

Writing Equations of Ellipses

Use the information provided to write the standard form equation of each ellipse.

- 1) Vertices: $(8, 9)$, $(-20, 9)$
 Co-vertices: $(-6, 20)$, $(-6, -2)$

$$\textcircled{1} \left(\frac{8 + (-20)}{2}, \frac{9 + 9}{2} \right)$$

$$(-6, 9)$$

$$\textcircled{2} a = (-6, 9) \text{ to } (-20, 9)$$

$$a = -14 \quad a^2 = 196$$

$$\textcircled{3} b = (-6, 9) \text{ to } (-6, 20)$$

$$b = 11 \quad b^2 = 121$$

$$\textcircled{4} \frac{(x+6)^2}{196} + \frac{(y-9)^2}{121} = 1$$

- 2) Vertices: $(5, -5)$, $(-21, -5)$
 Co-vertices: $(-8, 4)$, $(-8, -14)$

$$\textcircled{1} \left(\frac{5 + (-21)}{2}, \frac{-5 + (-5)}{2} \right) (-8, -5)$$

$$\textcircled{2} a = (5, -5) \text{ to } (-21, -5)$$

$$a = -13 \quad a^2 = 169$$

$$\textcircled{3} b = (-8, -5) \text{ to } (-8, -14)$$

$$b = -9 \quad b^2 = 81$$

$$\textcircled{4} \frac{(x+8)^2}{169} + \frac{(y+5)^2}{81} = 1$$

- 3) Vertices: $(-8, 15)$, $(-8, -3)$
 Co-vertices: $(-1, 6)$, $(-15, 6)$

$$\textcircled{1} \left(\frac{-8 + (-8)}{2}, \frac{15 + (-3)}{2} \right)$$

$$(-8, 6)$$

$$\textcircled{2} a = (-8, 6) \text{ to } (-8, 15)$$

$$a = 9 \quad a^2 = 81$$

$$\textcircled{3} b = (-8, 6) \text{ to } (-15, 6)$$

$$b = -7 \quad b^2 = 49$$

$$\textcircled{4} \frac{(x+8)^2}{49} + \frac{(y-6)^2}{81} = 1$$

- 4) Vertices: $(2, 3)$, $(2, -19)$
 Co-vertices: $(10, -8)$, $(-6, -8)$

$$\textcircled{1} \left(\frac{2 + 2}{2}, \frac{3 + (-19)}{2} \right) = (2, -8)$$

$$\textcircled{2} a = (2, -8) \text{ to } (2, -19)$$

$$a = -11 \quad a^2 = 121$$

$$\textcircled{3} b = (2, -8) \text{ to } (10, -8)$$

$$b = 8 \quad b^2 = 64$$

$$\textcircled{4} \frac{(x-2)^2}{64} + \frac{(y+8)^2}{121} = 1$$