

Math 3 Fall Final Review Ch 3

1. Describe the *end behavior* of the function using infinity notation.

$$h(x) = -6x^3 + 6x^2 + 2x + 10$$

2. Find the difference:

$$(5x^3 + 2x^2 + 4x - 8) - (5x^3 - 3x^2 + 9x - 10)$$

3. Find the product: a) $(x - 3)(2x^2 - 4x + 6)$ b) $(3x - 7)(3x + 7)$ c) $(5x + 2)^2$ d) $(x + 2)^3$

4. Use your answer Pascal's triangle to expand $(3x + 2)^4$

5. Divide using *long division*.

$$(2x^2 + x - 17) \div (x - 4)$$

6. Use *synthetic division* to divide

$$(-2x^3 + 4x^2 + 8x + 10) \div (x + 3)$$

7. Use synthetic division to *evaluate* the function

$$\text{for } x = -1 \quad g(x) = 3x^3 - 2x^2 + 2x - 5$$

8. Factor completely: $x^3 - 7x^2 - 18x$

9. Factor completely $x^3 - 2x^2 - 9x + 18$

10. Factor completely $x^3 - 125$

11. Factor completely $2x^2 - 8$

12. Factor completely $x^4 - 10x^2 + 9$

13. Factor completely $9x^3 + 21x^2 + 6x$

14. Solve the equation by factoring $2x^2 - 5x - 3 = 0$

15. Solve the equations:

a. $3x^3 - 15x = 0$

b. $x^3 - 3x^2 - 10x = 0$

- 16.. List the *possible* rational roots of $h(x) = x^4 - 3x^3 + x^2 - 4x - 6$

17. Find all the roots of $h(x) = x^3 + x^2 - 17x + 15$

18. Write a polynomial function (in function form) of least degree with leading coefficient of 1 and zeros:

a) 3, -1, and -2

b) 3 and 2i

19. *Sketch* a graph of a polynomial function f that has the given characteristics.

The graph has these three x-intercepts at $x = -1$, $x = 1$, and $x = 3$

- f has a local maximum at $f(2)$
- f has a local minimum at $f(0)$

20. Graph the function $f(x) = (x + 1)(x - 1)(x - 2)$

(include specific points between and beyond the x-intercepts)