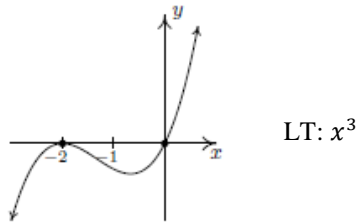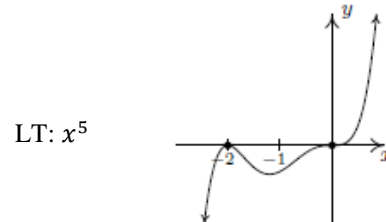## Worksheet 7 KEY – Polynomial Functions (§4.2 and §4.4)

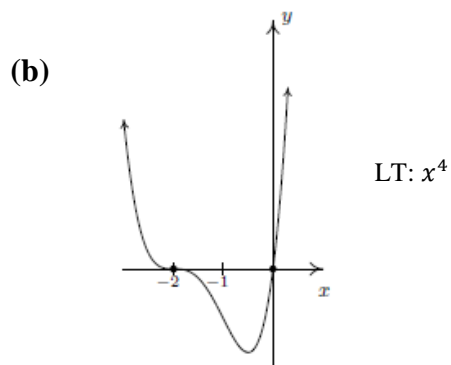**1.**

(a) $x = 0$ multiplicity 1
        $x = -2$ multiplicity 2

LT: x^3

(e) $x = 0$ multiplicity 3
        $x = -2$ multiplicity 2
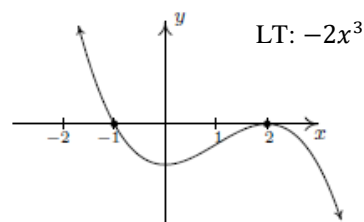
LT: x^5

(b) $x = 0$ multiplicity 1
        $x = -2$ multiplicity 3

LT: x^4

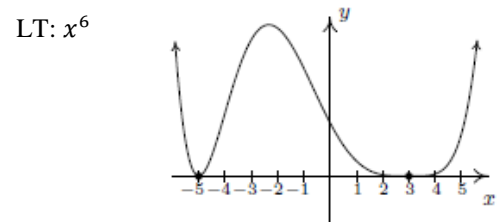**(f)** $x = 1$ multiplicity 1
        $x = 2$ multiplicity 1
        $x = 3$ multiplicity 1
        $x = 4$ multiplicity 1

LT: x^4
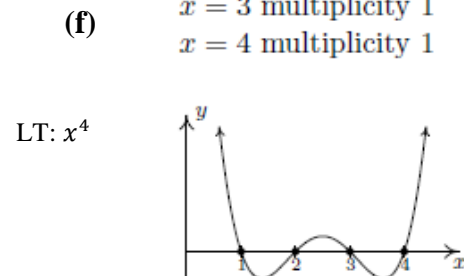
(c) $x = 2$ multiplicity 2
        $x = -1$ multiplicity 1

LT: $-2x^3$

(g) $x = -5$ multiplicity 2
        $x = 3$ multiplicity 4

LT: x^6

(d) $x = -\frac{1}{2}$ multiplicity 2
        $x = 3$ multiplicity 1

LT: $4x^3$
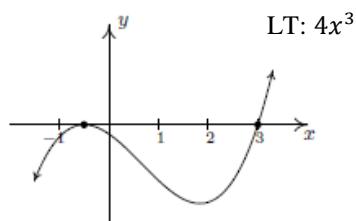
(h) $x = -2$ multiplicity 2
        $x = 0$ multiplicity 2
        $x = 2$ multiplicity 2

LT: x^6
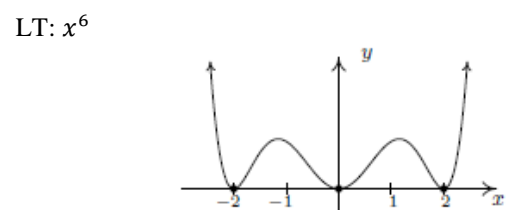
2.

    (a) $4x^2 + 3x - 1 = (x - 3)(4x + 15) + 44$

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

    (c) $5x^4 - 3x^3 + 2x^2 - 1 = (x^2 + 4)(5x^2 - 3x - 18) + (12x + 71)$

    (d) $-x^5 + 7x^3 - x = (x^3 - x^2 + 1)(-x^2 - x + 6) + (7x^2 - 6)$

3.

    (a) $3x^2 - 2x + 1 = (x - 1)(3x + 1) + 2$

    (b) $x^2 - 5 = (x - 5)(x + 5) + 20$

    (c) $x^3 + 8 = (x + 2)(x^2 - 2x + 4) + 0$

    (d) $4x^3 + 2x - 3 = (x - 3)(4x^2 + 12x + 38) + 111$

    (e) $18x^2 - 15x - 25 = \left(x - \frac{5}{3}\right)(18x + 15) + 0$

    (f) $4x^2 - 1 = \left(x - \frac{1}{2}\right)(4x + 2) + 0$

    (g) $x^4 - 6x^2 + 9 = \left(x - \sqrt{3}\right)\left(x^3 + \sqrt{3}x^2 - 3x - 3\sqrt{3}\right) + 0$

    (h) $x^6 - 6x^4 + 12x^2 - 8 = \left(x + \sqrt{2}\right)\left(x^5 - \sqrt{2}x^4 - 4x^3 + 4\sqrt{2}x^2 + 4x - 4\sqrt{2}\right) +$

      0

4.

    (a) $p(4) = 29$

    (b) $p(12) = 0, p(x) = (x - 12)(4x + 15)$

    (c) $p(-3) = -45$

    (d) $p\left(\frac{3}{2}\right) = \frac{73}{16}$

    (e) $p(-1) = 2$

    (f) $p(2) = 0, p(x) = (x - 2)(3x^2 + 4)$

    (g) $p\left(-\frac{1}{2}\right) = 0, p(x) = \left(x + \frac{1}{2}\right)(8x^2 + 8x + 2)$

    (h) $p\left(2 - \sqrt{3}\right) = 0, p(x) = \left(x - \left(2 - \sqrt{3}\right)\right)\left(x - \left(2 + \sqrt{3}\right)\right)$

5.

    (a) $p(x) = (x - 1)(x + 3)(x - 2)$ (c) $p(x) = (x + 1)(x + 2)(x - 3)(x - 4)$

    (b) $p(x) = (x^2 + 1)(x + 2)(x - 1)$ (d) $p(x) = x^2(x - 1)(x + 4)(x - 2)$