

PRINTABLE VERSION

Quiz 4

Question 1

C

Find the coordinates of the center for the given circle.

$$(x + 5)^2 + (y + 2)^2 = 81$$

- a) ☐ (-5, 2)
- b) ☐ (-2, -5)
- c) ☒ (-5, -2)
- d) ☐ (5, 2)
- e) ☐ (2, 5)
- f) ☐ None of the above.

Center = (-5, -2)

radius = $\sqrt{81}$

r = 9

Question 2

B

Find the length of the radius for the given circle.

$$(x + 3)^2 + (y + 2)^2 = 64$$

- a) ☐ 64
- b) ☒ 8
- c) ☐ 32
- d) ☐ $2\sqrt{2}$
- e) ☐ 16
- f) ☐ None of the above.

Center = (-3, -2)

radius = $\sqrt{64}$

r = 8

Question 3

A

Find the coordinates of the center for the given circle.

$$x^2 + 4x - 29 + y^2 + 8y = 0$$

← Group x^2 terms, y^2 terms

← complete the squares

a) ☒ (-2, -4)

b) ☐ (4, 2)

c) ☐ (2, 4)

d) ☐ (-2, 4)

e) ☐ (-4, -2)

f) ☐ None of the above.

$$\left(x^2 + 4x + \underbrace{4}_{\left(\frac{4}{2}=2\right)^2}\right) + \left(y^2 + 8y + \underbrace{16}_{\left(\frac{8}{2}=4\right)^2}\right) = 29 + 4 + 16$$

$$\Rightarrow (x+2)^2 + (y+4)^2 = 49$$

$$\boxed{\text{Center} = (-2, -4)}, \text{ radius} = \sqrt{49} = 7$$

Question 4

CWrite the equation of the circle with center (-3, -4) and radius of length $5\sqrt{3}$.

a) ☐ $(x+3)^2 + (y+4)^2 = 5\sqrt{3}$

b) ☐ $(x-3)^2 + (y-4)^2 = 10\sqrt{3}$

c) ☒ $(x+3)^2 + (y+4)^2 = 75$

d) ☐ $(x-3)^2 + (y-4)^2 = 5\sqrt{3}$

e) ☐ $(x-3)^2 + (y-4)^2 = 75$

f) ☐ None of the above.

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

$$(x+3)^2 + (y+4)^2 = (5\sqrt{3})^2$$

$$\Rightarrow \boxed{(x+3)^2 + (y+4)^2 = 75}$$

Question 5

BWrite the equation of the circle whose diameter has endpoints $(4, 4)$ and $(4, -4)$.

a) ☐ $(x-4)^2 + y^2 = 4$

b) ☒ $(x-4)^2 + y^2 = 16$

c) ☐ $(x+4)^2 + y^2 = 4$

d) ☐ $(x+4)^2 + y^2 = 64$

e) ☐ $(x+4)^2 + y^2 = 16$

f) ☐ None of the above.

$$\bullet \text{ radius} = \frac{1}{2} \cdot \text{diameter length}$$

$$\text{length} = \text{distance} = \sqrt{(4-4)^2 + (-4-4)^2} = \sqrt{64} = 8$$

$$\Rightarrow r = \frac{1}{2} \cdot 8 = 4$$

$$\bullet \text{ center} = \text{midpoint of diameter}$$

$$= \left(\frac{4+4}{2}, \frac{4-4}{2}\right) = (4, 0)$$

$$\Rightarrow (x-4)^2 + (y-0)^2 = 4^2 \Rightarrow \boxed{(x-4)^2 + y^2 = 16}$$

distance =

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

midpoint

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

Question 6

C

Write the following in standard form for a parabola.

$$\underline{x}^2 - 2x - 15 - 4y = 0$$

$$\text{vertical} \leftrightarrow (x-h)^2 = 4p(y-k)$$

a) ☐ $\left(x - \frac{1}{2}\right)^2 = -4(y + 4)$

b) ☐ $(x + 1)^2 = 4(y + 4)$

c) ☒ $(x - 1)^2 = 4(y + 4)$

d) ☐ $(x + 1)^2 = -4(y + 4)$

e) ☐ $\left(x - \frac{1}{2}\right)^2 = 4(y - 4)$

f) ☐ None of the above.

$$x^2 - 2x + 1 = 4y + 15 + 1$$

$$\left(\frac{2}{2} - 1\right)^2$$

$$16$$

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

Question 7

B

Write the following in standard form for a parabola.

$$\underline{y}^2 - 4y - 6 - 5x = 0$$

$$\text{horizontal} \leftrightarrow (y-k)^2 = 4p(x-h)$$

a) ☐ $(y - 1)^2 = 5(x - 2)$

b) ☒ $(y - 2)^2 = 5(x + 2)$

c) ☐ $(y - 1)^2 = -5(x + 2)$

d) ☐ $(y + 2)^2 = -5(x + 2)$

e) ☐ $(y + 2)^2 = 5(x + 2)$

f) ☐ None of the above.

$$y^2 - 4y + 4 = 5x + 6 + 4$$

$$\left(\frac{4}{2} - 2\right)^2$$

$$10$$

$$\rightarrow (y-2)^2 = 5(x+2)$$

Question 8

D

State the coordinates of the vertex for the given parabola.

$$\underline{x}^2 + 16x + 70 - 3y = 0 \quad \leftarrow \text{Vertical}$$

$$(x-h)^2 = 4p(y-k)$$

and vertex (h, k)

- a) ☐ $(2, -8)$
- b) ☐ $(-4, 2)$
- c) ☐ $(-2, 8)$
- d) ☒ $(-8, 2)$
- e) ☐ $(8, -2)$
- f) ☐ None of the above.

$$x^2 + \underline{16x} + 64 = 3y - 70 + 64$$

$$\left(\frac{16}{2} = 8\right)^2 \quad \quad \quad 3y - 6$$

$$\Rightarrow (x+8)^2 = 3(y-2) \Rightarrow \boxed{\text{vertex } (-8, 2)}$$

Question 9

C

State the coordinates of the vertex for the given parabola.

$$y^2 + 6y + 30 - 3x = 0$$

horizontal $\hookrightarrow (y-k)^2 = 4p(x-h)$

Vertex = (h, k)

- a) ☐ $(7, -3/2)$
- b) ☐ $(3, -7)$
- c) ☒ $(7, -3)$
- d) ☐ $(-3, 7)$
- e) ☐ $(-7, 3)$
- f) ☐ None of the above.

$$y^2 + \underline{6y} + 9 = 3x - 30 + 9$$

$$\left(\frac{6}{2} = 3\right)^2 \quad \quad \quad 3x - 21$$

$$\Rightarrow (y+3)^2 = 3(x-7) \Rightarrow \text{vertex} = (7, -3)$$

Question 10

B

State the equation of the directrix for the given parabola.

 $\rightarrow$ horizontal with a left opening.

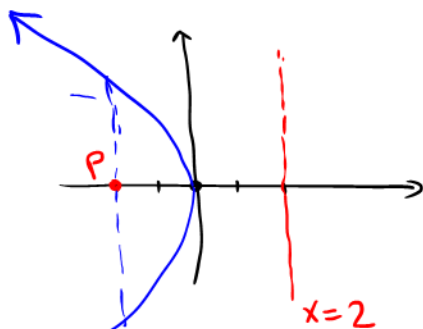
$$y^2 = -8x = 4px$$

$$-8 = 4p \Rightarrow p = \frac{-8}{4} = -2$$

Focus point $(-2, 0)$ $\Rightarrow$ Directrix line

$$\boxed{x = 2}$$

- a) ☐ $y = -2$
- b) ☒ $x = 2$
- c) ☐ $y = 0$
- d) ☐ $y = 2$
- e) ☐ $x = -2$



f) ☐ None of the above.

Question 11

C

State the equation of the axis of symmetry for the given parabola.

a) ☐ $x = 6$

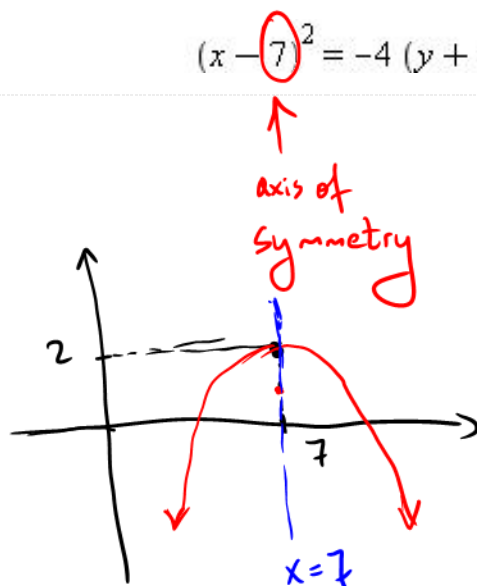
b) ☐ $x = -7$

c) ☒ $x = 7$

d) ☐ $y = -1$

e) ☐ $y = -2$

f) ☐ None of the above.



$$(x-7)^2 = -4(y+2) \leftarrow \text{vertical parabola}$$

Axis of symmetry
is the x -value of
Vertex $(7, -2)$

$$\Rightarrow \boxed{x = 7}$$

Question 12

D

State the coordinates of the focus for the given parabola.

a) ☐ $(4, 4)$

b) ☐ $(5, 3)$

c) ☐ $(3, 3)$

d) ☒ $(4, 2)$

e) ☐ $(-4, -4)$

f) ☐ None of the above.

$$(x-4)^2 = -4(y-3) \leftrightarrow \text{vertical parabola}$$

$$-4 = 4p \Rightarrow p = -1 \Rightarrow (0, -1) \leftarrow \text{downward}$$

$$(0, -1) \xrightarrow[\begin{pmatrix} 4, 3 \end{pmatrix}]{\text{shifted}} (0+4, -1+3) = \boxed{(4, 2)}$$

Question 13

D

State the focal width for the given parabola.

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

a) ☐ 4

absolute value of $-16 = \text{focal width}$

b) ☐ $\frac{1}{4}$

c) ☐ 2

d) ☒ 16

e) ☐ $\frac{1}{16}$

f) ☐ None of the above.

$$\Rightarrow -16 = 4p \Rightarrow p = -4$$

$$\text{Focal width} = 4 \cdot |p| = 4 \cdot 4 = \boxed{16}$$

Question 14

B

State the endpoints of the focal chord for the given parabola.

$$x^2 = 12y$$

$$12 = 4p \Rightarrow p = 3$$

a) ☐ (6, -3), (-6, -3)

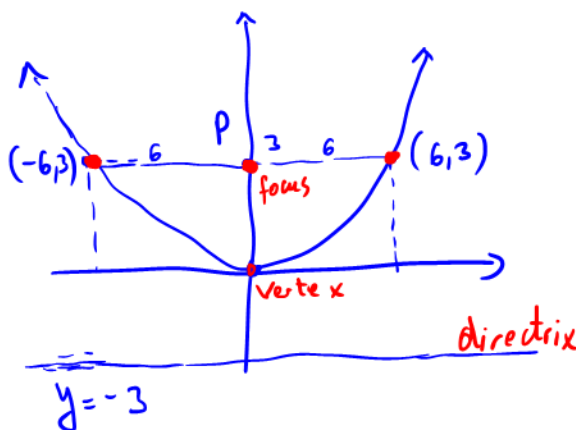
b) ☒ (6, 3), (-6, 3)

c) ☐ (6, 0), (-6, 0)

d) ☐ (3, 0), (-3, 0)

e) ☐ (3, 6), (3, -6)

f) ☐ None of the above.



$$\Rightarrow (2p, p) \text{ \& } (-2p, p)$$

i.e

$$\boxed{(6, 3) \text{ \& } (-6, 3)}$$

Question 15

B

Is the given ellipse oriented vertically or horizontally?

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

bigger

a) ☐ Vertically

b) ☒ Horizontally

Question 16

D

State the length of the major axis and the coordinates of the vertices of the major axis for the given ellipse.

$$\frac{(x-9)^2}{(36)} + \frac{(y-5)^2}{(49)} = 1$$

bigger

Vertical, shifted by (9,5)

- a) ☐ Length of major axis: 12; Coordinates of vertices: (3, 5), (15, 5)
- b) ☐ Length of major axis: 14; Coordinates of vertices: (3, 5), (15, 5)
- c) ☐ Length of major axis: 13; Coordinates of vertices: (3, -2), (15, 12)
- d) ☒ Length of major axis: 14; Coordinates of vertices: (9, -2), (9, 12)
- e) ☐ Length of major axis: 12; Coordinates of vertices: (9, -2), (9, 12)
- f) ☐ None of the above.

$$a^2 = 49 \Rightarrow a = 7$$

$$(0, 7), (0, -7)$$

shifted to 0, 9

$$(9, 12), (9, -2)$$

$$\text{length} = 2 \cdot 7 = 14$$

Question 17

B

State the length of the minor axis and the coordinates of the vertices of the minor axis for the given ellipse.

horizontal $\left[\frac{x^2}{(36)} + \frac{y^2}{(16)} = 1 \right]$

- a) ☐ Length of minor axis: 4; Coordinates of vertices: (-6, 0), (6, 0)
- b) ☒ Length of minor axis: 8; Coordinates of vertices: (0, -4), (0, 4)
- c) ☐ Length of minor axis: 12; Coordinates of vertices: (-6, 0), (6, 0)
- d) ☐ Length of minor axis: 6; Coordinates of vertices: (0, -4), (0, 4)
- e) ☐ Length of minor axis: 10; Coordinates of vertices: (-6, -4), (6, 4)
- f) ☐ None of the above.

$$b^2 = 16 \Rightarrow b = 4$$

$$\text{length} = 2 \cdot 4 = 8$$

$$(0, 4), (0, -4)$$

over y-axis

Question 18

D

State the coordinates of the foci for the given ellipse.

$$\frac{x^2}{(9)} + \frac{y^2}{(16)} = 1$$

$\underbrace{(9)}_{b^2} + \underbrace{(16)}_{a^2} = 1$

vertical ellipse

$$c^2 = a^2 - b^2 = 16 - 9 = 7$$

$$c = \pm \sqrt{7}$$

$$\Rightarrow (0, \sqrt{7}), (0, -\sqrt{7})$$

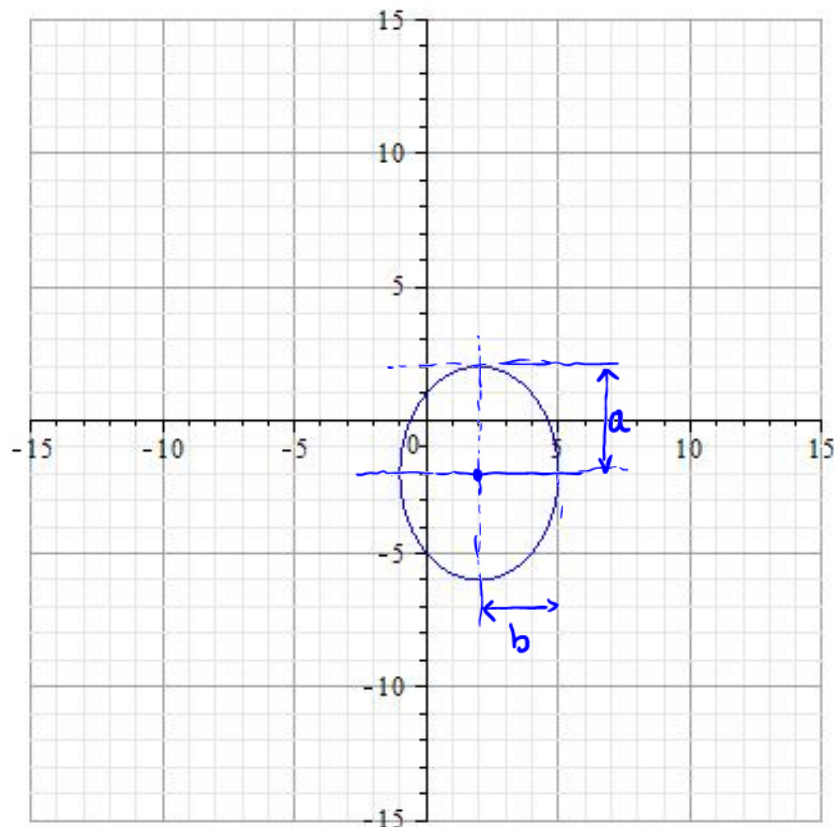
- a) ☐ $(-\sqrt{7}, 0), (\sqrt{7}, 0)$
- b) ☐ $(5, 0), (-5, 0)$
- c) ☐ $(5, -\sqrt{7}), (-5, \sqrt{7})$

- d) ☒ $(0, -\sqrt{7}), (0, \sqrt{7})$
- e) ☐ $(0, -5), (0, 5)$
- f) ☐ None of the above.

Question 19

B

Given:



Center $(2, -2)$
 $\downarrow$
 shift 2 right,
 2 down

Which of the following is the equation of this ellipse?

- a) ☐ $\frac{(x+2)^2}{(9)} + \frac{(y-2)^2}{(16)} = 1$
- b) ☒ $\frac{(x-2)^2}{(9)} + \frac{(y+2)^2}{(16)} = 1$
- c) ☐ $\frac{(x-2)^2}{(16)} + \frac{(y+2)^2}{(9)} = 1$
- d) ☐ $\frac{(x+2)^2}{(16)} + \frac{(y-2)^2}{(16)} = 1$

$$a = 4 \Rightarrow a^2 = 16$$

$$b = 3 \Rightarrow b^2 = 9$$

Vertical ellipse:

$$\frac{(y+2)^2}{16} + \frac{(x-2)^2}{9} = 1$$

e) ☐ $\frac{(x+2)^2}{(9)} + \frac{(y+2)^2}{(16)} = 1$

f) ☐ None of the above.

Question 20

E

Write the following in standard form for an ellipse.

$$4x^2 - 24x - 39 + 25y^2 + 50y = 0 \leftarrow \text{group 'x' terms, 'y' terms}$$

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

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

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

d) ☐ $\frac{(x-3)^2}{(10)} + \frac{(y+1)^2}{(10)} = 1$

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

f) ☐ None of the above.

↪

$$4x^2 - 24x + 25y^2 + 50y = 39$$

↪

$$4(x^2 - 6x + 9) + 25(y^2 + 2y + 1) = 39 + 36 + 25$$

$\left(\frac{6}{2}=3\right)^2$ $\left(\frac{2}{2}=1\right)^2$

$$4(x-3)^2 + 25(y+1)^2 = 100$$

↪ divide by 100 both sides

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