

Work on as many problems as you can together with your group members. Towards the end of lecture your group will be asked to present problems correctly to receive classwork points.

1. Divide using long division. State the quotient,  $q(x)$ , and the remainder,  $r(x)$ .

(a)  $(8x^3 - 12x^2 - 14x - 15) \div (2x - 5)$

(b)  $(6x^3 - 2x^2 + 10x - 14) \div (2x - 2)$

(c)  $(9x^3 + 6x^2 - 9x - 6) \div (3x - 3)$

(d)  $(4x^3 + 4x^2 - 9x - 9) \div (2x - 3)$

(e)  $(4x^3 + 12x^2 + 7x - 7) \div (2x - 1)$

2. Divide using long division. State the quotient,  $q(x)$ , and the remainder,  $r(x)$ .

(a)  $(15x^4 + 18x^3 + x^2) \div (3x^2 + 2)$

(b)  $(18x^4 + 12x^3 + 17x^2) \div (2x^2 + 3)$

(c)  $(24x^4 + 9x^3 + 5x^2) \div (3x^2 + 1)$

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

(e)  $(10x^4 + 10x^3 + 11x^2) \div (2x^2 + 3)$

3. Divide using synthetic division.

(a)  $(4x^5 - 2x^3 + 6x^2 - 7x + 6) \div (x - 2)$

(b)  $(5x^5 - 4x^3 + 4x^2 - 3x + 7) \div (x - 2)$

(c)  $(6x^5 - 4x^3 + 5x^2 - 4x + 2) \div (x - 2)$

(d)  $(3x^5 - 5x^3 + 3x^2 - 4x + 3) \div (x - 2)$

(e)  $(6x^5 - 5x^3 + 4x^2 - 3x + 5) \div (x - 2)$

4. Use synthetic division and the remainder theorem to find the indicated function value.

(a)  $f(x) = x^4 + 4x^3 + 3x^2 - 2x - 6; f(4)$

(b)  $f(x) = 6x^3 - 2x^2 - 3x + 1; f(-1)$

(c)  $f(x) = 4x^3 - 3x^2 - 5x + 4; f(-1)$

(d)  $f(x) = 3x^3 - 13x^2 + 3x - 3; f(3)$

(e)  $f(x) = x^4 + 3x^3 + 5x^2 - 7x - 4; f(4)$

5. Solve the equation  $f(x) = 0$  given that  $a$  is a zero of  $f(x)$ .

(a)  $f(x) = x^3 - 5x^2 + 2x + 8, a = -1$

(b)  $f(x) = x^3 + 2x^2 - 5x - 6, a = 2$

(c)  $f(x) = x^3 - 13x^2 + 47x - 35, a = 1$

(d)  $f(x) = 9x^3 + 9x^2 - x - 1, a = -\frac{1}{3}$

(e)  $f(x) = 16x^3 + 16x^2 - x - 1, a = -\frac{1}{4}$