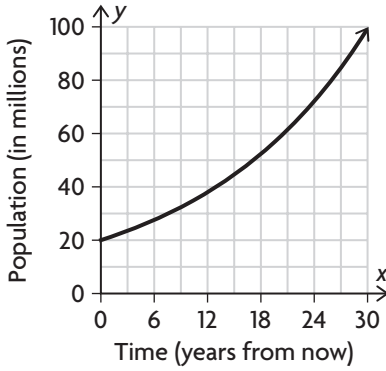


Chapter 9 Review Extra Practice Answers

1. a) $f + g = \{(-11, 5), (-7, -3), (-2, 17), (8, 19)\}$
 b) $f - g = \{(-11, 9), (-7, -9), (-2, 15), (8, 7)\}$
 c) $g + f = \{(-11, 5), (-7, -3), (-2, 17), (8, 19)\}$
 d) $g - f = \{(-11, -9), (-7, 9), (-2, -15), (8, -7)\}$
 e) $f - f = \{(-11, 0), (-7, 0), (-2, 0), (1, 0), (8, 0), (9, 0)\}$
 f) $g + g = \{(-11, -4), (-8, 10), (-7, 6), (-2, 2), (2, 24), (8, 12)\}$
2. a) $(f \times g)(x) = 4x^2 + 35x + 9$
 b) $(f \times g)(x) = 8x^4$
 c) $(f \times g)(x) = 27 \tan x$
 d) $(f \times g)(x) = 24x$
 e) $(f \times g)(x) = -x^2 + 150x - 5625$
 f) $(f \times g)(x) = 18^{4x}$
3. a) $(f \div g)(x) = 3x - 4$
 b) $(f \div g)(x) = 7 \cot x$
 c) $(f \div g)(x) = 6x^4$
 d) $(f \div g)(x) = \sqrt{7x - 8}$
 e) $(f \div g)(x) = 5^x$
 f) $(f \div g)(x) = \frac{1}{2x + 3}$
4. a) $\frac{83}{2}$
 b) $\frac{1875}{4}$
 c) $\frac{41}{32}$
 d) $\frac{3}{4}$
 e) $-\frac{3}{4}$
 f) $\frac{1}{3}$
5. a) $f \circ g: D = \{x \in \mathbf{R}\};$
 $R = \{y \in \mathbf{R} \mid -25 \leq y \leq -24\};$
 $g \circ f: D = \{x \in \mathbf{R}\};$
 $R = \{y \in \mathbf{R} \mid -1 \leq y \leq 1\}$
 b) $f \circ g: D = \left\{x \in \mathbf{R} \mid x < \frac{1}{6}\right\}; R = \{y \in \mathbf{R}\};$
 $g \circ f: D = \{x \in \mathbf{R} \mid x > 9 \text{ and } x \neq 10\};$
 $R = \{y \in \mathbf{R} \mid y \neq 0\}$
- c) $f \circ g: D = \{x \in \mathbf{R}\}; R = \{y \in \mathbf{R} \mid -1 \leq y \leq 1\};$
 $g \circ f: D = \{x \in \mathbf{R}\}; R = \{y \in \mathbf{R} \mid 0 \leq y \leq 5\}$
 d) $f \circ g: D = \{x \in \mathbf{R} \mid x \neq -4\}; R = \{y \in \mathbf{R} \mid y \neq 6\};$
 $g \circ f: D = \{x \in \mathbf{R} \mid x \neq 13\}; R = \{y \in \mathbf{R} \mid y \neq 3\}$
 e) $f \circ g: D = \{x \in \mathbf{R}\}; R = \{y \in \mathbf{R} \mid -7 \leq y \leq 13\};$
 $g \circ f: D = \{x \in \mathbf{R}\}; R = \{y \in \mathbf{R} \mid -1 \leq y \leq 1\}$
 f) $f \circ g: D = \{x \in \mathbf{R}\}; R = \{y \in \mathbf{R} \mid 0 < y \leq 1\};$
 $g \circ f: D = \{x \in \mathbf{R}\}; R = \{y \in \mathbf{R} \mid y > 0\}$
6. a) $x = -0.3, 0.4, 2.7, \text{ or } 3.4$
 b) $x = 4.0$
 c) $x = -0.9 \text{ or } x = 1.2$
 d) $x = -1.0$
 e) $x = 0.7$
 f) $x = -0.2$
7. a) 
- b) $P(t) = 20\,000\,000(1.0549)^t$
 c) 20.54 years
 d) 1 691 586 people/year