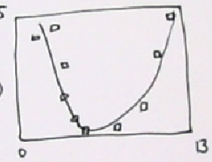
2.8 p.165-167
(1-8, 17, 21-24 all)

1. quadratic
2. $r^2 = 0.0305$
   $r^2 = 0.9688$ ← better, closer to 1
3. quadratic
4. linear
5. linear
6. neither
7. neither
8. quadratic

17. Jan	t=1	4.5
Feb	2	4.61
March	3	3.26
April	4	1.46
May	5	0.70
June	6	0.16
July	7	0.00
Aug	8	0.06
Sept	9	0.21
Oct	10	1.12
Nov	11	3.16
Dec	12	4.56

(a); (c)



(b) $y = ax^2 + bx + c$
$a = 0.160064935$
$b = -2.205069931$
$c = 7.65$

$P = 0.160t^2 - 2.206t + 7.65$

(c) $r^2 = 0.918508$

(d) July → 0.00

(e) July → $t = 7$ → 0.053

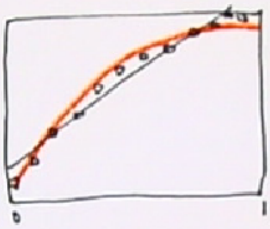
(22) True

(23) True

(24) False, depends on data

(21)

t=0 2000	100.8
1	102.2
2	105.5
3	106.7
4	108.4
5	109.6
6	110.2
7	111.4
8	112.8
9	114.5
10	114.9
11	115.9
12	114.7



(b) $T = 1.23t + 102.4$
$r^2 \approx 0.9468$
Coefficient of determination

(c)

(d) $T = -0.076t^2 + 2.14t + 100.8$
$r^2 = 0.9870$

(e)

(f) Quadratic its coefficient of determination is .98 (unlike .95) so it's closer to 1

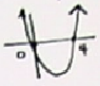
(g) reach 120 → linear 2015 (≈ 120.85)
quad not possible (max at 115)

2.2

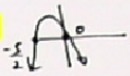
p. 109 (9-16, 21, 25, 35, 41, 51, 57, 73, 79, 109)

(9) $f(x) = -2x+3$ (f.)

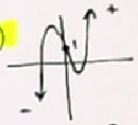
(10) $f(x) = x^2 - 4x$
$x(x-4)$ (h.)



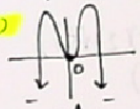
(11) $f(x) = -2x^2 - 5x$
$= -x(2x+5)$ (c)



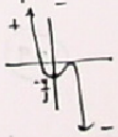
(12) $f(x) = 2x^3 - 3x + 1$ (a)



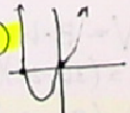
(13) $f(x) = -\frac{1}{4}x^4 + 3x^2$
$= -x^2\left(\frac{1}{4}x^2 - 3\right)$ (e)



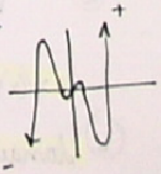
(14) $f(x) = -\frac{1}{3}x^3 + x^2 - \frac{4}{3}$ (d)



(15) $f(x) = x^4 + 2x^3$
$x^3(x+2)$ (g)

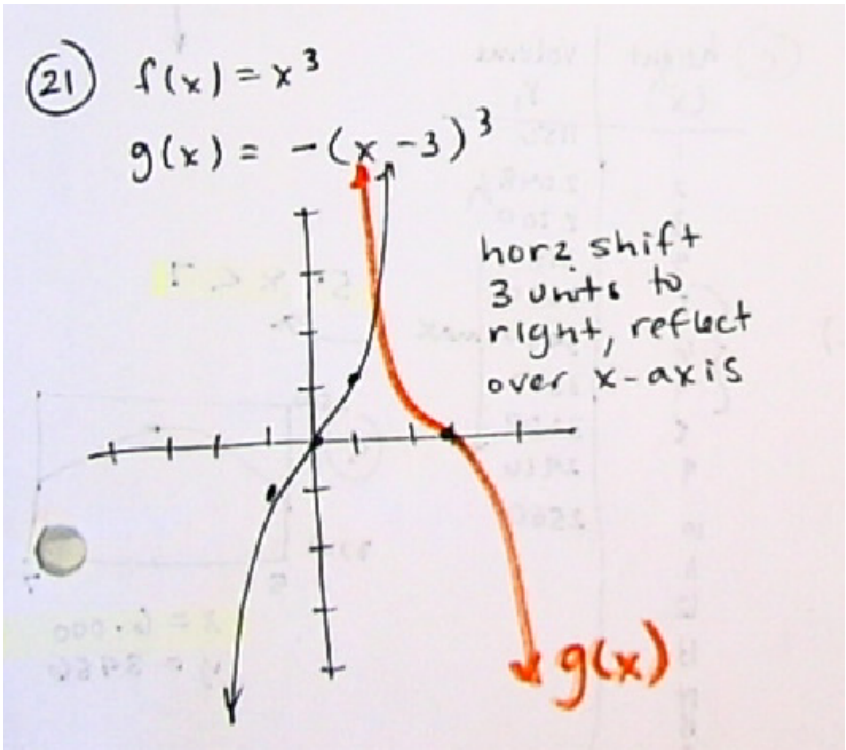


(16) $f(x) = \frac{1}{5}x^5 - 2x^3 + \frac{9}{5}x$ (b)



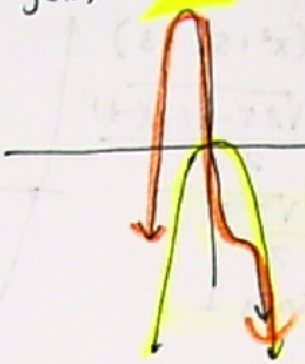
(21) $f(x) = x^3$

$g(x) = -(x-3)^3$



(25) $f(x) = -(x^4 - 4x^3 + 16x)$

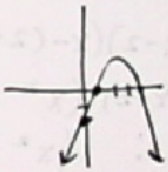
$g(x) = -x^4$



end behavior is down for each graph, same leading (negative) coefficient

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

end behavior is down, falls to left, falls to right



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

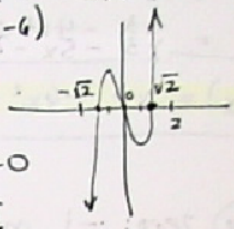
$0 = x(x^4 + x^2 - 6)$

$x = 0$

$x^4 + x^2 - 6 = 0$

$(x^2 + 3)(x^2 - 2) = 0$

$x = \pm\sqrt{3}i, \pm\sqrt{2}$



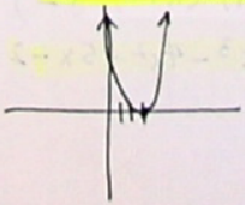
(a) $(0,0)$
$(0,\sqrt{2})$
$(0,-\sqrt{2})$

(51) $h(t) = t^2 - 6t + 9$

$0 = (t-3)(t-3)$

$0 = (t-3)^2$

$t = 3$ multiplicity 2



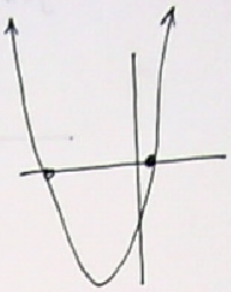
(57) $f(x) = \frac{1}{2}x^2 + \frac{5}{2}x - \frac{3}{2}$

$0 = \frac{1}{2}(x^2 + 5x - 3)$

$x = \frac{-5 \pm \sqrt{25 - 4(1)(-3)}}{2}$

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

multiplicity 1



(73) $2,\ 2+\sqrt{5},\ 2-\sqrt{5}$.

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

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

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

$\vdots\ (x^2 - 4x - 1)$

$= (x-2)(x^2 - 4x - 1)$

$= x^3 - 4x^2 - x - 2x^2 + 8x + 2$

$f(x) = x^3 - 6x^2 + 7x + 2$

(109)

(a) V

$=$

$V(x)$

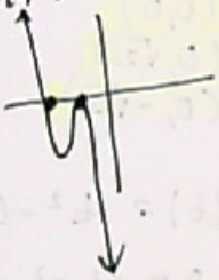
(79) zero: -1, mult: 2

zero: -2, mult: 1

degree 3

rise to left

fall to right



$= (x+1)^2(x+2) = (x^2+2x+1)(x+2)$

$= -(x^3 + 4x^2 + 5x + 2)$

$f(x) = -x^3 - 4x^2 - 5x - 2$

$\sqrt{5})(2-\sqrt{5}))$

$5))$

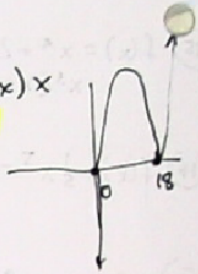
36

(109)

(a) $V = B \cdot h$

$= (36-2x)(36-2x)x$

$V(x) = (36-2x)^2 x$



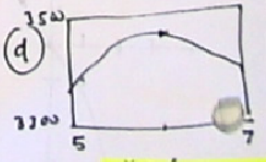
(b) domain $0 < x < 18$

(c)

height (x)	Volume Y_1
1	1156
2	2048
3	2700
4	3136
5	3380
6	3456 max
7	3388
8	3200
9	2916
10	2560
11	
12	
13	
14	

$5 < x < 7$

(d)



$x = 6.000$

$y = 3456$