Trig/PreCalc
Chapter 10 Practice Test

Name: Answer Key

1. Find the distance and the midpoint between the points (-1, 2) and (3, 1).

$\sqrt{(3+1)^2+(1-2)^2}$

$\sqrt{16+1}$

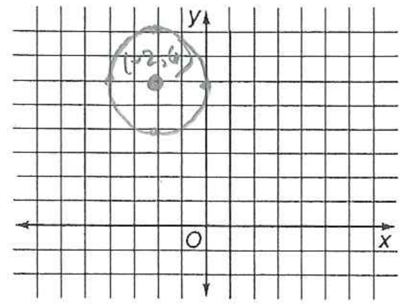
$\sqrt{17}$

$\left(\frac{-1+3}{2}, \frac{2+1}{2}\right) = (1, 1.5)$

2. Write $x^2 + 4x + y^2 - 12y + 36 = 0$ in standard form. Then graph the equation, labeling the center.

$x^2+4x+\underline{4}+y^2-12y+\underline{36} = -36+\underline{4}+\underline{36}$

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



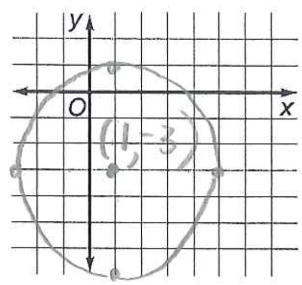
3. Write $6x^2 - 12x + 6y^2 + 36y = 36$ in standard form. Then graph the equation, labeling the center.

$\frac{6x^2 - 12x + 6y^2 + 36y = 36}{6}$

$x^2-2x+y^2+6y = 6$

$x^2-2x+\underline{1}+y^2+6y+\underline{9} = 6+\underline{1}+\underline{9}$

$(x-1)^2+(y+3)^2 = 16$



4. Write $4x^2 + 16y^2 + 32x - 32y + 16 = 0$ in standard form. Then find the coordinates of the center, foci, and vertices of the ellipse. Graph the equation.

$4x^2+32x+16y^2-32y = -16$

$4(x^2+8x+\underline{16})+16(y^2-2y+\underline{1}) = -16+\underline{64}+\underline{16}$

$\frac{4(x+4)^2}{64}+\frac{16(y-1)^2}{64} = \frac{64}{64}$

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

center: $(-4,1)$

vertices: $(-4\pm4,1)$ $(-4,1\pm2)$

$(0,1)$ $(-8,1)$ $(-4,3)$ $(-4,-1)$

foci: $(-4\pm2\sqrt{3},1)$

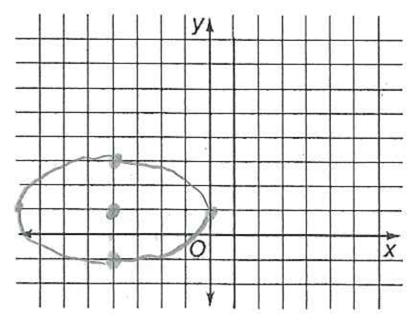
$c^2=a^2-b^2$

$c^2=16-4$

$c^2=12$

$c=\sqrt{12}$

$c=2\sqrt{3}$



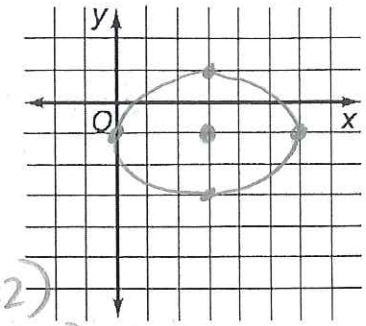
5. Write $4x^2 + 9y^2 + 9 = 24x - 18y$ in standard form. Then find the coordinates of the center, foci, and vertices of the ellipse. Graph the equation.

$4x^2 - 24x + 9y^2 + 18y = -9$

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

$\frac{4(x-3)^2}{36} + \frac{9(y+1)^2}{36} = \frac{36}{36}$

$\frac{(x-3)^2}{9} + \frac{(y+1)^2}{4} = 1$



center: $(3,-1)$

vertices: $(3\pm3,-1)(3,-1\pm2)$

$(6,-1)(0,-1)(3,1)(3,-3)$

foci: $(3\pm\sqrt{5},-1)$

$c^2 = 9-4$

$c = \sqrt{5}$

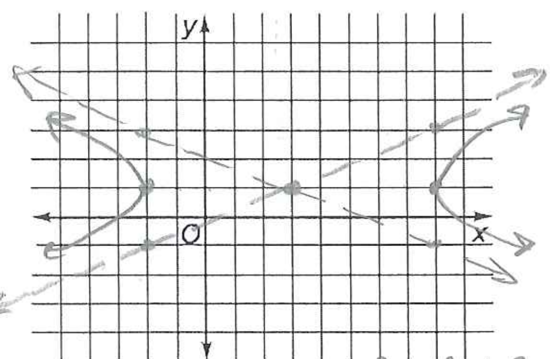
6. Write $4x^2 - 25y^2 - 24x + 50y - 89 = 0$ in standard form. Find the coordinates of the center, foci, vertices and the equation of the asymptotes. Then graph the equation.

$4x^2 - 24x - 25y^2 + 50y = 89$

$4(x^2 - 6x + 9) - 25(y^2 - 2y + 1) = 89 + 36 + -25$

$\frac{4(x-3)^2}{100} - \frac{25(y-1)^2}{100} = \frac{100}{100}$

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



center: $(3,1)$

vertices: $(8,1)$

$(-2,1)$

asymp: $(y-1) = \pm\frac{2}{5}(x-3)$

foci: $(3\pm\sqrt{29},1)$

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

$c^2 = 25+4$

$c^2 = 29$

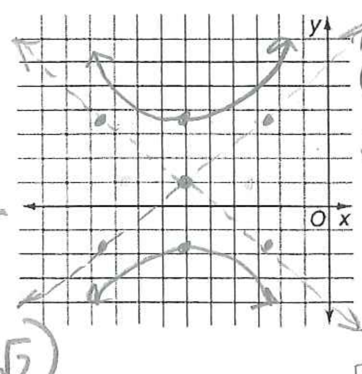
$c = \sqrt{29}$

7 Write $-2x^2 + 3y^2 - 24x - 6y - 93 = 0$ in standard form. Find the equations of the asymptotes of the graph. Then, graph the equation, labeling the center, foci, and vertices.

$-2x^2 - 24x + 3y^2 - 6y = 93$

$-2(x^2 + 12x + 36) + 3(y^2 - 2y + 1) = 93 + -72 + 3$

$\frac{-2(x+6)^2}{24} + \frac{3(y-1)^2}{24} = \frac{24}{24}$



$c^2 = 8+12$

$\sqrt{c^2} = \sqrt{20}$

$c = 2\sqrt{5}$

center: $(-6,1)$

vertices: $(-6, 1\pm2\sqrt{2})$

$-\frac{(x+6)^2}{12} + \frac{(y-1)^2}{8} = 1$

$\frac{(y-1)^2}{8} - \frac{(x+6)^2}{12} = 1$

$a = 2\sqrt{2}$

$b = 2\sqrt{3}$

asymp: $(y-1) = \pm\frac{\sqrt{8}}{\sqrt{12}}(x+6)$

$(y-1) = \pm\frac{\sqrt{6}}{3}(x+6)$

foci: $(-6, 1\pm2\sqrt{5})$

$\frac{\sqrt{8}}{\sqrt{12}} = \frac{\sqrt{2}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$= \frac{\sqrt{6}}{3}$

8. Write $y^2 - 4x + 10y + 29 = 0$ in standard form. Find the coordinates of the focus, vertex, and the equation of the directrix.

$y^2 + 10y = 4x - 29$

$y^2 + 10y + \underline{25} = 4x - 29 + \underline{25}$

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

$(y+5)^2 = 4(x-1)$

opens right

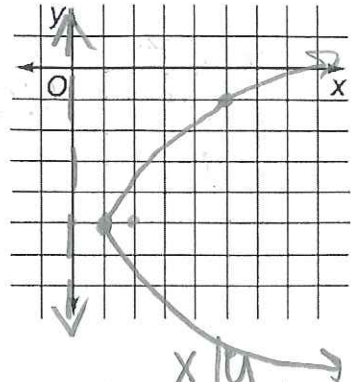
$4p = 4$

$p = 1$

vertex: $(1, -5)$

focus: $(2, -5)$

directrix: $x = 0$



x	y
5	-1 / -9

$(y+5)^2 = 16$

$y+5 = 4$ $\quad y+5 = -4$

$y = -1$ $\quad y = -9$

9. Write $x = y^2 - 2y - 5$ in standard form. Find the equations of the directrix and axis of symmetry. Then, graph the equation, labeling the focus, vertex, and directrix.

$1 + x + 5 = y^2 - 2y + 1$

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

opens right

$4p = 1$

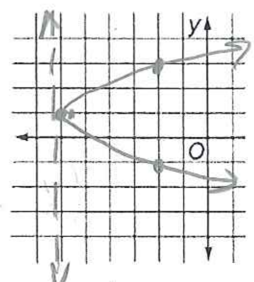
$p = 1/4$

vertex: $(-6, 1)$

focus: $(-5.75, 1)$

directrix: $x = -6.25$

axis of symm: $y = 1$



x	y
-2	-1/3

$4 = (y-1)^2$

$\pm 2 = y - 1$

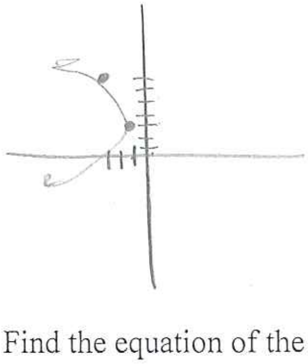
$-2 = y - 1$

$-1 = y$

$2 = y - 1$

$3 = y$

10. Find the equation of the parabola that passes through the point at (-3, 7), has its vertex at (-1, 3), and opens to the left.



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

$(7-3)^2 = 4p(-3+1)$

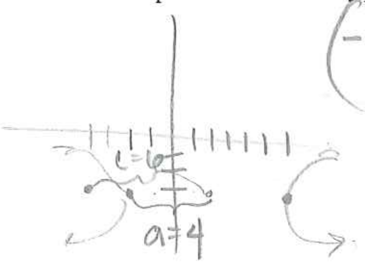
$4^2 = 4p(-2)$

$16 = 4p(-2)$

$-8 = 4p$

$(y-3)^2 = -8(x+1)$

11. Find the equation of the hyperbola that has vertices at (-2, -3) and (6, -3) and a focus is at (-4, -3).



$\left(\frac{-2+6}{2}, \frac{-3+-3}{2}\right) = (2, -3)$

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

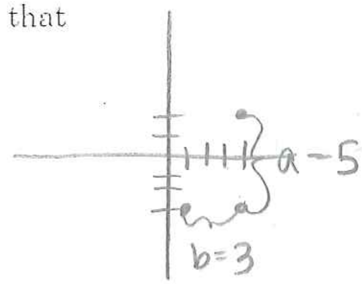
$6^2 = 4^2 + b^2$

$20 = b^2$

$\frac{(x-2)^2}{16} - \frac{(y+3)^2}{20} = 1$

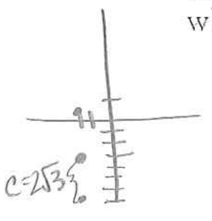
12. Find the equation of the ellipse that has its major axis parallel to the y-axis and its center at $(4, -3)$, and that passes through points at $(1, -3)$ and $(4, 2)$.

$$\frac{(x-4)^2}{9} + \frac{(y+3)^2}{25} = 1$$



13. Find the equation of the equilateral hyperbola that has its foci at $(-2, -3 - 2\sqrt{3})$ and $(-2, -3 + 2\sqrt{3})$, and whose conjugate axis is 6 units long.

$$\left(\frac{-2+-2}{2}, \frac{-3-2\sqrt{3}+-3+2\sqrt{3}}{2}\right)$$



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

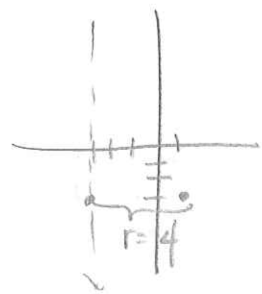
$(-2,-3)$ - center

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

$(2\sqrt{3})^2 = a^2 + 9 \quad 3 = a^2$

14. Write the standard form of the equation of the circle that is tangent to $x = -3$ and has its center at $(1, -3)$.

$$(x-1)^2 + (y+3)^2 = 16$$



15. Write the standard form of the equation of the circle that passes through (-6, -4) and has its center at (-8, 3).

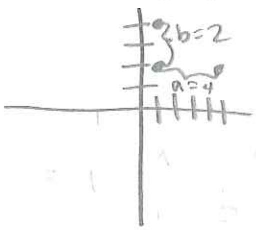
$(x+8)^2 + (y-3)^2 = r^2$

$(-6+8)^2 + (-4-3)^2 = r^2$

$4 + 49 = r^2 \quad 53 = r^2$

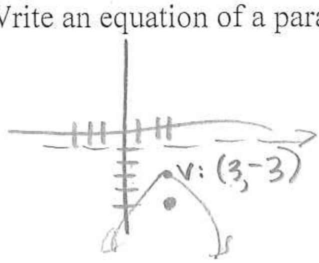
$$(x+8)^2 + (y-3)^2 = 53$$

16. Find the equation of the ellipse that has its center at (1, 2), the major axis is parallel to the x-axis, and the ellipse passes through the points at (1, 4) and (5, 2).



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

17. Write an equation of a parabola that has a focus at (3, -5) and a directrix with equation y = -1.



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

$$(x-3)^2 = -8(y+3)$$