

1. Does $y = 3x^2$ open narrower or wider than $y = x^2$?

$$|3| > 1$$

Answer: narrower

2. Does $y = (1/2)x^2$ open narrower or wider?

$$|1/2| < 1$$

Answer: wider

3. Does $y = -x^2$ open up or down?

$$a = -1$$

Answer: down

4. Compare the openings of $y = 2x^2$ and $y = 5x^2$.

Bigger a = narrower

Answer: $5x^2$ is narrower

5. $y = -3(x - 1)^2 + 4$: vertex, direction, and narrow/wide?

$$h=1, k=4; a=-3$$

Answer: vertex (1,4); down; narrow

6. A parabola opens down and is wider than $y = x^2$. Give a possible 'a'.

Negative, $|a| < 1$

Answer: e.g., $a = -0.5$

7. Which has the highest maximum: $y = -(x)^2 + 2$ or $y = -3(x)^2 + 2$?

Same vertex $y = 2$

Answer: same max of 2

8. Write a parabola with vertex (0, 0) that opens down and is narrower than $y = x^2$.

a negative, $|a| > 1$

Answer: e.g., $y = -2x^2$

9. $y = a(x - 2)^2$ passes through (2,0) and (4, 8). Find a. ★ challenge

Vertex (2,0)

$$8 = a(2)^2 = 4a$$

Answer: $a = 2$

10. Two parabolas share vertex (0,0): $y = x^2$ and $y = ax^2$. The second passes through (3, 27). Find a, and

$$27 = a(9)$$

Answer: $a = 3$; narrower