

Unit 8: Quiz #1 Review: Parabolas and Circles

- I. Write the equation in standard form – show all work.
For Parabola, state the vertex, focus, directrix, and axis of symmetry.
For Circle, state the center and radius.

1) $X^2 + 12Y = 0$ $X^2 = -12Y$ $p = -3$
 v(0, 0)
 dir: $Y = 3$
 f(0, -3)

2) $4(\frac{1}{4}X^2 + \frac{1}{4}Y^2 = 16)$ $X^2 + Y^2 = 64$ $c(0, 0)$
 $r = 8$

3) $X^2 + Y^2 - 6X - 8Y + 24 = 0$ $X^2 - 6X + (-3)^2 + Y^2 - 8Y + (-4)^2 = -1 + 16 + 1$
 $c(3, 4)$ $r = 1$
 $(X - 3)^2 + (Y - 4)^2 = 1$

4) $2Y^2 - 8Y - 4X + 10 = 0$
 $2(Y^2 - 4Y + (-2)^2) = 4X - 10 + 8$
 $2(Y - 2)^2 = 4X - 2$
 $(Y - 2)^2 = 2X - 1$
 $(Y - 2)^2 = 2(X - \frac{1}{2})$

- II. Write the equation in standard form.

5) Vertex (-3, 1) $\frac{(-3, 1)}{-3}$ Focus (1, 1)
 $(Y - 1)^2 = 16(X + 3)$
 v($\frac{1}{2}$, 2) f(1, 2)
 dir: $X = 0$
 Axis: $Y = 2$

6) Center (3, 0) Radius = 5 $(X - 3)^2 + Y^2 = 25$

7) Center is in the 3rd quadrant, radius = 2, tangent to the x-axis at (-4, 0)



$(-4, -2)$

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

$(-4, -2)$

III. Write the equation of the circle in general form.

8) Ends of the diameter are at (-10, -5) and (-4, 7)

$$M\left(-\frac{14}{2}, \frac{2}{2}\right) = (-7, 1)$$

$$d = \sqrt{(-10 - (-4))^2 + (-5 - 7)^2} = \sqrt{36 + 144} = \sqrt{180}$$

$$(x+7)^2 + (y-1)^2 = 180$$

$$x^2 + y^2 + 14x - 2y - 130 = 0$$

$$x^2 + 14x + 49 + y^2 - 2y + 1 - 180 = 0$$

IV. Write an equation for the perpendicular bisector of the line segment joining the two points. (3, -7) and (-3, 1)

$$m_{\perp} = \frac{3}{4} \quad M(0, -3)$$

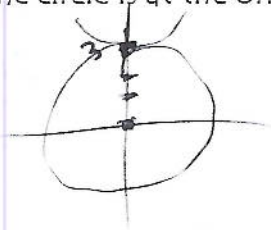
$$m = \frac{1-7}{-3-3} = \frac{-6}{-6} = 1$$

$$-3 = b$$

$$y = \frac{3}{4}x - 3$$

Bonus Review problem: (huh?)

To practice making a figure eight, Mr. Tucker (yes, he is an excellent figure skater) will skate along two circles etched in the ice. Please help him to write equations for two externally tangent circles that are each 6 feet in diameter so that the center of one circle is at the origin and the center of the other circle is on the positive y-axis.



$$x^2 + y^2 = 9$$

$$x^2 + (y-3)^2 = 9$$