

## Chapter 4 Review Extra Practice

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1. Determine the zeros of the following functions algebraically.

- $x^3 = 7x + 6$
- $16 - 12x = 8x^2 - 3x^3 - x^4$
- $2x^3 - 8x^2 + 2x = -12$
- $2x^4 = -6x^3 + 6x^2 + 14x - 12$
- $-20 = -35x + 10x^2 + 5x^3$
- $7x^4 - 14x^2 - 56 = 21x^3 - 84x$

2. Determine the zeros of the following functions with graphing technology. Round to the nearest hundredth, if necessary.

- $x^3 + 6x^2 - 5x + 12 = 0$
- $x^4 - 5x^2 + 9x = 6$
- $3x^3 + x^2 = 12x$
- $2x^4 = x^3 + 1$
- $18 = -7x^3 + x^2$
- $-\frac{1}{2}x^4 + \frac{7}{2}x^3 = 9$

3. Solve the following inequalities algebraically. Express your solution in set notation.

- $4x - 7 > 3x - 5$
- $\frac{13}{2}x < -2 + 6x$
- $3 - 4x \geq -2 - 3x$
- $\frac{2x + 1}{2} \geq \frac{5 + 3x}{4}$
- $\frac{x + 6}{3} + 2x < \frac{7}{3} + 2x$
- $\frac{6x}{5} \leq \frac{10 + 7x}{5}$

4. Solve the following double inequalities algebraically and determine if  $x = 2$  is a solution. Express your solution in interval notation.

- $2x + 1 < 3x + 2 < 9 + 2x$
- $-\frac{3}{2} < \frac{x}{4} \leq \frac{1}{2}$
- $-2 + 5x > 4x > -8 + 5x$
- $3 \leq 3x - 6 \leq 39$
- $x + 5 < 2x + 4 < x + 6$
- $0 \leq (3x + 6) + (x - 13) \leq 3$

5. Solve the following inequalities.

- $(x + 2)(x - 4) < 0$
- $(3x - 6)(x - 5) \geq 0$
- $(2x - 2)(x + 6)(x - 1) > 0$
- $-2x(x + 4)(x - 6)(x + 1) \leq 0$
- $(-3x + 9)(x + 1)(x - 4) > 0$
- $x^2(x - 4)(-5x + 10) \geq 0$

6. Use graphing technology and state the intervals when  $f(x) < 0$ . Express your solution in interval notation.

- $f(x) = x^3 + x^2 - 44x - 84$
- $f(x) = x^4 + 12x^3 + 52x^2 + 96x + 64$
- $f(x) = 8x^2 + 8x - 48$
- $f(x) = 8x^4 - 56x^2 + 48x$
- $f(x) = 12x^4 - 84x^2 + 72x$
- $f(x) = 14x^5 + 14x^4 - 56x^3 - 56x^2$

7. Determine the average rate of change of the following functions on the interval  $-2 \leq x \leq 2$ .

- $f(x) = -3x - 7$
- $g(x) = x^2 - x + 9$
- $h(x) = x^3 - x^2 + x - 1$
- $j(x) = -2x^3 + 5x^2 - 5$
- $k(x) = 5$
- $l(x) = -6x^2 + 7$

8. Estimate the instantaneous rate of change at  $x = 1$  and let  $h = 0.001$  for the following functions.

- $f(x) = -3x + 2$
- $g(x) = -x^2 - 8$
- $h(x) = 2^x + 1$
- $j(x) = \sqrt{x + 7} - 5$
- $k(x) = 2|x + 4| - 1$
- $l(x) = 3x^4 - x^2 + 8x - 1$