Name Answer Key Date:

Practice Test

1. What is the midpoint of the line segment with endpoints at (12, 7) and (18, 19)?

   A. (30, 26) **B.** (15, 13) **C.** (−6, −12) **D.** (3, 6) 1. B

2. Choose the midpoint of the line segment with endpoints at (5, 9) and (11, 15).

   F. (8, 12) **G.** (16, 24) **H.** (6, 6) **J.** (−6, −6) 2. F

3. Find the distance between $A(12, 8)$ and $B(4, 2)$.

   A. 14 units **B.** 100 units **C.** 10 units **D.** −10 units 3. C

4. What is the distance between $C(4, 3)$ and $D(7, 7)$?

   F. −5 units **G.** 7 units **H.** 25 units **J.** 5 units 4. J

5. Write the equation of the parabola $y = x^2 + 10x + 16$ in standard form.

   A. $y = (x + 5)^2 - 9$ **C.** $y = (x + 5)^2 + 16$

   B. $y = (x + 5)^2 + 41$ **D.** $y = (x + 8)(x + 2)$ 5. A

6. Write an equation for the parabola with vertex (1, 0) if the length of the latus rectum is $\frac{1}{2}$ and the parabola opens down. $a = -2$

   F. $y = -\frac{1}{2}(x - 1)^2$ **G.** $y = -2(x - 1)^2$ **H.** $x = -2(y - 1)^2$ **J.** $x = -\frac{1}{2}(y - 1)^2$ 6. G

Graph each equation.

7. $x^2 + y^2 + 4x + 6y - 3 = 0$

$(x^2+4x) + (y^2-6y) = 3$

$\left(\frac{4}{2}\right)^2 = (2)^2 = 4 \quad \left(\frac{-6}{2}\right)^2 = (-3)^2 = 9$

$(x^2+4x+4) + (y^2-6y+9) = 3+4+9$

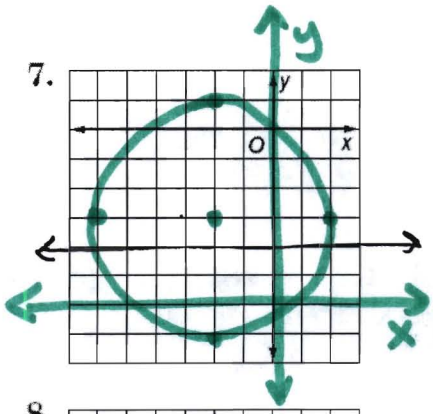
$(x+2)^2 + (y-3)^2 = 16$

center $(-2, 3)$ radius $= 4$

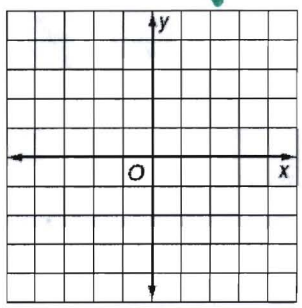
center (−2, 3) radius = 4

8. $9x^2 + 4y^2 = 36$

7.



8.



10. Which is the equation of a circle with center (2, 1) that passes through (2, 4)?

    F. $(x - 2)^2 + (y - 1)^2 = 9$ **H.** $(x - 2)^2 + (y - 1)^2 = 3$

    G. $(x + 2)^2 + (y + 1)^2 = 9$ **J.** $(x + 2)^2 + (y + 1)^2 = 3$ 10. F

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Review

Consider the segment connecting the points $(-3, 5)$ and $(9, 11)$. (x_1, y_1 and x_2, y_2)

1. Find the midpoint of this segment.

$$\left(\frac{-3+9}{2}, \frac{5+11}{2}\right) = \left(\frac{6}{2}, \frac{16}{2}\right) = \boxed{(3,8)}$$

2. Find the length of the segment.

$$d = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$$
$$= \sqrt{(9-(-3))^2+(11-5)^2} = \sqrt{12^2+6^2}$$
$$= \sqrt{144+36} = \sqrt{180} = \boxed{6\sqrt{5}}$$

3. Circle P has a diameter $\overline{CD}$ If C is at (4, -3) and D is at (-3, 5), find the center of the circle and the length of the diameter.

$(4, -3)$ $(-3, 5)$

$$\text{center} = \left(\frac{4+(-3)}{2}, \frac{-3+5}{2}\right) = \boxed{\left(\frac{1}{2}, 1\right)}$$

$$\text{length of diameter} = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$$
$$= \sqrt{(-3-4)^2+(5-(-3))^2}$$
$$= \sqrt{(-7)^2+8^2}$$
$$= \sqrt{49+64} = \boxed{\sqrt{113}}$$

Write each equation in vertex form, identify the vertex, axis of symmetry, and direction.

4. $y = 2x^2 - 8x + 1$

$y - 1 = 2x^2 - 8x$

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

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

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

$+4(2)$

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

$\boxed{y = 2(x-2)^2 - 7}$ vertex $(2, -7)$, A of S $x = 2$, direction: up

5. $y = -2x^2 + 6x + 1$

$y - 1 = -2x^2 + 6x$

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

$\left(\frac{-3}{2}\right)^2 = \frac{9}{4}$

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

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

$y - \frac{11}{2} = -2\left(x - \frac{3}{2}\right)^2$

$\boxed{y = -2\left(x - \frac{3}{2}\right)^2 + \frac{11}{2}}$ vertex $\left(\frac{3}{2}, \frac{11}{2}\right)$, A of S $x = \frac{3}{2}$, direction: down

6. $y = \frac{1}{2}x^2 - 5x + 12$

$y - 12 = \frac{1}{2}x^2 - 5x$

$y - 12 = \frac{1}{2}(x^2 - 10x)$

$\left(\frac{-10}{2}\right)^2 = (-5)^2 = 25$

$y - 12 + 25\left(\frac{1}{2}\right) = \frac{1}{2}(x^2 - 10x + 25)$

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

$\boxed{y = \frac{1}{2}(x-5)^2 - \frac{1}{2}}$ vertex $(5, -\frac{1}{2})$, A of S $x = 5$, direction up

7. Write the equation of the circle with center (4, -3) and radius 5.

$$(x-h)^2 + (y-k)^2 = r^2$$
$$(x-4)^2 + (y-(-3))^2 = 5^2$$
$$\boxed{(x-4)^2 + (y+3)^2 = 25}$$

8. The circle with equation $(x + 8)^2 + y^2 = 121$ has center $\boxed{(-8, 0)}$ and radius $\sqrt{121} = \boxed{11}$.

9. Find the center and radius of the circle with equation $x^2 + y^2 + 4x - 6y - 3 = 0$.

$$x^2 + 4x + y^2 - 6y - 3 = 0$$
$$+3 \quad +3$$
$$(x^2 + 4x) + (y^2 - 6y) = 3$$
$$\left(\frac{4}{2}\right)^2 = (2)^2 = 4 \qquad \left(\frac{-6}{2}\right)^2 = (-3)^2 = 9$$
$$(x^2 + 4x + 4) + (y^2 - 6y + 9) = 3 + 4 + 9$$
$$(x+2)^2 + (y-3)^2 = 16$$

$\boxed{\text{center } (-2, 3) \quad \text{radius} = 4}$