A. Polynomial Functions

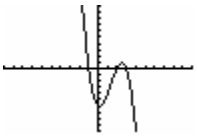
1. a. $x \geq \frac{1}{2}, x \leq -3$ b. $-\frac{2}{5} \leq x \leq 3$

2. a. $-0.369 \leq x \leq 2.703$
   b. No Solutions

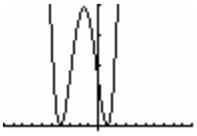
3. a. $(3x+8)(x-2)+11$, x ≠ 2
   b. $(x-4)^2(x+2)-28$, x ≠ -2
   c. $(2x-5)(2x^2+3)$, x ≠ $\frac{5}{2}$
   d. $(x-1)(x^4+x^3+x^2+x+1)$, x ≠

4. i. $h(x) = -x^6 + 3x^4 + 2x - 5$
   Negative function (leading coeff.), y-intercept = -5, Starts in 3rd, ends in 4th → Even degree
   $f(x) = -2x^3 + 5x$
   ii. Negative function (leading coeff.), y-int = 0, 3 zeros, Odd function starting in 2nd, ending in 4th
   iii. $g(x) = x^4 - 3x^2 + x$
   Positive function (leading coeff), Starts in 2nd, ends in 1st, y-int = 0, 3 zeros (1 is a local max)

5. a. $y = -(x-2)(x+1)(x-3)$



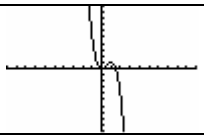
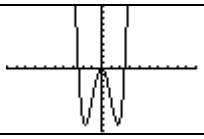
   b. $y = (x-1)^2(x+4)^2$



6. a. $x = 0, \pm 4$
   b. $x = \pm 2, 3, 6$

7. a) $y = \frac{1}{2}(x+1)(x-2)(x+4)$
   b) $y = (x-2)(x+2)^2(x+3)$

8.

	a. $f(x) = -2x^3 + 3x^2$	b. $h(x) = x^4 - 6x^2$
x-intercepts	(0,0), (1.5,0)	(-2.45,0), (0,0), (2.45,0)
y-intercepts	(0,0)	(0,0)
Local Maximum(s)	(1,1)	(0,0)
Local Minimum(s)	(0,0)	(-1.73,-9), (1.73,-9)
Points of Inflection	None	None
Intervals of Increase	None	$x \leq -1.73,\ 0 \leq x \leq 1.73$
Intervals of Decrease	all x	$-1.73 \leq x \leq 0,\ x \geq 1.73$
Graph		

9. a. 3 b. 11 c. 14 d. 18 e. 43 f. 19

10. a) $x^3 - 3x^2 - 6x + 8 = (x+2)(x-4)(x-1)$
    b) $x^3 + 4x^2 - 7x - 10 = (x+1)(x+5)(x-2)$
    c) $x^3 - 8x^2 + 20x - 16 = (x-2)^2(x-4)$
    d) $x^3 + x^2 - 8x - 12 = (x+2)^2(x+3)$
    e) $x^3 - 2x^2 - 11x + 12 = (x-3)(x+1)(x+4)$
    f) $x^3 + 3x^2 - 6x - 8 = (x+4)(x+1)(x-2)$

11. b = -2, Rem = - 1

12. a. x = -1, 2, 4 b. x = -2, 1,3

13. At rest at the local max (1,11) and local min (5,-21). Moving in a positive direction when s(t) is increasing $0 \leq t \leq 1$ and $t \geq 5$.
    b. Intervals of increase $0 \leq t \leq 1$ and $t \geq 5$
    Interval of decrease $1 \leq t \leq 5$
    c. $v_{av} = \frac{11-4}{1-0} = 7$ m/s $v_T = 0$ m/s