

Multiple Choice

6.

Identify the choice that best completes the statement or answers the question.

- C 1. Write the equation of a circle with center $M(7, -10)$ and radius 2.
 A $(x+10)^2 + (y-7)^2 = 4$ ~~C~~ $(x-7)^2 + (y+10)^2 = 4$
 B $(x-y)^2 + (7+10)^2 = 4$ D $(x-7)^2 + (y+10)^2 = 2$

- ~~B~~ D 2. Find the center and radius of $x^2 + y^2 + 2x - 10y + 10 = 0$.
~~A~~ center $(1, -5); r = 16$ C center $(-1, 5); r = 16$
~~B~~ center $(1, -5); r = 4$ D center $(-1, 5); r = 4$

$$\underline{x^2 + 2x + 1 + y^2 - 10y + 25 = -10 + 1 + 25}$$

$$(x+1)^2 + (y-5)^2 = 16 \quad R = \sqrt{16} = 4$$

- D 3. Write the standard equation of a circle with center $(-3, -4)$ and radius 6.
 A $(x-3)^2 - (y-4)^2 = 6$ C $(x+3)^2 + (y-4)^2 = 36$
 B $(x-3)^2 + (y-4)^2 = 6$ D $(x+3)^2 + (y+4)^2 = 36$

A 4. Write the equation in standard form for the parabola with vertex (0,0) and directrix $y = -6$.

A $y = \frac{1}{24} x^2$

C $y = -\frac{1}{24} x^2$ $y = -P$
 $P = 6$

B $x = 24y^2$

D $x = \frac{1}{24} y^2$

$x^2 = 4 \cdot 6 y$
 $x^2 = 24 y$
 $\frac{1}{24} x^2 = y$

D 5. Write an equation in standard form for the parabola with focus $F(0, -6)$ and directrix $y = 6$. VERT

A $y = \frac{1}{24} x^2$

C $x = -\frac{1}{24} y^2$ $P = \frac{-6 - 6}{2} = -6$

B $x = \frac{1}{24} y^2$

D $y = -\frac{1}{24} x^2$

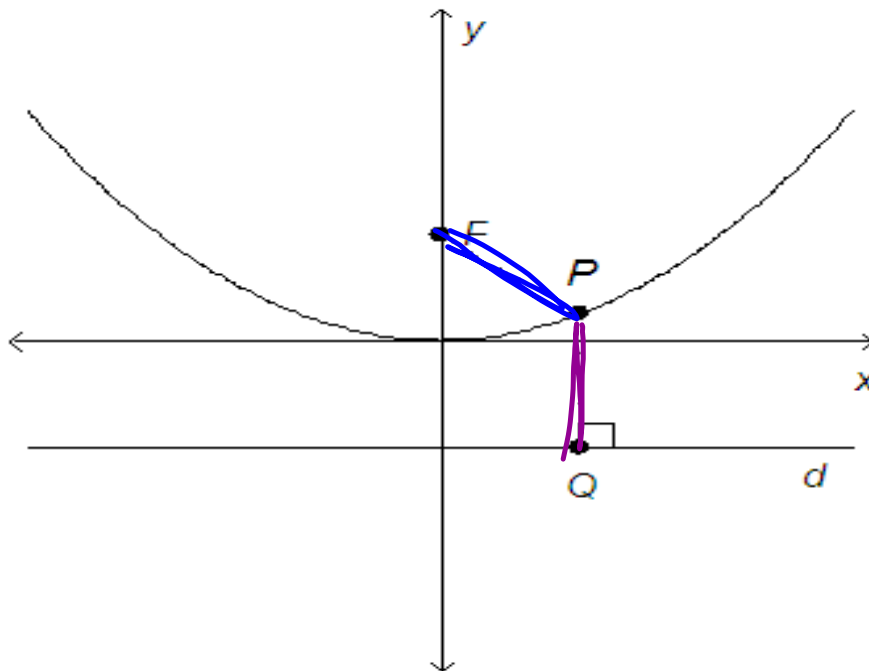
$P = -6$

(0,0)

$x^2 = 4(-6)y$
 $x^2 = -24y$
 $-\frac{1}{24} x^2 = y$

$K - P = 6$
 $K - (-6) = 6$
 $K + 6 = 6$
 $K = 0$

6. In the diagram below, F is the focus of the parabola, line d is the directrix, and $QP \perp d$. What is the relationship between FP and QP ?



- A $FP < QP$
B $FP = QP$
C $FP > QP$
D A relationship cannot be determined.

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7. Which is the equation of a circle that passes through $(2, 2)$ and is centered at $(5, 6)$?

A $(x-6)^2 + (y-5)^2 = 25$ C $(x+5)^2 + (y+6)^2 = 25$

B $(x-5)^2 + (y-6)^2 = 5$ D $(x-5)^2 + (y-6)^2 = 25$

$$(2-5)^2 + (2-6)^2 = R^2$$

$$9 + 16 = R^2$$

$$25 = R^2$$

$$5 = R$$

8. Which is the equation of a circle that has a diameter with endpoints $(1, 3)$ and $(-3, 1)$?

A $(x+1)^2 + (y-2)^2 = 10$ C $(x+1)^2 + (y-2)^2 = 5$

B $(x+1)^2 + (y-2)^2 = 20$ ~~D~~ $(x-1)^2 + (y-2)^2 = 5$

$$h = \frac{1+(-3)}{2} = -1$$

$$k = \frac{3+1}{2} = 2$$

$$(-1, 2)$$

$$(1+1)^2 + (3-2)^2 = R^2$$

$$1+1 = R^2$$

$$5 = R^2$$

Matching

Match each equation with the description of the circle it represents.

A center: $(-7, 2)$;
radius 3

E center: $(-4, -5)$;
radius 4

B center: $(-7, -2)$;
radius $\sqrt{3}$

F center: $(4, 5)$; radius
2

C center: $(-2, 7)$;
radius 3

G center: $(5, -4)$;
radius $\sqrt{2}$

D center: $(2, -7)$;
radius $\sqrt{3}$

H center: $(5, 4)$; radius
 $\sqrt{2}$

F

1. $(x-4)^2 + (y-5)^2 = 4$ C: $(4, 5)$

H

2. $x^2 - 10x + y^2 - 8y = -39$

$$\begin{aligned} x^2 - 10x + 25 + y^2 - 8y + 16 &= -39 + 25 + 16 \\ (x-5)^2 + (y-4)^2 &= 2 \\ (5, 4) \end{aligned}$$

Short Answer

1. Find the equation of the circle with center $(2, -6)$ and radius of 4.

$$(x-2)^2 + (y+6)^2 = 16$$

2. Write the equation of the circle in standard form.
*Identify the radius and center.

$$x^2 + y^2 - 4x + 6y + 9 = 0$$

$$x^2 - 4x + 4 + y^2 + 6y + 9 = -9 + 4 + 9$$

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

$$C (2, -3) \quad R = 2$$

3. Write the standard equation of a circle with center $(-4, -4)$ and radius 4.

$$(x+4)^2 + (y+4)^2 = 16$$

4. Write the standard form of the equation for a parabola with the given focus and vertex at $(0, 0)$.

$(0, 4)$

$$p=4$$

$$x^2 = 4 \cdot 4 \cdot y$$

$$x^2 = 16y$$

5. Write an equation for a parabola with vertex at $(-4, 3)$ and focus at $(-4, -2)$.

VERT

(h, k) and focus at $(h, k+p)$

$$k+p = -2$$

$$3+p = -2$$

$$p = -5$$

$$(x+4)^2 = -20(y-3)$$

6. A parabola has focus $(4, 0)$ and directrix $x = -4$.

HORIZ

(h, k)

$h-p$

Part A: What is the equation of the parabola?

$$y^2 = 16x$$

$$p = \frac{4 - (-4)}{2} = 4$$

Part B: Without graphing, tell the direction in which the parabola opens. How do you know?

$$h+p = 4$$

$$h+4 = 4$$

$$h = 0$$

The directrix is $x = -4$, so the parabola must be horizontal. p is positive, therefore opens to the right.

7. ^{Vertex} Write the equation for a parabola whose vertex is at $(-5, 3)$ and whose directrix is $y = 5$. Identify the focus. h, k

$$y = k - p$$

$$k - p = 5$$

$$3 - p = 5$$

$$-p = 2$$

$$p = -2$$

$$(x + 5)^2 = -8(y - 3)$$

$$F: (-5, 1)$$