mathbf{\frac{(x+2)^2}{25} + \frac{(y-3)^2}{4} = 1}$

Center $\mathbf{(-2, 3)}$ Major axis **Horizontal ($y = 3$)**

Verticies $\mathbf{(-7, 3)}$ **&** $\mathbf{(3, 3)}$

Co-verticies $\mathbf{(-2, 5)}$ **&** $\mathbf{(-2, 1)}$

Foci $\mathbf{(-2 + \sqrt{21}, 3)}$ **&** $\mathbf{(-2 - \sqrt{21}, 3)}$

DIRECTIONS: For #11-12, use the given information to **write an equation** for a hyperbola.

11. Foci: $(6, 0), (-6, 0)$; difference of focal radii $= 10$ $\quad \frac{x^2}{25} - \frac{y^2}{11} = 1$

12. Foci: $(1, 1), (1, 7)$; slope of asymptotes $= \pm\frac{\sqrt{5}}{2}$ $\quad \frac{(y-4)^2}{5} - \frac{(x-1)^2}{4} = 1$

DIRECTIONS: For #13, **rewrite the equation** in the standard form for hyperbolas. Then identify the **center**, direction of the **transverse axis**, **verticies**, **foci**, and the **slopes of the asymptotes**.

13. $x^2 - 4y^2 + 10x + 32y - 55 = 0$

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

Center $(-5, 4)$ Transverse axis **Horizontal**

Verticies $(-9, 4)$ **&** $(-1, 4)$

Foci $(-5 + 2\sqrt{5}, 4)$ **&** $(-5 - 2\sqrt{5}, 4)$

Slopes of asymptotes $\pm\frac{1}{2}$

DIRECTIONS: For #14-17, **identify the conic section** (circle, ellipse, parabola, hyperbola) from its equation.

14. $2x^2 + 2y^2 - 20x + 4y - 34 = 0$

circle

15. $2x^2 - 4x - y - 5 = 0$

parabola

16. $2x^2 - 3y^2 - 12x - 18y - 15 = 0$

hyperbola

17. $4x^2 + 5y^2 + 16x - 60y + 176 = 0$

ellipse

EQUATION SHEET (a list of equations, with no explanations or labels) – you will also get graph paper to use during the test

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

$$(x - h)^2 + (y - k)^2 = r^2$$

$$y - k = a(x - h)^2$$

$$x - h = a(y - k)^2$$

$$a = \frac{1}{4c}$$

$$\frac{(x - h)^2}{a^2} + \frac{(y - k)^2}{b^2} = 1$$

$$\frac{(x - h)^2}{b^2} + \frac{(y - k)^2}{a^2} = 1$$

$$c^2 = a^2 - b^2$$

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

$$\frac{(x - h)^2}{a^2} - \frac{(y - k)^2}{b^2} = 1$$

$$\frac{(y - k)^2}{a^2} - \frac{(x - h)^2}{b^2} = 1$$