

1. Vertex of  $y = (x - 3)^2 + 2$ ?

$$h = 3, k = 2$$

Answer: (3, 2)

2. Vertex of  $y = (x + 5)^2 - 1$ ?

$$x + 5 \text{ means } h = -5$$

Answer: (-5, -1)

3. Shift  $y = x^2$  right 4 units. Write it.

$$\text{Right} = x - 4 \text{ inside}$$

Answer:  $y = (x - 4)^2$

4. Shift  $y = x^2$  up 3 units.

$$\text{Add 3 outside}$$

Answer:  $y = x^2 + 3$

5. Shift  $x^2$  left 3 units. (Trainer echo - Aug 2025 Q13!)

$$\text{Left} = x + 3 \text{ inside}$$

Answer:  $(x + 3)^2$

6. Shift  $f(x) = (x + 5)^2 - 2$  left 3 units. (Trainer echo - Jan 2026 Q15!)

$$\text{Left 3: replace } x \text{ with } x + 3$$

$$(x + 8)^2 - 2$$

Answer:  $(x + 8)^2 - 2$

7. Vertex of  $y = -(x - 2)^2 + 6$ ? Does it open up or down?

$$h = 2, k = 6; a = -1$$

Answer: (2, 6), opens down

8. Write a parabola with vertex (4, -3) opening up.

$$\text{Plug into vertex form}$$

Answer:  $y = (x - 4)^2 - 3$

9.  $y = (x - 1)^2 - 9$ . Find the vertex AND the zeros. ★ challenge

$$\text{Vertex } (1, -9)$$

$$\text{Set } = 0: (x-1)^2 = 9, x - 1 = \pm 3$$

Answer: vertex (1,-9); zeros 4 and -2

10. Describe how  $y = (x + 2)^2 - 5$  moved from  $y = x^2$ , then give its vertex. ★ challenge

$$\text{Left 2, down 5}$$

Answer: left 2 & down 5; vertex (-2, -5)