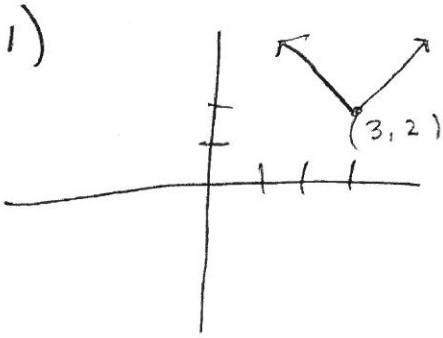


Alg II 2016 Final Exam Review Answer KEY ①



2)

$$y = -2|-5+3|-1$$

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

$$y = -4-1$$

$$y = -5$$

3)

$$(\sqrt{3}-5)(\sqrt{3}-5)$$

$$3 - 10\sqrt{3} + 25$$

$$28 - 10\sqrt{3}$$

4a)

$$f(-2) = 2(-2) - 1$$

$$f(-2) = -5$$

b)

$$g(4) = 2 - 4^2$$

$$g(4) = -14$$

2-16

5)

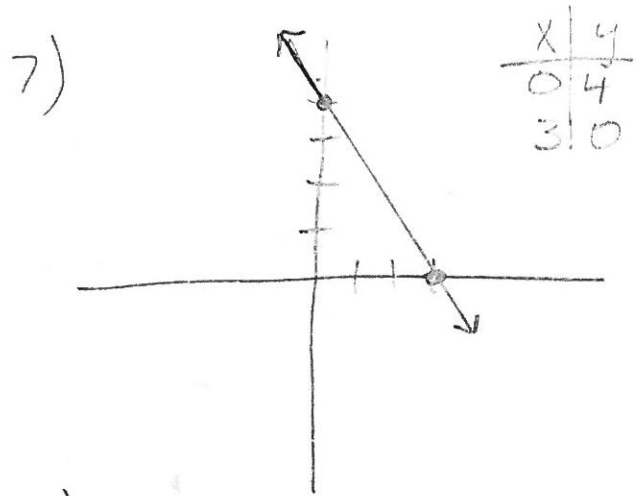
x int (5, 0)

y int (0, 2)

6)

$$25^{3/2} (x^4)^{3/2} (y^{-2})^{3/2}$$

$$125 x^6 y^{-3} = \frac{125x^6}{y^3}$$



8)

$$\frac{y-5}{1-6} = \frac{7}{5}$$

$$5y - 25 = -35$$

$$5y = -10$$

$$y = -2$$

9)

$$\frac{-7-3}{x-2} = \frac{1}{2}$$

$$x-2 = -8$$

$$x = -6$$

$$10) \sqrt[3]{27} = \boxed{3}$$

$$12) \sqrt[3]{8 \cdot 2} - \sqrt[3]{27 \cdot 2}$$

$$2\sqrt[3]{2} - 3\sqrt[3]{2}$$

$$\boxed{-\sqrt[3]{2}}$$

$$14) y - -1 = 5(x - 3)$$

$$y + 1 = 5x - 15$$

$$\boxed{y = 5x - 16 \text{ or } 5x - y = 16}$$

$$16) \sqrt[4]{16x^{15}} = \boxed{2x^3\sqrt[4]{x^3}}$$

$$11) 9 - 7x = 9x - 7$$

$$16 = 16x$$

$$\boxed{x = 1}$$

13a) answers vary slope must be $-\frac{1}{4}$

b) answers vary slope must be 4.

$$15a) \boxed{y = 3}$$

$$15b) \boxed{x = 4}$$

17)

	x int	y int	vertex
a)	(0,0)	(0,0)	(0,0)
b)	(2,0)	(0,4)	(2,0)
c)	(2,0) (4,0)	(0,8)	(3,-1)

18)

	min	max	Domain	Range
a		0	all \mathbb{R}	$y \leq 0$
b	14		all \mathbb{R}	$y \geq 14$
c		4	all \mathbb{R}	$y \leq 4$

c)

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

$$(-1, 4)$$

$$-(-1)^2 - 2(-1) + 3$$

$$-1 + 2 + 3$$

3

19a)

$$x^2 - 4 = 60$$

$$x^2 = 64$$

$$x = \pm 8$$

19b)

$$2x^2 + 5x - 3 = 0$$

$$(2x-1)(x+3) = 0$$

$$x = \frac{1}{2} \text{ or } -3$$

20a)

$$(-6i^2)(5i) =$$

$$(6)(5i) = 30i$$

20b)

$$3 - 7i$$

20c)

$$14 - 12i - 21i + 18i$$

$$14 - 33i - 18$$

$$-4 - 33i$$

21a)

$$64 - 64 = 0 ; 1 \text{ real solution}$$

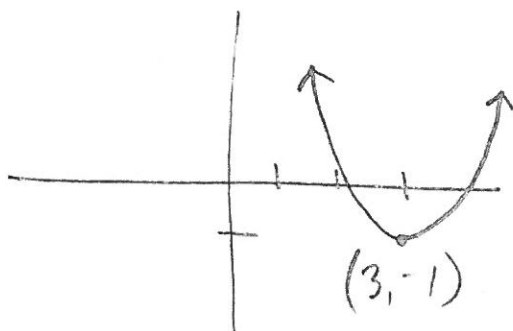
21b)

$$1 - 4 = -3 ; \text{ No real solutions}$$

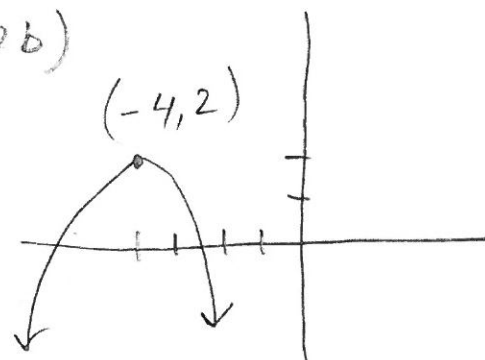
21c)

$$64 - 52 = 12 ; 2 \text{ real solutions}$$

22a)

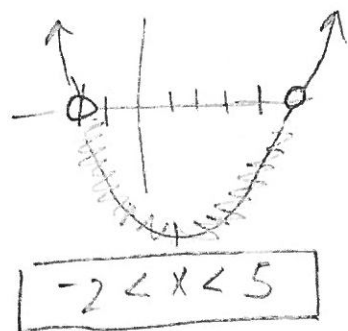


22b)

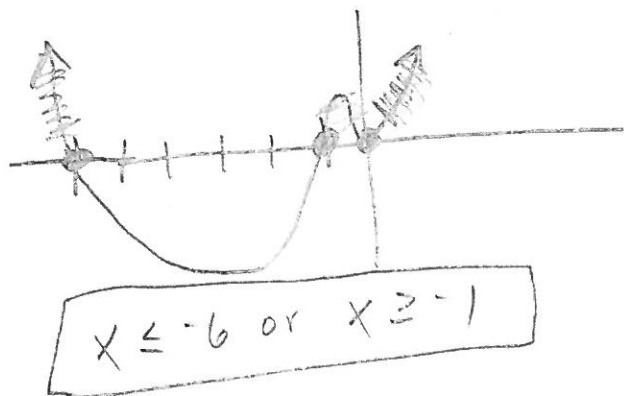


- 23a) shifts 2 left
 b) shifts 2 up
 c) shifts 2 right
 d) shifts 2 down
 e) reflects

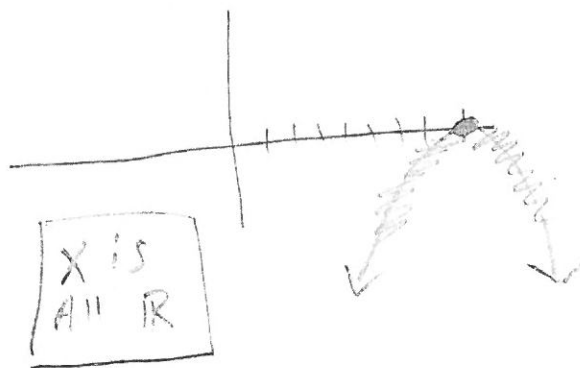
24a) $(x-5)(x+2) < 0$ (4)



24b) $x^2(x^2+7x+6) \geq 0$
 $x^2(x+6)(x+1) \geq 0$



24c) $-x^2+16x-64 \leq 0$
 $-1(x^2-16x+64) \leq 0$
 $-1(x-8)(x-8) \leq 0$



25a) $-\frac{c}{6a^3b^6}$

25b) $\frac{x^8 y^{-4}}{25 x^6 y^4} \cdot \frac{100 x^4}{9 y^{-16}} = \frac{4 x^{12} y^{-4}}{9 x^6 y^{-12}} = \frac{4 x^6 y^8}{9}$

26) $36^{\frac{1}{2}} = 6$

27) $(5^2)^{2x+1} = (5^3)^{3x} \rightarrow$

$2(2x+1) = 3 \cdot 3x$
 $4x+2 = 9x$
 $5x = 2$

$x = \frac{2}{5}$

28) $2000 = 1500 \left(1 + \frac{0.039}{4}\right)^{4t}$
 $\frac{4}{3} = (1.00975)^{4t}$

$\log_{1.00975} \left(\frac{4}{3}\right) = \log_{1.00975} 1.00975^{4t}$

$4t = 29.64964201$
 $t \approx 7.4 \text{ years}$

29) \boxed{c}

30)

$A = 3(6)^3 + 5(6)^2 - 15(6) + 4$

$A = 126,200,000$

31a) $x^2 + 3x - 2$

b) $-x^2 + 3x + 4$

c) $(3x+1)^2 - 3$

$9x^2 + 6x + 1 - 3$

$9x^2 + 6x - 2$

d) $3(x^2 - 3) + 1$

$3x^2 - 9 + 1$

$3x^2 - 8$

e) $f(-2) = 1$

f) $f^{-1}(x) = \pm \sqrt{x+3}$

$y = x^2 - 3$
 $x = y^2 - 3$
 $y^2 = x + 3$
 $y = \pm \sqrt{x+3}$

32a) $x = y + 2$

$y = x - 2$

32b) $x = 8y - 10$

$8y = x + 10$

$y = \frac{1}{8}x + \frac{10}{8}$

$\boxed{y = \frac{1}{8}x + \frac{5}{4}}$

33a) $\sqrt[3]{5}$

33b) $\sqrt[7]{12^2}$ or $\sqrt[7]{144}$ or $(\sqrt[7]{12})^2$

$$34a) 3x+1=5^2$$

$$3x=24$$

$$x=8$$

$$34b)$$

$$\sqrt{3x+7}=4$$

$$3x+7=16$$

$$3x=9$$

$$x=3$$

(6)

$$35a) \frac{\cancel{5}x^2}{(x+2)(x-2)} \cdot \frac{(x+2)}{\cancel{10}x^5} = \frac{x^2}{2x^5(x-2)} = \frac{1}{2x^3(x-2)}$$

$$35b) \frac{(x-8)(x+3)}{(x+1)} \cdot \frac{(x-7)(x+1)}{(x+3)} = (x-8)(x-7)$$

$$35c) \frac{(x+12)(x+7)}{4(x+1)} \cdot \frac{2(x-1)}{(x+7)(x+2)} = \frac{(x+12)}{2(x+2)}$$

$$36) A \rightarrow 6$$

$$B \rightarrow 4$$

$$C \rightarrow 5$$

$$37) (x-2)(x+10) = (x+4)(x+1)$$

$$x^2 + 8x - 20 = x^2 + 5x + 4$$

$$3x = 24$$

$$x=8$$

$$\frac{6}{12} \leftarrow \frac{8-2}{8+4} = \frac{8+1}{8+10} \rightarrow \frac{9}{18}$$

check

$$38) 2(x-1) = x^2 - x$$

$$x^2 - x = 2x - 2$$

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

$$(x-2)(x-1) = 0$$

$$x=2 \quad x=1 \text{ extraneous}$$

$x=2$ only solution

39) $C = 52,000(1.025)^t$

40) $C = 1500(1-.01)^0 \approx \1356.57

41) $A = Pe^{rt}$ $A = 7,500e^{.065t}$
 $A \approx \$8,003.69$

42a) $3^5 = 243$ b) $5^{-2} = \frac{1}{25}$ c) $10^x = 15$

d) $e^{.6931} = x$

43) $\frac{\log 9}{\log 2}$ or $\frac{\ln 9}{\ln 2}$

44a) 2 d) 3

b) $\frac{1}{2}$ e) 3

c) -3 f) -2.5

45a) $3^5 = x$
 $x = 243$

c) $(x^{\frac{1}{2}})^2 = 3^2$
 $x = 9$

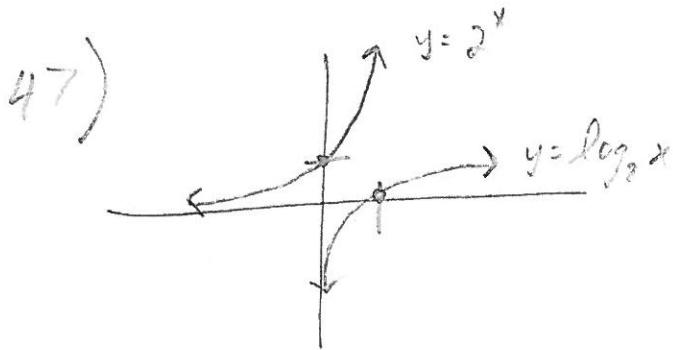
b) $(\frac{1}{4})^3 = x$
 $x = \frac{1}{64}$

d) $5^2 = 3x$
 $3x = 25$
 $x = \frac{25}{3}$

$$46a) 8e - 6e^2 + e - 1 = \boxed{-6e^2 + 9e - 1} \quad (8)$$

$$b) e \left(\frac{e^4}{25} \right) = \boxed{\frac{e^5}{25}}$$

$$c) 2e^{-6x} = \boxed{\frac{2}{e^{6x}}}$$



They are inverses.
They reflect over the
line $y=x$.

$$48a) \log_5 5^{3x} = \log_5 106$$
$$3x = \frac{\log 106}{\log 5}$$
$$x \approx \boxed{.966}$$

$$b) \log_2 2^{x+1} = \log_2 17$$
$$x+1 = \frac{\log 17}{\log 2}$$
$$x \approx \boxed{3.087}$$

$$c) 2e^x = 12$$
$$e^x = 6$$
$$\ln e^x = \ln 6$$
$$x = \ln 6$$
$$x \approx \boxed{1.792}$$

$$d) \ln(3x) = 2$$
$$e^2 = 3x$$
$$x = \frac{e^2}{3} \approx \boxed{2.463}$$

$$e) 8 \ln(x+3) = 16$$
$$\ln(x+3) = 2$$
$$e^2 = x+3$$
$$x = e^2 - 3 \approx \boxed{4.389}$$

$$49) \quad a_n = 101 + 101(n-1)$$

$$a_n = 101 + 101n - 101$$

$$a_n = 101n$$

$$a_{10} = 101(10)$$

$$a_{10} = 1010$$

$$50) \quad 6, 15, 24, 33, 42$$

$$51) \quad a_n = 18 + 2(n-1)$$

$$a_n = 18 + 2n - 2$$

$$a_n = 16 + 2n$$

$$a_8 = 16 + 2(8)$$

$$a_8 = 32$$

$$52) \quad \sum_{n=1}^{40} 3n+2$$

$$a_n = 5 + 3n - 3$$

$$a_n = 3n + 2$$

$$53) \quad 40 \left(\frac{5 + 122}{2} \right) = 2540$$

$$54) \quad -1 + 2 + 7 + 14 + 23$$

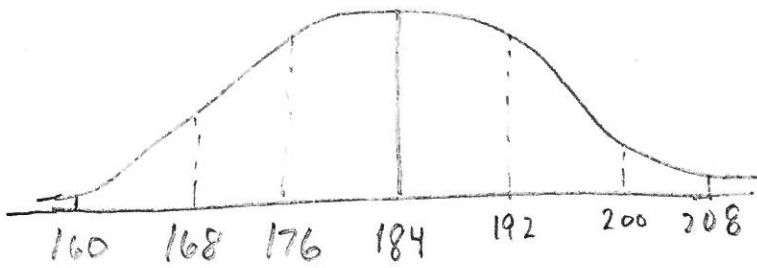
$$55) \quad 18 \left(\frac{13 + 64}{2} \right) = 693$$

$$56) \quad 6 + 12 + 24 + 48 + 96$$

$$57) \quad a_n = 2(-3)^{n-1}$$

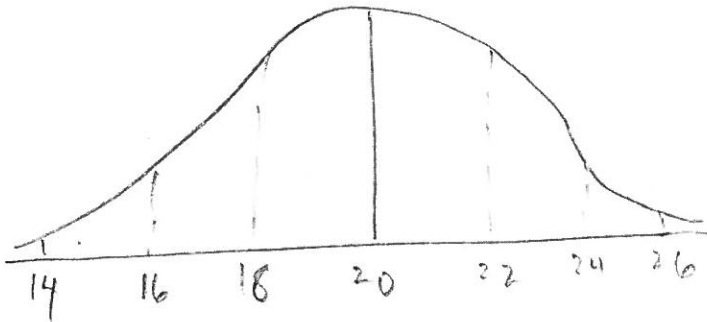
$$58) \quad 2 \left(\frac{1 - (-3)^9}{1 - (-3)} \right) = 9842$$

59)



(10)

60)



- a) 68% of the time
 b) 84% of the time
 c) 2.5%

61a) mean = 22

median = 22

mode = 22

b) $\sigma \approx 3.90$

d) range = 17

IQR = 5.5

c) LE = 12
LQ = 19.5

e) $5.5 * 1.5 = 8.25$

M = 22

UQ = 25

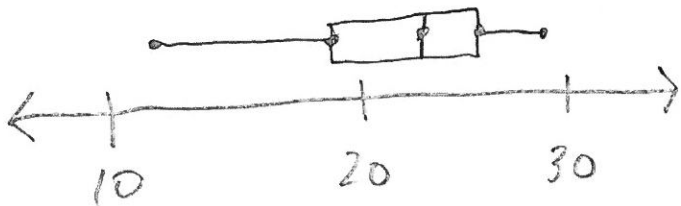
UE = 29

Lower Limit: $19.5 - 8.25 = 11.25$

Upper Limit: $25 + 8.25 = 33.25$

No outliers because no data item exceeds upper or lower limit.

f)



g) 25

62) a) $\frac{90}{478} = \frac{45}{239}$

b) $\frac{227}{478}$

c) $\frac{91}{251}$

d) $\frac{117}{247} = \frac{9}{19}$

63) a) $\tan \theta = \frac{11.9}{10}$

$$c^2 = 10^2 + 11.9^2$$

$\angle A \quad \theta = \tan^{-1}\left(\frac{11.9}{10}\right)$

$$c^2 = 241.61$$

$\angle A \quad \theta = 49.96^\circ$

$$c = \sqrt{241.61}$$

$\angle B = 40.04^\circ$

$$c \approx 15.54$$

b) $\angle A = 28^\circ$

$$\sin 62^\circ = \frac{22.6}{c}$$

$$\tan 28^\circ = \frac{a}{22.6}$$

$$c \cdot \sin 62 = 22.6$$

$$a = 22.6 \tan 28$$

$$c = \frac{22.6}{\sin 62}$$

$$a \approx 12.02$$

$$c \approx 25.60$$

64)

	amplitude	period	Maximum	Minimum
a	3	$\frac{2\pi}{3}$	2	-4
b	2	2	4	0
c	1	4π	1	-1

65 a) $\frac{1}{2}$

b) $-\frac{\sqrt{2}}{2}$

c) $\sqrt{3}$

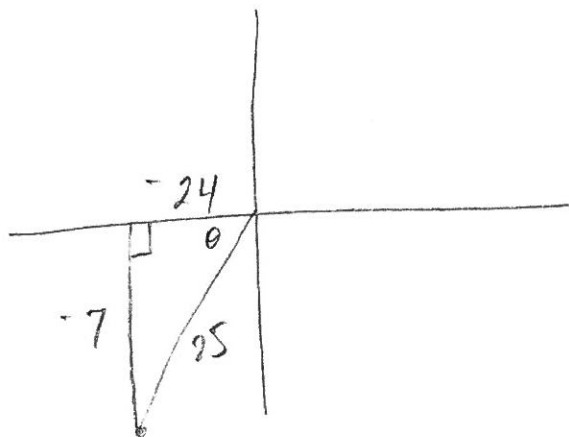
(12)

d) -1

e) 0

f) undefined

66)



$$\cos \theta = \frac{-24}{25}$$

$$\sin \theta = \frac{-7}{25}$$