

A. Polynomial Functions

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

$$-\frac{2}{5} \leq x \leq 3$$

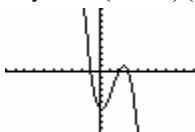
2. a. $-0.369 \leq x \leq 2.703$
b. No Solutions

3. a. $(3x+8)(x-2)+13, x \neq 2$
b. $(x-4)^2(x+2)-28, x \neq -2$
c. $(2x-5)(2x^2+3), x \neq \frac{5}{2}$

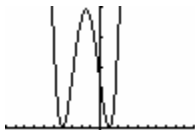
d. $(x-1)(x^4+x^3+x^2+x+1), x \neq$

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. $x = 0, \pm 2$
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. 13 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. $b = -2, \text{Rem} = -1$

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. $v_{av} = \frac{11-4}{1-0} = 7 \text{ m/s}$ $v_T = 0 \text{ m/s}$

