Mid-Chapter Quiz: Lessons 9-1 through 9-4

Find the midpoint of the line segment with endpoints at the given coordinates

1. (7, 4), (−1, −5)

   ANSWER:

   $\left(3, -\dfrac{1}{2}\right)$

2. (−2, −9), (−6, 0)

   ANSWER:

   $\left(-4, -\dfrac{9}{2}\right)$

Find the distance between each pair of points with the given coordinates

3. (0, 6), (−2, 5)

   ANSWER:

   $\sqrt{5}$ units

4. (10, 1), (0, −4)

   ANSWER:

   $5\sqrt{5}$ units

5. **HIKING** Carla and Lance left their campsite and hiked 6 miles directly north and then turned and hiked 7 miles east to view a waterfall.

   a. How far is the waterfall from their campsite?

   b. Let the campsite be located at the origin on a coordinate grid. At the waterfall they decide to head directly back to the campsite. If they stop halfway between the waterfall and the campsite for lunch, at what coordinate will they stop for lunch?

   ANSWER:

   a. $\sqrt{85}$ or about 9.22 miles

   b. (3.5, 3)

Write each equation in standard form. Identify the vertex, axis of symmetry, and direction of opening of the parabola.

6. $y = 3x^2 - 12x + 21$

   ANSWER:

   $y = 3(x - 2)^2$; (2, 9); $x = 2$; opens up

7. $x - 2y^2 = 4y + 6$

   ANSWER:

   $x = 2(y + 1)^2 + 4$; (4, −1); $y = -1$; opens to the right

8. $y = \dfrac{1}{2}x^2 + 12x - 8$

   ANSWER:

   $y = \dfrac{1}{2}(x + 12)^2 - 80$; (−12, −80); $x = -12$; opens up

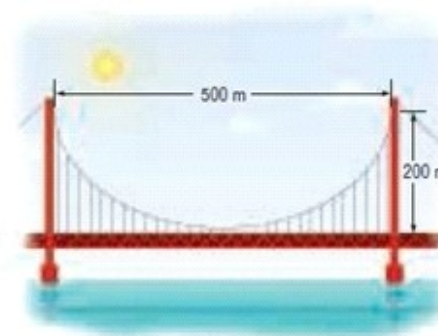9. $x = 3y^2 + 5y - 9$

   ANSWER:

   $x = 3\left(y + \dfrac{5}{6}\right)^2 - 11\dfrac{1}{12}$;

   $\left(-\dfrac{133}{12}, -\dfrac{5}{6}\right)$;

   $y = -\dfrac{5}{6}$;

   opens to the right

10. **BRIDGES** Write an equation of a parabola to model the shape of the suspension cable of the bridge shown. Assume that the origin is at the lowest point of the cables.

    ANSWER:

    $y = \dfrac{2}{625}x^2$

Identify the coordinates of the vertex and focus, the equation of the axis of symmetry and directrix, and the direction of opening of the parabola with the given equation. Then find the length of the latus rectum.

11. $y = x^2 + 6x + 5$

ANSWER:

$(-3,\ -4);\ \left(-3, -\dfrac{15}{4}\right);\ x = -3;\ y = -\dfrac{17}{4}$; opens up; 1 unit

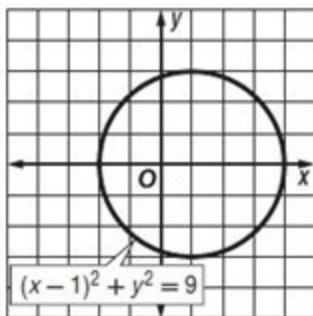12. $x = -2y^2 + 4y + 1$

ANSWER:

$(3,\ 1);\ \left(\dfrac{23}{8}, 1\right);\ y = 1;\ x = \dfrac{25}{8}$; opens to the left;

$\dfrac{1}{2}$ unit

13. Find the center and radius of the circle with equation $(x-1)^2 + y^2 = 9$. Then graph the circle.

ANSWER:

$(1,\ 0)$; 3 units

14. Write an equation for a circle that has center at (3, −2) and passes through (3, 4).

ANSWER:

$(x-3)^2 + (y+2)^2 = 36$

15. Write an equation for a circle if the endpoints of a diameter are at (8, 31) and (32, 49).

ANSWER:

$(x-20)^2 + (y-40)^2 = 225$

16. **MULTIPLE CHOICE** What is the radius of the circle with equation $x^2 + 2x + y^2 + 14y + 34 = 0$?
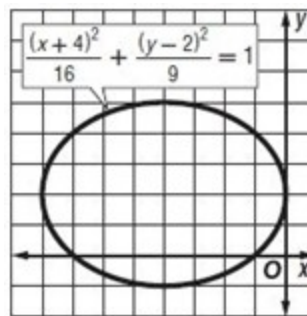
A 2
B 4
C 8
D 16

ANSWER:

B

Find the coordinates of the center and foci and the lengths of the major and minor axes of the ellipse with the given equation. Then graph the ellipse.

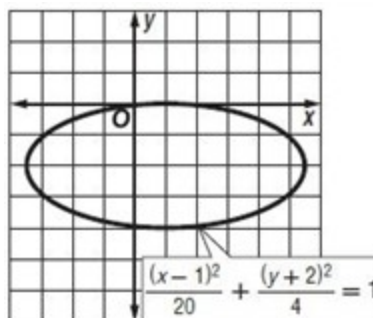17. $\dfrac{(x+4)^2}{16} + \dfrac{(y-2)^2}{9} = 1$

ANSWER:

$(-4,\ 2);\ \left(-4 \pm \sqrt{7}, 2\right)$; 8; 6

18. $\dfrac{(x-1)^2}{20} + \dfrac{(y+2)^2}{4} = 1$

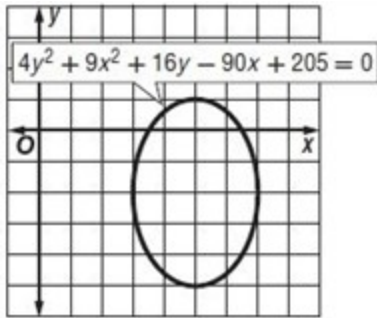*ANSWER:*

$(1,\ -2);\ (5,\ -2),\ (-3,\ -2);\ 4\sqrt{5}\ ;\ 4$

19. $4y^2 + 9x^2 + 16y - 90x + 205 = 0$

    ANSWER:

    $(5, -2)$; $\left(5, -2 \pm \sqrt{5}\right)$; 6; 4

20. **MULTIPLE CHOICE** Which equation represents an ellipse with endpoints at (−4, 10) and (−4, −6) and foci at about (−4, 7.3) and (−4, −3.3)?

    F $\dfrac{(x-2)^2}{36} + \dfrac{(y+4)^2}{64} = 1$

    G $\dfrac{(x+4)^2}{64} + \dfrac{(y-2)^2}{36} = 1$

    H $\dfrac{(y-2)^2}{64} + \dfrac{(x+4)^2}{36} = 1$

    I $\dfrac{(x-2)^2}{64} + \dfrac{(y+4)^2}{36} = 1$

    ANSWER:

    H