

Name: \_\_\_\_\_

## Division of Polynomial Functions

**Exercise 1:** Use long division to find the quotient and the remainder.

1)  $\frac{x^2 - 6x + 11}{x - 2}$

2)  $\frac{x^2 + 5x + 12}{x + 3}$

3)  $\frac{x^2 - 6x - 5}{x - 4}$

4)  $\frac{x^2 + 7x - 2}{x + 1}$

5)  $\frac{x^3 - 2x^2 - 19x - 12}{x + 3}$

6)  $\frac{12x^3 + 13x^2 - 22x - 14}{3x + 4}$

7)  $\frac{2x^3 + 13x^2 + 28x + 21}{x^2 + 3x + 1}$

8)  $\frac{x^4 - 7x^3 + 4x^2 - 42x - 12}{x^2 - 7x - 2}$

9)  $\frac{2x^5 + 32x^4 + 3x^3 + 44x^2 - 14}{4x^2 + 6}$

10)  $\frac{10x^8 + 20x^6 + x^4 + 2x^3 + 28x^2 + 4}{2x^4 + 6x^2 + 3}$

11)  $\frac{3x^4 - x^3 - 15}{x^2 + 5}$

12)  $\frac{3x^5 - 4x^3 - 2x + 7}{x^2 - 2x}$

**Exercise 2:** Use synthetic division to find the quotient and the remainder.

1)  $\frac{x^2 - 8x + 4}{x - 10}$

2)  $\frac{4x^3 - 7x + 5}{x - \frac{1}{2}}$

3)  $\frac{x^2 - 4x - 6}{x + 3}$

4)  $\frac{3x^3 + 13x^2 - 6x + 28}{x + 5}$

5)  $\frac{2x^3 - x^2 - 31x}{x - 4}$

6)  $\frac{x^4 + 3x^2 - 4}{x + 1}$

7) 
$$\frac{2x^5 + 3x^4 - 7x + 8}{x - 1}$$

8) 
$$\frac{3x^4 - 11x^3 - 27x^2 + 18x + 10}{x - 5}$$

9) 
$$\frac{2x^4 + 3x^3 - 18x^2 + 5x - 12}{x - 2}$$

10) 
$$\frac{x^4 - 81}{x + 3}$$

11) 
$$\frac{x^3 + 8}{x + 2}$$

12) 
$$\frac{6x^4 + x^3 - 10x^2 + 9}{x - \frac{1}{3}}$$

**Exercise 3:** Use either long division or synthetic division to find the quotient, and then write the dividend as a product of two factors.

1) 
$$\frac{x^2 - 11x + 24}{x - 8}$$

2) 
$$\frac{x^2 + 3x - 40}{x - 5}$$

3) 
$$\frac{x^2 + 10x + 21}{2x - 1}$$

4) 
$$\frac{x^2 - 7x - 18}{x + 2}$$

5) 
$$\frac{3x^2 - 22x + 24}{x - 6}$$

6) 
$$\frac{4x^3 - 25x - 21}{2x - 7}$$