②

$g(x) = \boxed{2(x+3)^2 - 4}$

↓

Approach 1 $2[(x+3)(x+3)] - 4$

↓

$2[x^2+3x+3x+9] - 4$

↓

$g(x) = 2[\overset{a}{x^2}+\overset{b}{6}x+\overset{c}{9}] - 4$

$x = \frac{-b}{2a} = \frac{-(6)}{2(1)}$

↓

$x = -\frac{6}{2} = -3$

$x = -3, y = -4$

I can input any real numbers because there are no issues with rationals and non-real numbers.

D: $(-\infty, \infty) \cup (\infty, -\infty)$

R: $[-4, \infty)$ or $y \geq -4$

$g(x) = 2(x+3)^2 - 4$

Get Range

Solve for x

Approach 2

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

$+4 \qquad +4$

$\downarrow$

Approach 2

$\frac{y+4}{2} = \frac{2(x+3)^2}{2}$

$\downarrow$

$\sqrt{\frac{y+4}{2}} = \sqrt{(x+3)^2}$

$\downarrow$

$\sqrt{\frac{y+4}{2}} = x+3$

$-3 \qquad -3$

$\pm\sqrt{\frac{y+4}{2}} - 3 = x$

$\downarrow$

I'm fine with 2 being in the denominator. I do not need a negative number under the radical.

$y + 4 \geq 0$

$-4 \quad -4$

$y \geq -4$

or

$R: [-4, \infty)$