

Chapter 2 Review - Answers

I. (a) -6

(b) -3

(c) $\frac{y^{38}}{81x^{23}}$

(d) $-\frac{8}{27x^9y^{12}}$

II. (a) D: $-4 \leq x \leq 4$ R: $-2 \leq y \leq 3$; yes

(b) D: $-1 \leq x \leq 7$ R: $2 \leq y \leq 6$; no

(c) D: $x \leq 5$ R: \mathbb{R} ; no

(d) D: \mathbb{R} R: $y = 3$; yes

(e) D: $\{0, 3, 7\}$ R: $\{3, 5, 7, 9, 11\}$; no

III. (a) $f \circ g(x) = -4x^2 + 31$

(b) $f \circ g(-5) = -69$

(c) $g \circ f(x) = 16x^2 - 24x + 2$

(d) $g \circ f(6) = 434$

(e) $f \circ f(x) = 16x - 9$

(f) $f \circ f(x^2 - 2) = 16x^2 - 41$

(g) $g \circ g(x) = x^4 - 14x^2 + 42$

(h) $g \circ g(2a) = 16a^4 - 56a^2 + 42$

IV. (a) $f^{-1}(x) = \frac{x+5}{3} = \frac{1}{3}x + \frac{5}{3}$

(b) $g^{-1}(x) = -\frac{4}{3}x + \frac{5}{6}$

V. (a) endpoints: $(-6, 8)$ closed, $(2, 4)$ open

$(2, 6)$ open, $(5, 6)$ open

$(5, 3)$ closed - ray

$f(-4) = 7$; $f(2) = \text{undefined}$;

$f(5) = 3$

(b) $f(x) = \left\{ \begin{array}{ll} 5 & ; x = -9 \\ -\frac{1}{3}x - 4 & ; -9 < x \leq -3 \\ \frac{2}{3}x + 4 & ; -3 < x < 6 \\ -2x + 15 & ; x \geq 6 \end{array} \right\}$

$f(-9) = 5$

$f(-3) = -3$

$f(3) = 6$

(c) $f(x) = \left\{ \begin{array}{ll} \frac{5}{3}x + 12 & ; -9 \leq x < -6 \\ -\frac{1}{2}x - 1 & ; -6 < x \leq 4 \\ -6x + 30 & ; x > 4 \end{array} \right\}$

$f(-6) = \text{undefined}$

$f(4) = -3$

$f(8) = -18$