Exam 2 Review Key

(1) ① $y = 3x^2 - 12x + 1$

$y = 3(x^2 - 4x + \underline{4}) + 1$

$12 + y = 3x^2 - 12x + 12 + 1$

$\boxed{y = 3(x-2)^2 - 11}$

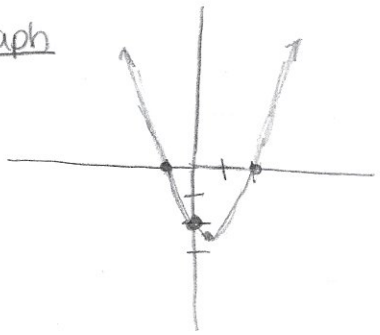
③ $y = 3x^2 - 12x + 1$

$y = 3(x-2)^2 - 11$

↑ moved right 2 and down 11

$\boxed{\text{minimum pt } (2, -11)}$

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

x-intercept	y-intercept	asymptotes	Graph
$y = 0$	$x = 0$	* There are no asymptotes	
$0 = x^2 - x - 2$	$y = (0)^2 - (0) - 2$		
$0 = (x-2)(x+1)$	$y = -2$		
$\boxed{x = 2 \text{ & } x = -1}$	$\boxed{(0, -2)}$		
$(2, 0)$ & $(-1, 0)$			

(102) $x^2 + 2x < 63$

$x^2 + 2x - 63 < 0$

$(x+9)(x-7) < 0$

$x = -9 \quad x = 7$

$-9 < x < 7$

(115) $S = -16t^2 + 156t$

t-intercept	$9.75/2 = 4.875$
$S = 0$	$t = 4.875$
$0 = -16t^2 + 156t$	$-380.25 + 760.5 = 380.5$
$0 = t(-16t + 156)$	
$t = 0$ & $t = 9.75$	Max: 380.5 ft at 4.875 secs

(2) ⑦ $f(x) = 3x - 1$

$0 = 3x - 1$

$\boxed{x = 1/3}$

⑨ $h(x) = x^2 - 8$

$0 = x^2 - 8$

$8 = x^2$

$x = \pm\sqrt{8}$ or $\pm 2\sqrt{2}$

⑪ $n(x) = 8x^3 - 1$

$0 = 8x^3 - 1$

$1/8 = x^3$

$x = \sqrt[3]{1/8} = 1/2$

$\boxed{x = 1/2, \frac{-1 + i\sqrt{3}}{4}, \frac{-1 - i\sqrt{3}}{4}}$

$\frac{1}{2}$ | 8 0 0 -1

4 2 1

8 4 2 0

↓

$8x^2 + 4x + 2$

$2(4x^2 + 2x + 1)$

$\frac{-2 \pm \sqrt{4 - 4(4)(1)}}{2(4)}$

$\frac{-2 \pm \sqrt{-12}}{8} = \frac{-2 \pm 2i\sqrt{3}}{8}$

$\frac{-1 \pm i\sqrt{3}}{4}$

⑬ $P(t) = t^4 - 100$

$(t^2 - 10)(t^2 + 10)$

$t = \pm\sqrt{10} \quad t = \pm\sqrt{-10}$

$t = \boxed{\sqrt{10}, -\sqrt{10}, -i\sqrt{10}, i\sqrt{10}}$

(15) $R(s) = 8s^3 - 4s^2 - 2s + 1$

$\frac{1}{8} = \frac{\pm 1}{\pm 1, 2, 4, 8} = \pm 1, \pm\frac{1}{2}, \pm\frac{1}{4}, \pm\frac{1}{8}$

$\frac{1}{2}$	8	-4	-2	1
		4	0	-1
	8	0	-2	0

$\rightarrow 8x^2 - 2 \Rightarrow 2(4x^2 - 1) \Rightarrow x = \sqrt{1/4} = \pm 1/2$

$x = 1/2, -1/2$ m2

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

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

$\frac{-2 \pm \sqrt{4 - 4(1)(-6)}}{2} = \frac{-2 \pm \sqrt{28}}{2} = \frac{-2 \pm 2\sqrt{7}}{2} = -1 \pm \sqrt{7}$

$x = 0, -1 + \sqrt{7}, -1 - \sqrt{7}$

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

$\frac{-2}{-3} = \frac{2}{3} = \frac{\pm 2, 1}{\pm 3, 1} = 1, -1, 2, -2, 2/3, -2/3, 1/3, -1/3$

3

(27) $-1/2, 3$

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

(29) $3 - 2i = 3 - \sqrt{-4}$ $\quad x = 3 - \sqrt{-4} \Rightarrow 3 - x = \sqrt{-4} \Rightarrow (3-x)^2 = -4 \Rightarrow (3-x)^2 + 4$

$(3-x)(3-x) = 9 - 3x - 3x + x^2 + 4 = x^2 - 6x + 13$

(47) $x^3 - 6x^2 + 11x - 6 = 0$

$\frac{1}{6} = \frac{\pm 1}{\pm 1, 2, 3, 6} = \pm 1, \pm 1/2, \pm 1/3, \pm 1/6$

1	1	-6	11	-6
		1	-5	6
	1	-5	6	0

$x^2 - 5x + 6$

$(x-6)(x+1)$

$x = 6, -1, 1$

(49) $6x^4 - 5x^3 + 7x^2 - 5x + 1 = 0$

$\frac{1}{6} = \frac{\pm 1}{\pm 1, 2, 3, 6}$

1/2	6	-5	7	-5	1
		3	-1	3	-1
	6	-2	6	-2	0
1/3		2	0	2	
	6	0	6	0	

$x = 1/2, 1/3, 1, -1$

$6x^2 + 6 = 6(x^2 + 1)$

(51) $x^3-9x^2+28x-30=0$ $\quad \frac{-30}{1}=\pm 1,2,3,5,6,10,15,30$

3 | 1 −9 28 −30
  | 3 −18 30
  | 1 −6 10 0

$x=3, 3+i, 3-i$

$x^2-6x+10$

$\frac{6\pm\sqrt{36-4(1)(10)}}{2}=\frac{6\pm\sqrt{36-40}}{2}=\frac{6\pm\sqrt{-4}}{2}=\frac{6\pm 2i}{2}=3\pm i$

(53) x^3-4x^2+7x-6 $\quad \frac{-6}{1}=\pm 1,2,3,6$

2 | 1 −4 7 −6
  | 2 −4 6
  | 1 −2 3 0

$x=-1, 2, 3$

x^2-2x+3

$(x-3)(x+1)$

(55) $2x^4-5x^3-2x^2+2x=0 \Rightarrow x(2x^3-5x^2-2x+2)$ $\quad \frac{2}{2}=\frac{\pm 1,2}{\pm 1,2}=\pm 1, \pm 2, \pm\frac{1}{2}$

$\frac{2\pm\sqrt{4-4(1)(-2)}}{2}=\frac{2\pm\sqrt{4+8}}{2}=\frac{2\pm\sqrt{12}}{2}=\frac{2\pm 2\sqrt{3}}{2}=1\pm\sqrt{3}$

1/2 | 2 −5 −2 2
  | 1 −2 −2
  | 2 −4 −4 0

$x=0, \frac{1}{2}, 1+\sqrt{3}, 1-\sqrt{3}$

$2x^2-4x-4 \Rightarrow 2(x^2-2x-2)$

(4)

(57) $|2v-1|=3v$

(59) $x^4+7x^2=18$

$x^4+7x^2-18=0$

$(x^2-2)(x^2+9)$

$x=\pm 2$ ← imagenary

(61) $\sqrt{x+6}-\sqrt{x-5}=1$

$(\sqrt{x+6})^2=(1+\sqrt{x+5})^2(1+\sqrt{x+5})$

$x+6=1+2\sqrt{x+5}+x+5$

$x+6=6+x+2\sqrt{x+5}$

$2\sqrt{x+5}=0$

$x=-5$

(65) $x^4-3x^2-4=0$

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

$x=\pm 2$ ← imaginary

(66) $(y-1)^2-(y-1)=2$

$(y-1)^2=y+1$

$y^2-2y+1=y+1$

$y^2-3y=0$

$y(y-3)=0$

$y=0,3$

(67) $(x-1)^{2/3}=4$

(69) $(x+3)^{-3/4} = -8$

$$\frac{1}{(x+3)^{3/4}} = -8$$

5

(85) $f(x) = x^3 - 3x - 2$

x-intercepts

when $y = 0$

$0 = x^3 - 3x - 2$

$\frac{2}{1} = \frac{\pm 1, 2}{\pm 1} = \pm 1, 2$

2	1	0	-3	-2
		2	4	2
	1	2	1	0

$x^2 + 2x + 1$

$(x+1)(x+1)$

$x = 2, -1$

y-intercept

when $x = 0$

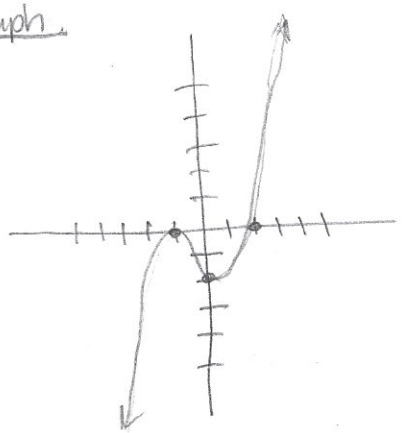
$y = (0)^3 - 3(0) - 2$

$y = -2$

asymptotes

*none

Graph.



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

x-intercepts

when $y = 0$

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

$0 = \frac{1}{2}(x^3 - x^2 - 4x + 4)$

$\frac{4}{1} = \frac{\pm 1, 2, 4}{\pm 1} = \pm 1, 2, 4$

2	1	-1	-4	4
		2	2	-4
	1	1	-2	0

$x^2 + x - 2$

$(x+2)(x-1)$

$x = -2, 1, 2$

y-intercept

when $x = 0$

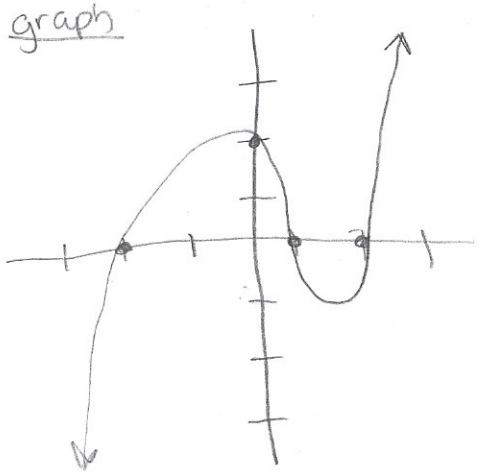
$y = \frac{1}{2}(0)^3 - \frac{1}{2}(0)^2 - 2(0) + 2$

$y = 2$

asymptotes

*none

graph



(105) $4x^3 - 400x^2 - x + 100 \geq 0$

100 | 4 −400 −1 100
| 400 0 −100
| 4 0 −1 0

$4x^2 - 1$

$(2x+1)(2x-1)$

$x = -1/2, 1/2, 100$

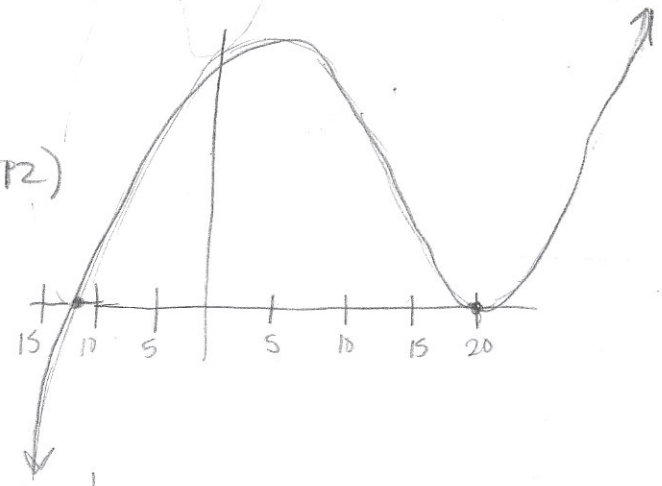
$\frac{100}{4} = \frac{\pm 1, 2, 4, 5, 10, 20, 25, 50, 100}{\pm 1, 2, 4} = \pm 1, 2, 4, 5, 10, 20, 25, 50, 100$ / $1/2, 5/2, 25/2, 1/4, 5/4, 25/4$

$-1/2 \leq x \leq 1/2 \cup x \leq 100$

(6) Graph $f(x) = (x-20)^2 (x+12)$

$0 = (x-20)(x-20)(x+12)$

$x = 20^{M2}, -12$



(7) 91. $f(x) = \frac{2}{x+3}$

x-intercepts
$0 = \frac{2}{x+3}$
does not exist
you cannot divide by 0

y-intercepts
$y = \frac{2}{0+3}$
$y = 2/3$
$(0, 2/3)$

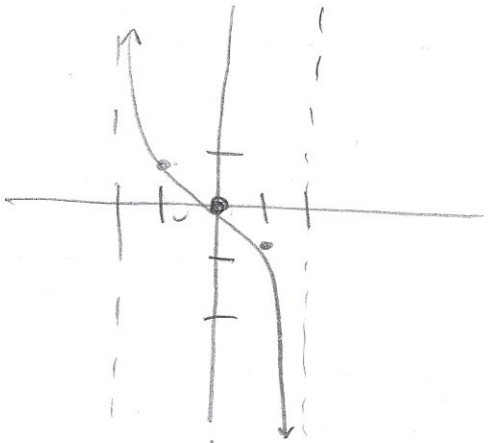
Asymptotes
when $x = -3$
there is a vertical asymptotes.

93. $f(x) = \frac{2x}{x^2-4}$

x-intercepts
$0 = \frac{2x}{x^2-4}$
when $x = 0$ then you get
$0/-4 = 0$
$(0, 0)$

y-intercept
$y = \frac{2(0)}{0-4} = 0$
$(0, 0)$ is the y-intercept as well.

Asymptotes
when $x = 2, -2$
you have a vertical asymptote



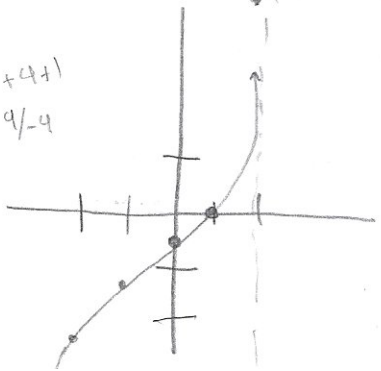
95. $f(x) = \frac{x^2-2x+1}{x-2} = \frac{(x-1)(x-1)}{x-2}$

x-intercepts
$0 = \frac{x^2-2x+1}{x-2}$
$0 = (x-1)(x-1)$
$x = 1$
$(1, 0)$

y-intercepts
$y = \frac{0^2-2(0)+1}{0-2}$
$y = -1/2$
$(0, -1/2)$

Asymptotes
when $x = 2$
there is a
vertical asymptote

$4+4+1$
$9/-4$



97. $f(x) = \frac{2x-1}{2-x}$

x-intercept

$0 = \frac{2x-1}{2-x}$

$0 = 2x - 1$

$x = 1/2$

$(1/2, 0)$

y-intercept

$y = \frac{2(0)-1}{2-(0)}$

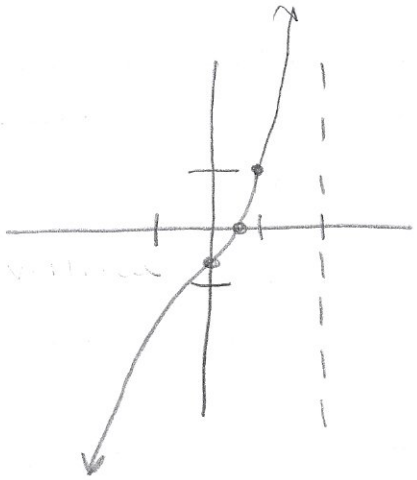
$y = -1/2$

$(0, -1/2)$

asymptotes

$2 - x = 0$

$x = 2$ there is a vertical asymptote



107. $\frac{x+10}{x+2} < 5$

$x + 10 < 5x + 10$

$0 < 6x$

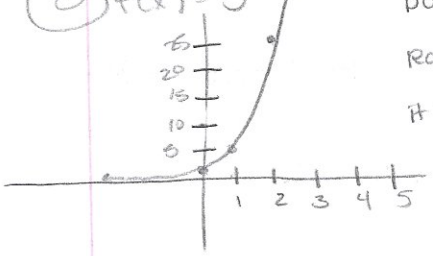
$x > 0$

Check

$x = -1$

$9/1 \not< 5$

(8) 62. $f(x) = 5^x$



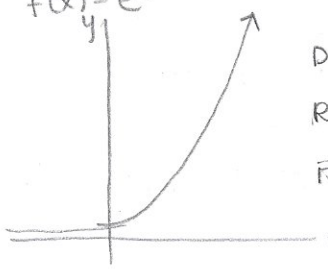
domain: $(-\infty, \infty)$

Range: $(0, \infty)$

It is an increasing fxn

Asymptote at $y = 0$

64. $f(x) = e^x$



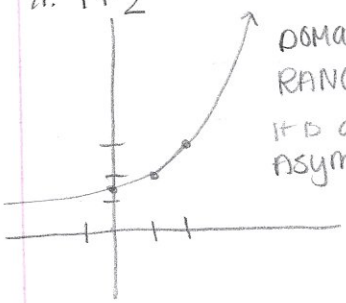
DOMAIN: $(-\infty, \infty)$

Range: $(0, \infty)$

It is an increasing fxn

Asymptote at $y = 0$

71. $1 + 2^{x-1}$



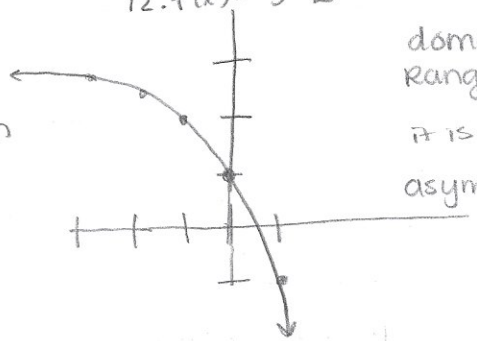
DOMAIN: $(-\infty, \infty)$

RANGE: $(1, \infty)$

It is an increasing fxn

Asymptote at $y = 1$

72. $f(x) = 3 - 2^{x+1}$



domain: $(-\infty, \infty)$

Range: $(-\infty, 3)$

It is a decreasing fxn

asymptote at $y = 3$

105. 50,000 , 5% compounded quarterly, at the end of 18 years?

$A = P(1+\frac{r}{n})^{nt} \Rightarrow A = 50000(1+\frac{.05}{4})^{4\cdot 18} \Rightarrow A = 50000(\frac{4.05}{4})^{76}$

106. 30,000, 6.18% compounded continuously, after 12 yr 3 months

$A = Pe^{rt} \Rightarrow A = 30000e^{.0618\cdot 12.25} = 63959.328$

(9)

33. $\log(x) = 10 \Rightarrow 10^{10} = x$

35. $\log_x(81) = 4 \Rightarrow x^4 = 81 \quad x = \pm 3$

37. $\log_{1/3}(27) = x+2 \Rightarrow (1/3)^{(x+2)} = 27$

$(1/3)^x \cdot (1/3)^2 = 27 \Rightarrow \frac{1}{9}(1/3)^x = 27 \Rightarrow (1/3)^x = 243$

39. $3^{x+2} = 1/9 - 4 \Rightarrow (x+2)\log(3) = \log(1/9-4) \Rightarrow x+2 = \frac{\log(1/9-4)}{\log(3)}$

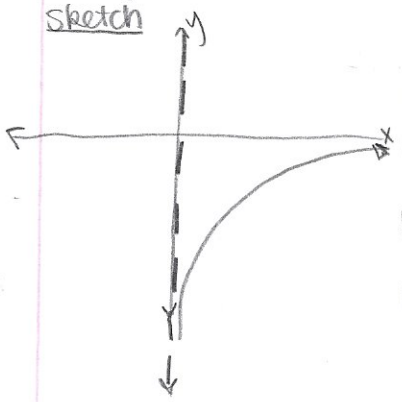
$\Rightarrow x = \frac{\log(1/9-4)}{\log(3)} - 2$

41. $e^{x-2} = 9 \Rightarrow (x-2)\ln(e) = \ln 9 \Rightarrow x-2 = \ln 9 \Rightarrow x = \ln 9 + 2 \approx 4.197$

43. $4^{x+3} = \frac{1}{2^x} \Rightarrow 4^x \cdot 4^3 \Rightarrow 64 \cdot 4^x = \frac{1}{2^x} \Rightarrow 4^x \cdot 2^x = 1/64$

67. $y = \log_3(x)$

Sketch



DOMAIN: $(0, \infty)$

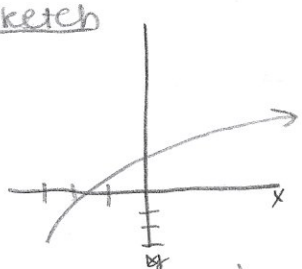
RANGE: $(-\infty, \infty)$

Increasing/Decreasing:
Increasing

Asymptotes:
Vertical at $x=0$

69. $y = 1 + \ln(x+3)$

Sketch



DOMAIN:
$(-3, \infty)$

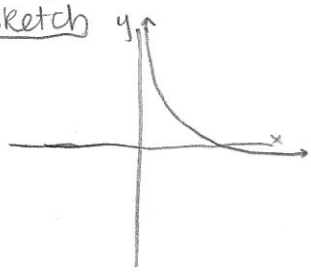
Range:
$(-3, \infty)$

Increasing/decreasing:
increasing

Asymptotes:
vertical asymptote at $x = -3$
horizontal asymptote at $y = -3$

70. $y = 3 - \log_2(x)$

Sketch



DOMAIN:
$(0, \infty)$

RANGE:
$(\infty, -\infty)$

Increasing/decreasing
decreasing

Asymptotes
vertical asymptote at $x = 0$

(10)

21. $\log(x-3) + \log(x) \Rightarrow \log(x(x-3)) \Rightarrow \log(x^2 - 3x)$

23. $2 \cdot \ln(x) + \ln(y) + \ln(3) \Rightarrow \ln(x^2) + \ln(3y) \Rightarrow \ln(3x^2y)$

24. $3 \cdot \log_2(x) - 2 \cdot \log_2(y) + \log_2(z) \Rightarrow \log_2(x^3) - \log_2(y^2) + \log_2(z) = \log_2(x^3y^2z)$

25. $\log(3x^4) = \log(3) + \log(x^4) = \log(3) + 4 \cdot \log(x)$

27. $\log_3\left(\frac{5\sqrt{x}}{y^4}\right) = \log_3(5\sqrt{x}) - \log_3(y^4) \Rightarrow (\log_3(5) + \log_3(x^{1/2})) - 4\log_3(y)$
$\Rightarrow (\log_3(5) + 1/2 \cdot \log(x)) - 4\log_3(y)$

41. $e^{x-2} = 9 \Rightarrow (x-2)\ln(e) = \ln 9 \Rightarrow x = \ln(9) + 2 = 4.197$

43. $\log_4^{x+3} = \log_2^{\frac{1}{2^x}} \Rightarrow (x+3)\log(4) = \log\left(\frac{1}{2^x}\right) \Rightarrow (x+3)\log(4) = \log(1) - x\log(2)$
$\Rightarrow x\log 4 + 3\log 4 = -x\log 2$
$x\log 4 + x\log 2 = -3\log 4$
$x = \frac{-3\log 4}{\log 4 + \log 2} = -2$

45. $\log(x) + \log(2x) = 5 \Rightarrow \log_{10}(x(2x)) = 5 \Rightarrow 2x^2 = 10^5 \Rightarrow$
$x^2 = 50000$
$x = 100\sqrt{5} = 223.61$

47. $\log_2(x) + \log_2(x-4) = \log_2(x+24)$

$\log(2)\left(\frac{\log(x)}{\log(2)} + \frac{\log(x-4)}{\log(2)} = \frac{\log(x+24)}{\log(2)}\right) \Rightarrow \log(x) + \log(x-4) = \log(x+24)$

$\Rightarrow \log(x(x-4)) = \log(x+24)$ (base 10)

$\Rightarrow x^2 - 4x = x + 24$

$\Rightarrow x^2 - 5x - 24$

$(x-8)(x+3) \qquad x = 8, -3$

49. $2 \cdot \ln(x+2) = 3\ln(4) \Rightarrow \ln((x+2)^2) = \ln(4^3) \Rightarrow x^2 + 4x + 4 = 64$ (base e)

$\Rightarrow x^2 + 4x - 60$

$(x-6)(x+10) \qquad x = 6, -10$

51. $\frac{x \cdot \log(4) = 6 - x \cdot \log(25)}{x\log 4 + x\log 25 = 6}$

$x(\log 4 + \log 25) = 6$

$x = \frac{6}{\log 4 + \log 25} = 1.303$

89. False, because $\log_3(81) = \log_3 9 + \log_3(9)$ it does not apply to multiplication

91. False because $\ln(3^2)$ is $2\ln(3)$ while $(\ln(3))^2$ would be $\ln(3) \cdot \ln(3)$

93. True

$4 \div \log_2 8 = 12 \Rightarrow 4 \cdot 3 = 12$

95. False

$\log(1006) = 3.002$ while $3 + \log(6) = 3.77$

97. $\frac{\log_2 8}{\log_2 16} \neq (\log_2(8) - \log_2(16)) \Rightarrow \log_2(8/16)$ not $\frac{\log_2 8}{\log_2 16}$

(11) 83. $3^x = 10 \Rightarrow x\ln(3) = \ln(10) \Rightarrow x = \frac{\ln(10)}{\ln(3)} \approx 2.0959$

84. $4^{2x} = 12 \Rightarrow 2x\ln(4) = \ln(12) \Rightarrow 2x = \frac{\ln(12)}{\ln(4)} \Rightarrow \frac{\ln(12)}{2\ln(4)} = x \approx .8962$

85. $\log_3(x) = 1.876 \Rightarrow 3^{1.876} = x \approx 7.8538$

86. $\log_5(x+2) = 2.7 \Rightarrow 5^{2.7} - 2 = x \approx 75.1292$

87. $5^x = 8^{x+1} \Rightarrow x\ln(5) = (x+1)\ln(8) \Rightarrow \frac{\ln(5)}{\ln(8)} = \frac{x+1}{x} \Rightarrow \frac{\ln(5)}{\ln(8)} = 1 + 1/x$

$\Rightarrow (.7739 - 1)^{-1} = (x^{-1})^{-1} \Rightarrow x = -4.4243$

88. $3^x = e^{x+1} \Rightarrow x\ln 3 = (x+1)1 \Rightarrow x\ln 3 - x = 1$

$x(\ln 3 - 1) = 1$

$x = \frac{1}{\ln 3 - 1} = 10.14$

109

A = # of grams $\quad A = 25e^{-.00032t}$

t = time (# of yrs from present)

a. How many grams are present initially? 25

b. How many grams are present after 1000 yrs? $A = 25e^{-.00032(1000)} = 18.1537$

c. What is the half-life of this substance?

$12.5 = 25e^{-.00032t} \Rightarrow 1/2 = e^{-.00032t} \Rightarrow \ln(1/2) = -.00032t$

$\Rightarrow t = \frac{\ln(1/2)}{-.00032} \approx 2166.0849$ years

111.

t = hours $\quad f(t) = 40{,}000(1 - e^{-.0001t})$

$f(t)$ = # of words learned

a. How many hours would it take to learn 10,000 words?

$10{,}000 = 40{,}000(1 - e^{-.0001t}) \Rightarrow 1/4 = 1 - e^{-.0001t} \Rightarrow 3/4 = e^{-.0001t}$

$\Rightarrow \ln(3/4) = -.0001t \Rightarrow \frac{\ln(3/4)}{-.0001} = t \approx 2876.8207$ hours

112.

i = thousands $\quad P = 31.5(0.935)^i$

p = % of pediatric TB cases

a. $P = 31.5(0.935)^8 \Rightarrow P \approx 18.399$

b. $2 = 31.5(0.935)^i \Rightarrow 2/31.5 = (0.935)^i \Rightarrow \log(.06349) = i\log(.935)$

$i = \frac{\log(.06349)}{\log(.935)} \approx 41.019$ thousands

(12) 1. $(x-3)^2=4 \rightarrow (x-3)=2$ or $(x-3)=-2$

$\boxed{x=5}$ $\boxed{x=1}$

2. $\log((x-3)^2)=\log 4$

$x^2-6x+9=4 \Rightarrow x^2-6x+5=0$

$(x-5)(x-1) \Rightarrow \boxed{x=1,5}$

3. $\log_2(x-3)=4 \Rightarrow \frac{\log(x-3)}{\log(2)}=4 \Rightarrow \log(x-3)=4\cdot\log(2)$

$\log(x-3)=\log(2^4) \Rightarrow x-3=16 \Rightarrow \boxed{x=19}$

4. $2^{x-3}=4 \Rightarrow (x-3)\ln(2)=\ln(4) \Rightarrow (x-3)=\frac{\ln(4)}{\ln(2)} \Rightarrow x=\frac{\ln(4)}{\ln(2)}+3$

$\boxed{x=5}$

5. $\sqrt{x-3}=4 \Rightarrow x-3=16 \Rightarrow \boxed{x=19}$

6. $|x-3|=4$

$(-x+3)=4$ and $(x-3)=4$

$\boxed{x=-1}$ $\boxed{x=7}$

7. $x^2-4x=-2$

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

$\frac{4\pm\sqrt{16-4(1)(2}}{2}=\frac{4\pm\sqrt{8}}{2}=\frac{4\pm2\sqrt{2}}{2}=2\pm\sqrt{2}$

$\boxed{2+\sqrt{2}=3.414}$ $\boxed{2-\sqrt{2}=.585}$

8. $2^{x-3}=4^x \Rightarrow (x-3)\ln(2)=x\ln(4) \Rightarrow x\ln 2-3\ln 2=x\ln 4$

$x\ln 2-x\ln 4=3\ln 2$

$x(\ln 2-\ln 4)=3\ln 2$

$x=\frac{3\ln 2}{\ln 2-\ln 4}=-3$

9. $\sqrt{x-5}=5 \Rightarrow x-5=25 \Rightarrow \boxed{x=30}$

10. $2^x=3 \Rightarrow x\ln(2)=\ln(3) \Rightarrow x=\frac{\ln(3)}{\ln(2)} \approx 1.5849$

11. $\log(x-3)+\log(4)=\log(x) \Rightarrow \log(4(x-3))=\log(x) \Rightarrow 4x-12=x$

$-3x=-12 \Rightarrow \boxed{x=4}$

12. $x^3-4x^2+x+6=0$

$\frac{6}{1}=\pm1,\pm2,\pm3,\pm6$

$-1 \mid 1 \quad -4 \quad 1 \quad 6$

$\quad\quad -1 \quad 5 \quad -6$

$1 \quad -5 \quad 6 \quad 0$

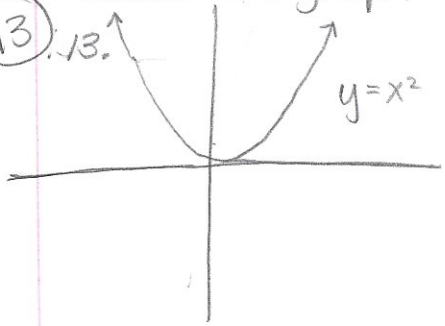
$x^2-5x+6=0$

$(x-3)(x-2)$

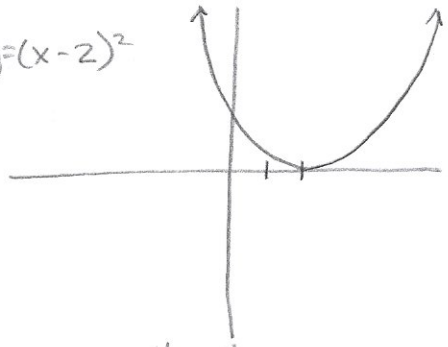
$\boxed{x=-1,3,2}$

(13) sketch the graph

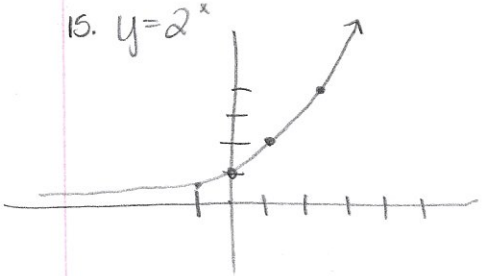
13. $y = x^2$



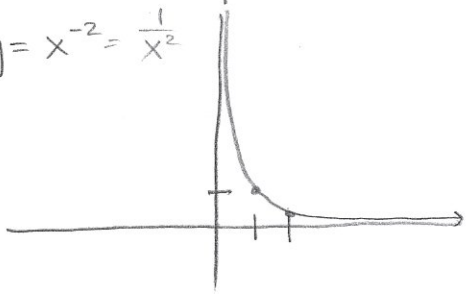
14. $y = (x-2)^2$



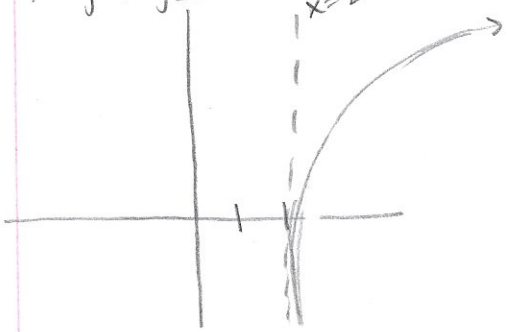
15. $y = 2^x$



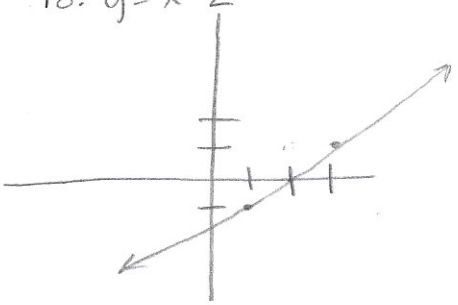
16. $y = x^{-2} = \frac{1}{x^2}$



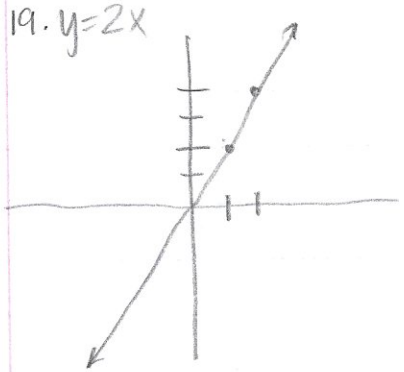
17. $y = \log_2(x-2)$



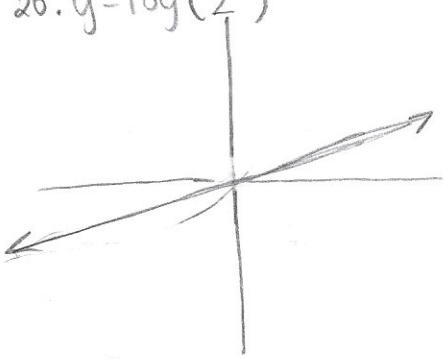
18. $y = x - 2$



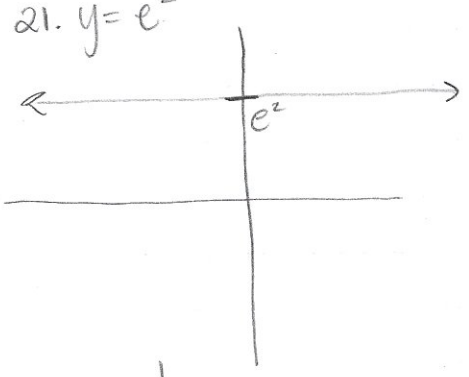
19. $y = 2x$



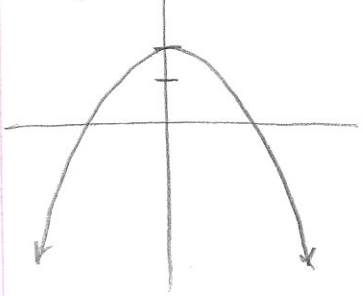
20. $y = \log(2^x)$



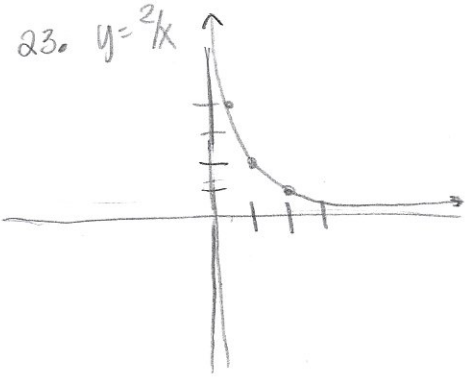
21. $y = e^2$



22. $y = 2 - x^2$



23. $y = 2/x$



24. $y = \frac{1}{x-2}$