PRE CALCULUS
CHAPTER 10 REVIEW: CONIC SECTIONS

Name KEY

1. Find the distance between the points (-2, -5) and (6, -1).

$x_1\ y_1 \quad x_2\ y_2$

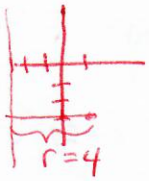
$d = \sqrt{(6-(-2))^2 + (-1-(-5))^2}$

$= \sqrt{8^2+4^2}$

$= \sqrt{80} = 4\sqrt{5}$

1. $4\sqrt{5}$

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



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

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

3. Write $x^2 + y^2 + 6x - 14y - 42 = 0$ in standard form. . Then, graph the equation

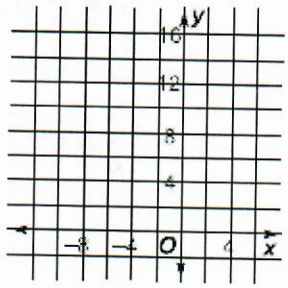
$x^2+6x+\underline{9} + y^2-14y+\underline{49} = 42+\underline{9}+\underline{49}$

$\frac{1}{2}(6) \to (3)^2 \qquad \frac{1}{2}(-14) \to (-7)^2$

$(x+3)^2 + (y-7)^2 = 100$

center $(-3, 7)$ radius $= 10$

3. $(x+3)^2 + (y-7)^2 = 100$



A ≠ C both +
Ellipse

4. Write $4x^2 + 9y^2 - 24x + 18y + 9 = 0$ in standard form. Find the center, vertices and foci, then graph the equation.

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

$4(x^2-6x+\underline{9}) + 9(y^2+2y+\underline{1}) = -9+36+9$

$\frac{1}{2}(-6) \to (-3)^2 \qquad \frac{1}{2}(2) \to (1)^2$

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

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

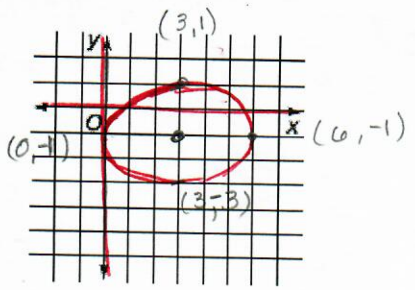
center (3,-1)

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

foci
$c^2 = a^2 - b^2$
$c^2 = 9 - 4$
$c = \sqrt{5}$
$(3 \pm \sqrt{5}, -1)$

$a^2 = 9$
$a = 3$
$b^2 = 4$
$b = 2$

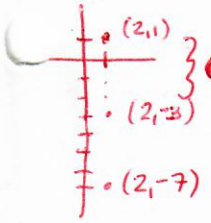
4. $\frac{(x-3)^2}{9} + \frac{(y+1)^2}{4} = 1$



5. Find the equation of the ellipse that has foci at (2, 1) and (2, -7) and b = 2.

center $(2, -3)$; $b = 2$
$c = 4$

$c^2 = a^2 - b^2$
$4^2 = a^2 - 2^2$
$16 = a^2 - 4$
$20 = a^2$



5. $\frac{(x-2)^2}{4} + \frac{(y+3)^2}{20} = 1$

$A = 4$
$C = -1$ Hyperbola

6. Write $4x^2 - y^2 + 24x + 4y + 28 = 0$ in standard form.
Find the center, foci, vertices and equations of the asymptotes.
Then graph the equation.

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

$4x^2+24x+\_\_ - y^2+4y+\_\_ = -28 + \_\_$

$4(x^2+6x+9) - 4(y^2-4y+4) = -28+36+-4$

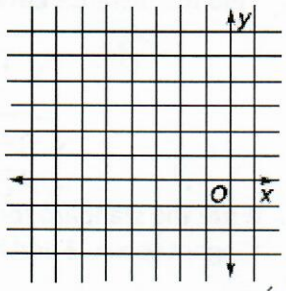
$\frac{1}{2}(6) \to (3)^2$ $\quad$ $\frac{1}{2}(4) \to (2)^2$

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

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

$a^2 = 1 \quad a = 1$
$b^2 = 4 \quad b = 2$
$b^2 = c^2 - a^2$
$4 = c^2 - 1$
$5 = c^2$
$\sqrt{5} = c$

center $(-3, 2)$
foci $(h \pm c, k)$
$(-3 \pm \sqrt{5}, 2)$
vertices $(h \pm a, k) = (-3 \pm 1, 2)$ $\quad$ $(-2, 2)$ $(-4, 2)$
asymp $y - k = \pm \frac{b}{a}(x+h)$: $y - 2 = \pm \frac{2}{1}(x-3)$



7. Write $-2x + y^2 - 2y + 5 = 0$ in standard form.
Find the vertex, focus, and equations of the directrix and axis of symmetry.
Then graph the equation.

7. $(y-1)^2 = 2(x-2)$
$x = \frac{3}{2}$; $y = 1$

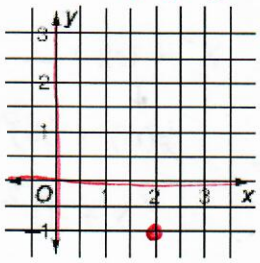
$y^2 - 2y + 1 = 2x - 5 + 1$

$\frac{1}{2}(-2) \to (-1)^2$

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

$4p = 2$
$p = \frac{1}{2}$

vertex $(2, -1)$
focus $(h, k+p)$
$(2, -1 + \frac{1}{2})$
$(2, -\frac{1}{2})$
directrix $x = h - p$
$x = 2 - \frac{1}{2}$
$x = \frac{3}{2}$



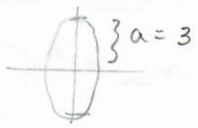
axis of sym $y = 1$

8. Find the equation of the ellipse that has its center at the origin,
eccentricity $\frac{2\sqrt{2}}{3}$, and a vertical major axis of 6 units.

8. $x^2 + \frac{y^2}{9} = 1$

$e = \frac{c}{a}$

$c = 2\sqrt{2}$
$a = 3$



$c^2 = a^2 - b^2$
$(2\sqrt{2})^2 = (3)^2 - b^2$
$8 = 9 - b^2$
$-1 = -b^2$
$1 = b^2$
$1 = b$

$\frac{(x-0)^2}{1} + \frac{(y-0)^2}{9} = 1$

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

9. Identify the conic section represented by $x^2 - 3xy + y^2 = 5$.

9. Circle

$A = 1$
$C = 1$