

CHAPTER 2 TEST

- Divide each of the following and write the answer in the form $P = D \cdot X \cdot Q + R$. Use long division.
 - $x-1 \overline{) 2x^3 - 3x^2 + 4x + 5}$
 - $x+2 \overline{) 2x^3 - 9x + 3}$
- Divide each of the following and write the answer in the form $P = D \cdot X \cdot Q + R$. Use synthetic Division.
 - $x-4 \overline{) 2x^3 - 7x^2 - 9}$
 - $x+3 \overline{) x^4 - 5x^2 + 7x - 20}$
- Find the remainder when the polynomial $P(x) = 2x^3 + 3x^2 - 5x + 2$ is divided by the binomial $x + 3$.
- Use the remainder theorem to find $P(2)$ if $P(x) = x^4 - 2x^3 + x^2 + 12x - 6$.
- Find k when $x^3 + x^2 + kx + 2$ is divided by $x - 4$ and the remainder is 70.
- When $ax^3 - 3x^2 + bx - 8$ is divided by $x - 2$ the remainder is 22, but when divided by $x + 1$ the remainder is -20. Find a and b .
- Solve the following and identify all double roots
 - $2x^3 - 8x = 0$
 - $x^4 + 2x^3 + x^2 = 0$
- Find all the zeros of the given function. Identify all double zeros of the function.
 - $f(x) = (x + 1)^3 + (x + 1)^2$

- $f(x) = 4x^4 - 12x^3 + 9x^2$
- Is $x + 1$ a factor of the polynomial of the polynomial $6x^4 + 2x^3 - 3x^2 - 1$?
 - Find the factors of the polynomial $3x^3 - 2x^2 - 12x + 8$.
 - Solve the following equation by factoring.

$$x^3 + 6x^2 - 31x - 36 = 0.$$
 - At most how many roots does the following polynomial equation have?

$$x^5 + x^4 - 9x^3 - 9x^2 = 0$$
 - Write a polynomial equation with the following roots. $\frac{1}{2}, \frac{1}{3}, -1$
 - What are the possible rational roots of the polynomial equation $3x^3 + 2x^2 - x + 2 = 0$?
(List Integer Zeros)
 - Use the rational root theorem first to find the possible rational roots, then use synthetic division and/or factoring to find the roots of the polynomial equation.

$$8x^3 + 4x^2 - 2x - 1 = 0$$
 - Which of the following are polynomial functions?
 - $f(x) = 3x(x - 5)(x + 4)^2$
 - $f(x) = (x - 7)(x^{-1} + 4)3x^2$

c) $f(x) = \frac{3}{2}x^2 - 2x + 7$

17. Sketch each graph of the given polynomial functions below, with or without a graphing calculator, determining
- (i) domain, ~~range~~ (ii) any real zeros
 - (iii) the y-intercept; (iv) any symmetry
- a) $f(x) = -x(x + 2)(x - 3)$

b) $f(x) = 4x^4 - 17x^2 + 4$

18. Determine the equation of the cubic function whose zeros are -1, 4, 3 and which passes through (2, -12).

19. Solving the following polynomial inequalities.

a. $3x^3 + 2x^2 - 7x + 2 \geq 0$

b. $3x^3 + 2x^2 - 7x + 2 < 0$

20. Solve using a graphing calculator.

$5x^3 - 11x^2 = 17x - 15$

21. Solve the following problem using a graphing calculator. Don't forget to model the given situation with a polynomial function and then analyze the graph.

A juice box measures 4 cm x 6.4 cm x 10.5 cm. It contains 250 ml of juice. If each dimension was increased by the same amount then the box would contain 500 ml of juice. What are the dimensions of the new box?