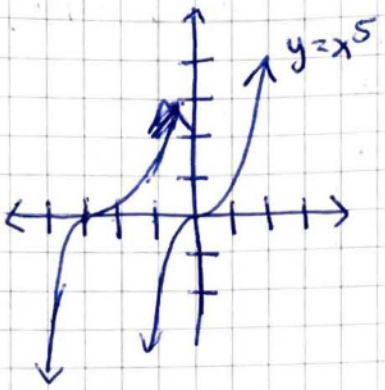
Polynomial Functions Higher Degree

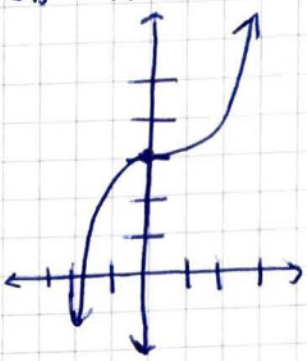
Sec 2.2 pg 156 #10-11, 23, 25, 33-35, 47, 51, 59, 63, 73, 77

#10) $y = x^5$

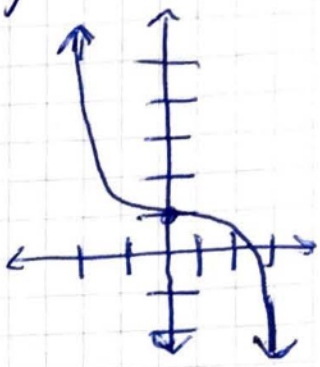
a) $f(x) = (x+3)^5$



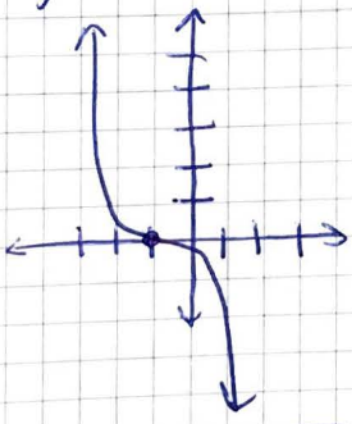
b) $f(x) = x^5 + 3$



c) $f(x) = 1 - \frac{1}{2}x^5$

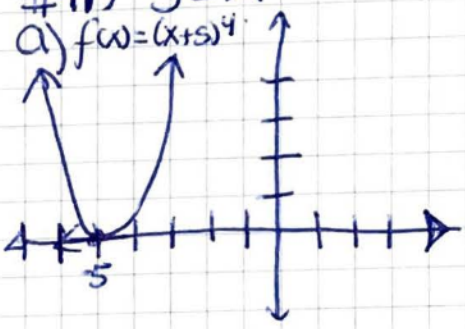


d) $f(x) = -\frac{1}{2}(x+1)^5$

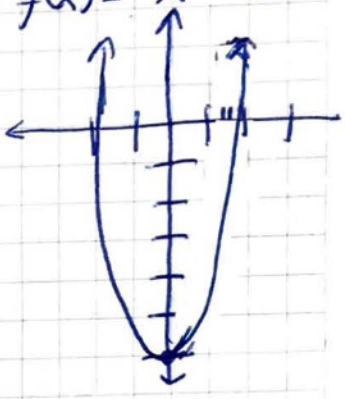


#11) $y = x^4$

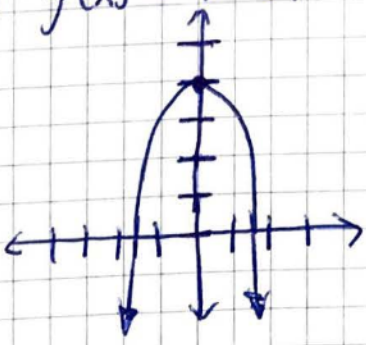
a) $f(x) = (x+5)^4$



b) $f(x) = x^4 - 5$



c) $f(x) = 4 - x^4$



d) $f(x) = \frac{1}{2}(x-1)^4$

#23, 25, 33-35, 47, 51, 59, 63, 73, 77

#23) $f(x) = 6 - 2x + 4x^2 - 5x^3$

Degree: 3

Leading Coefficient: -5

The degree is Odd and the leading Coeff. is negative.

** The graph rises to the left and falls to the right.

#25) $h(t) = -\frac{2}{3}(t^2 - 5t + 3)$

Degree: 2, Leading Coeff: $-\frac{2}{3}$

The degree is even and leading Coeff. is negative

** The graph falls to the left and right

#33) $f(t) = t^3 - 4t^2 - 4t$

$f(t) = t(t^2 - 4t - 4)$

$f(t) = t(t-2)^2$

$0 = t(t-2)^2$

$0 = t(t-2)(t-2)$

Zeros: $t = 0, 2$

#34) $f(x) = x^4 - x^3 - 20x^2$

$f(x) = x^2(x^2 - x - 20)$

$0 = x^2(x-5)(x+4)$

Zeros: $x = 0, 5, -4$

#35) $f(x) = \frac{1}{2}x^2 + \frac{5}{2}x - \frac{3}{2}$

$f(x) = \frac{1}{2}(x^2 + 5x - 3)$

$x = \frac{-5 \pm \sqrt{5^2 - 4(1)(-3)}}{2(1)}$

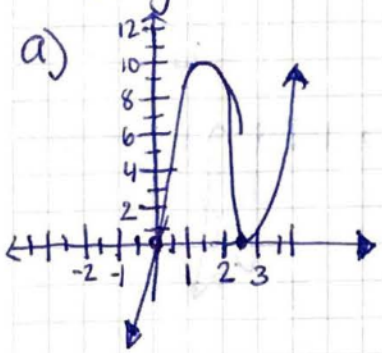
$= \frac{-5 \pm \sqrt{25 + 12}}{2}$

use Calc. $= \frac{-5 \pm \sqrt{37}}{2}$

Zeros: $x \approx 0.5414, -5.5414$

#47) $y = 4x^3 - 20x^2 + 25x$

a)



b) x-int: $(0,0), (2.5,0)$

c) $y = 4x^3 - 20x^2 + 25x$

$0 = x(4x^2 - 20x + 25)$

$0 = x(2x-5)^2$

Zeros: $x = 0, \frac{5}{2}$

#51) $f(x) = x^5 + 3x^3 - x + 6$

#59) $4, -3, 3, 0$

$f(x) = (x-4)(x+3)(x-3)(x-0)$

$= (x-4)(x^2-9)x$

$= (x-4)(x^3-9x)$

$= x^4 - 9x^2 - 4x^3 + 36x$

$\boxed{f(x) = x^4 - 4x^3 - 9x^2 + 36x}$

#63) $2, 4+\sqrt{5}, 4-\sqrt{5}$

$f(x) = (x-2)(x-(4+\sqrt{5}))(x-(4-\sqrt{5}))$

$= (x-2)((x-4)-\sqrt{5})((x-4)+\sqrt{5})$

$= (x-2)((x-4)^2 - \sqrt{5}(\sqrt{5}))$

$= (x-2)((x-4)^2 - 5)$

$= (x-2)(x^2 - 8x + 16 - 5)$

$= (x-2)(x^2 - 8x + 11)$

$= x^3 - 8x^2 + 11x - 2x^2 + 16x - 22$

$\boxed{f(x) = x^3 - 10x^2 + 27x - 22}$

#73) $f(x) = -x^3 - 5x^2$

(a) the degree of f is odd and the leading coeff. is -1.

** the graph rises to the left and falls to the right.

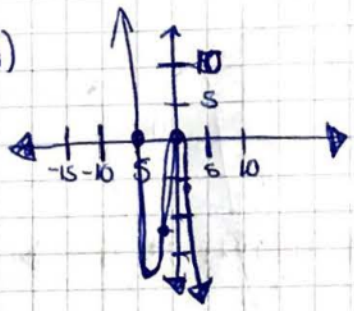
(b) $f(x) = -x^3 - 5x^2$

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

Zeros: $x = 0, -5$

(c) & (d)

x	y
-2	-12
-3	-18
1	-6



#77) $g(t) = -\frac{1}{4}(t-2)^2(t+2)^2$

a) The degree is even for g and leading coeff is $-\frac{1}{4}$

** the graph falls to the left & to the right.

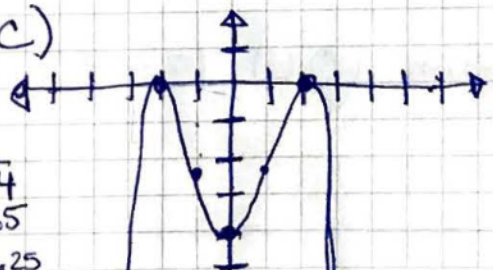
(b) $g(t) = -\frac{1}{4}(t-2)^2(t+2)^2$

$= -\frac{1}{4}(t-2)(t-2)(t+2)(t+2)$

Zeros: $x = 2, -2$

x	
0	-4
-1	-2.5
-3	-6.25

c)




-20.5
-6.25