MATH 3 QUIZ BOWL

1. $\sqrt[3]{12x^2} \cdot \sqrt[3]{126x^2}$

$= \sqrt[3]{1512x^4}$ $= \sqrt[3]{2\cdot2\cdot2\cdot3\cdot3\cdot3\cdot7\cdot x\cdot x\cdot x\cdot x}$ $= 6x\sqrt[3]{7x}$ (A)

126 12
42 3 3 4
6 7 2 2
2 3

2. $\frac{2(x+3)}{(x+6)(x-4)} \cdot \frac{(x+6)(x-4)}{(x-4)(x-3)} = \frac{2(x+3)}{(x-4)(x-3)}$ (C)

3. Graph, look for x-intercepts : $x = -5, 3, 4$ (B)

4. $\frac{x+3}{3(2x-1)} \cdot \frac{(2x-1)}{(x+3)(x-1)} = \frac{1}{3(x-1)}$ (D)

5. $h(x) = 2x$ $h(g(x)) = h(3x^2+1)$ (B)
$g(x) = 3x^2+1$ $= 2(3x^2+1)$
$= 6x^2+2$

6. $x = 3$ $x = 4+i$ (A)
$x-3=0$ $(x-4)^2=(i)^2$
$(x-4)(x-4) = -1$
$x^2-8x+16 = -1$
$x^2-8x+17=0$

	x^2	$-8x$	$+17$
x	x^3	$-8x^2$	$+17x$
-3	$-3x^2$	$+24x$	-51

$= x^3-11x^2+41x-51$

7. $\ln 7 + 3\ln x = 5\ln 2$ (B)
$\ln 7 + \ln x^3 = \ln 2^5$
$\ln 7x^3 = \ln 32$

8. $(x-h)^2 + (y-k)^2 = r^2$ (B)

$(x-5)^2 + (y+1)^2 = 49$

9. $y = 151\,(1.013)^{2000-1950}$ (D)

$y = 288$ million

10. (B)

x	y
0	7.6
10	7.0
20	6.4
30	5.7
40	5.4
50	4.5

* Must change years starting at 0

stat → calc → 4

$y = -0.06x + 7.6$

11. (A)

$$2x+1 \;\overline{)\; 6x^3 - 11x^2 - 47x - 20}$$

$3x^2 - 7x - 20$

$-6x^3 + -3x^2$ ↓

$-14x^2 - 47x$

$+14x^2 + 7x$ ↓

$-40x - 20$

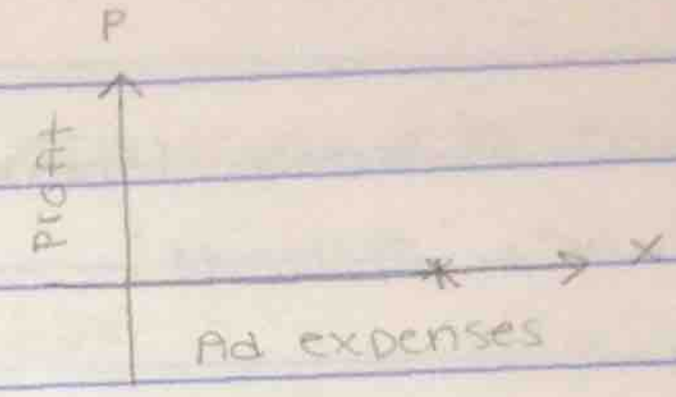
$+20x + 20$

0

12. (A)

$$\frac{\frac{x}{xy} - \frac{y}{xy}}{\frac{x}{xy} + \frac{y}{xy}} = \frac{\frac{x-y}{xy}}{\frac{x+y}{xy}} = \frac{x-y}{xy} \cdot \frac{xy}{x+y} = \frac{x-y}{x+y}$$

13. P = Profit
x = advertising expenses



(D)

As ad expenses increase, profit = 0.

14. $y = a(1+r)^t$

$y = 1.801(1+0.049)^t$

$y = 1.801(1.049)^t$

(C)

15. P = profit. Lose money means profit is negative. (D)

↳ y-values.

$P(x) = -750x^2 + 15000x$

* graph, look for x-values where y is negative

16. $A = \pi r^2$ * centers don't matter for area (D)

a) $r = \sqrt{12}$

b) $r = \sqrt{8}$

c) $r = \sqrt{6}$

d) $r = \sqrt{3}$ ← smallest radius = smallest area.

17. $\frac{-1}{2}|2x+6|+2=0$ gran, find x-int (C)

$x = -5, -1$

18. same

$x = 2y$ $x - y^2 = -2y$ $y(y-4) = 0$ $x = 2(0) = 0$

* use substitution → $2y - y^2 = -2y$ $y = 0$ $y = 4$

$2y = y^2 - 2y$ $x = 2(4) = 8$

$0 = y^2 - 4y$ solutions: (0,0) and (8,4)

19. a = vertical stretch (think pulling a hair tie) (A)

it gets skinnier!

20. $y = \frac{a}{x-h} + k$ Denominator = Left/right shift (A)

* think opposite!

21. $x = y - 9$ $f^{-1}(x) = x + 9$ (B)

$x + 9 = y$

22. $V = LWh$ * graph, find max $x = 1.8$ (C)

$V = w(w+2)(3-w)$ x = width y = volume $y = 8.2$

23. $N(t)$ = # of organisms at end $10000 = 1(2)^{t/3}$ $\frac{t}{3} = 13.3$ (D)

N_0 = starting # of organisms $\log 10000 = \frac{t}{3} \log 2$

t = time in days $\frac{t}{3} = \frac{\log 10000}{\log 2}$ $t = 39.86$

* can always graph and find answer in table

24. $4000 = 2000\left(1 + \frac{0.0525}{12}\right)^{12t}$ (C)

$2 = (1.004375)^{12t}$

$\log 2 = (12t)\log 1.004375$

$t = \frac{\log 2}{12 \log 1.004375} = 13.23$ years

25. vertical Asymptotes are the restrictions left in the denominator! (C)

$$\frac{4x^2-100}{2x^2+x-15}$$

-30 / 6 X -5 / 1

$(2x^2+6x)+(-5x-15)$

$2x(x+3)-5(x+3)$

$(2x-5)(x+3)$

$4(x^2-25)$

$4(x-5)(x+5)$

$= \frac{4(x-5)(x+5)}{(2x-5)(x+3)}$

$2x-5=0$ $\quad x+3=0$

$x=5/2$ $\quad x=-3$

26. $\frac{x+2}{x-2} = \frac{4}{x-2}$ (A)

$(x+2)(x-2)=4$

$x^2-4=4$

$x^2=8$

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

8
^
4 2
^
(2 2)

*cross multiply!

27. $y=(x-h)^2+k \Rightarrow y=(x-1)^2-2$ (B)

28. graph: $y_1 = x^3-6x^2-x+3$ $\quad x=6.09$ (C)

$y_2 = 0$

Find the largest intersection

29. x^2+7x+5 (D)

$x=\frac{-7\pm\sqrt{(7)^2-4(1)(5)}}{2(1)} = \frac{-7\pm\sqrt{29}}{2}$

30. $3x-7\sqrt{x}+2=0$

$3x-7\sqrt{x}=-2$

$-7\sqrt{x}=-3x-2$

$7\sqrt{x}=3x+2$

$49x=(3x+2)(3x+2)$

$49x=9x^2+12x+4$

$9x^2-37x+4=0$ (A)

$(9x^2-36x)+(1x+4)=0$

$9x(x-4)+1(x-4)=0$

$9x-1=0$ $\quad x-4=0$

$x=1/9$ $\quad x=4$

31. $y = a(1+r)^t$ (D)

$y = 215000(1+0.05)^5$

$y = \$27,440.05$

32. $(x^3 - x^2)(+3x - 3)$ (D)

$x^2(x-1)\,3(x-1)$

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

33. $4x^2 - 21x - 18$ (B)

-72, -24, 3, -21

$(4x^2 + 3x - 24x - 18)$

$x(4x+3) - 6(4x+3)$

$(x-6)(4x+3)$

34. $d = rt$ $\quad 20 = 3t$ (A)

$d = 5(4)$ $\quad t = 6.6\overline{7}$

$d = 20$ $\quad t = 6\ 2/3$

35. Left 2 (C)

36. $\frac{x-1}{x+5} = \frac{x}{2x+10}$ $\quad (2x+10)(x-1) = x(x+5)$ (B)

$x \neq -5$ b/c it is a restriction!

$2x^2 - 2x + 10x - 10 = x^2 + 5x$

$2x^2 + 8x - 10 = x^2 + 5x$

$x^2 + 3x - 10 = 0$

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

$x = -5 \quad x = 2$

37. $\left(x^{\frac{3}{4}}\right)^3 = x^{9/4}$ (B)

38. $y = a(1+r)^t$ (B)

$y = 4000(1+0.03)^t$

39. $-2x^3 + x^2 + 1$ (A)

cubic function: Domain is $(-\infty, \infty)$ or all reals

40. $f(x) = 2x+1$ $f(g(3)) \Rightarrow$ $g(3) = (3)^3 = 27$

$g(x) = x^3$ $f(27) = 2(27)+1 = 55$

41. Down (D)

42. $(x+yi) - (2-3i) = -6+4i$ (D)

$x+yi - 2+3i = -6+4i$

$+2 \quad -3i \quad +2 \quad -3i$

$x+yi = -4+1i$

43. $(x-h)^2 + (y-k)^2 = r^2$ (A)

$(x+2)^2 + (y-3)^2 = r^2$ $(x+2)^2 + (y-3)^2 = 5$

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

$1 + 4 = r^2$

$5 = r^2$

Distribute the negative as well!

* get common denominators! *

44. $\frac{\cos\theta}{\cos\theta(1-\sin\theta)} - \frac{(\sin\theta)(1-\sin\theta)}{\cos\theta(1-\sin\theta)} = \frac{\cos^2\theta - \sin\theta + \sin^2\theta}{\cos\theta(1-\sin\theta)}$ (A)

$= \frac{\sin^2\theta + \cos^2\theta - \sin\theta}{\cos\theta(1-\sin\theta)} = \frac{1-\sin\theta}{\cos\theta(1-\sin\theta)} = \frac{1}{\cos\theta} = \sec\theta$

45. SWOOSH! $x = 1.5^y + 4$

$x - 4 = 1.5^y$

$1.5^y = x - 4$

$\log_{1.5}(x-4) = y$

change base.

$f^{-1}(x) = \log_{1.5}(x-4) = \frac{\log(x-4)}{\log 1.5}$ (C)

46. $y = x^2 - 6x + 10 \Rightarrow$ 2 ways (B)

(#1) complete the □ $\left(\frac{-6}{2}\right)^2 = 9$

$y - 10 = x^2 - 6x$

$y - 10 + 9 = x^2 - 6x + 9$

$y - 1 = (x-3)^2$

$y = (x-3)^2 + 1$

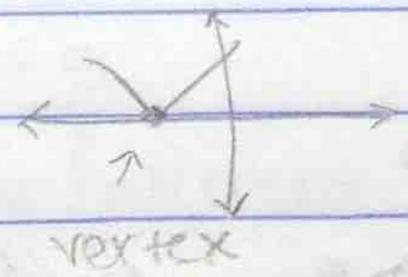
(#2) graph, find vertex

$(3, 1) \leftarrow (h, k)$

$y = a(x-h)^2 + k$

$y = 1(x-3)^2 + 1$

47. vertex: $(-2, 0)$

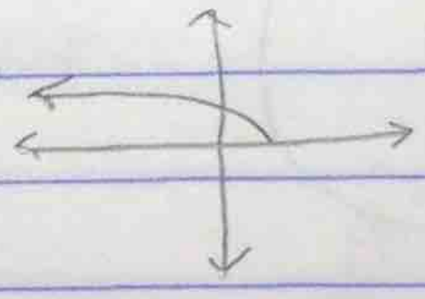


(A)

48. $-x + 2 = 0$

$-x = -2$

$x = 2$



$x \leq 2$

(B)

49. $y = \frac{a}{x-h} + K$ ← up/down (same) (B)

← left/right (opposite)

50. $d = rt$ $t = \frac{d}{r}$ (B)

car time $= \frac{210}{a-340}$ plane time $= \frac{1400}{a}$

same time means = car time = plane time

$\frac{210}{a-340} = \frac{1400}{a}$

$210a = 1400(a-340)$

$210a = 1400a - 476000$

$-1190a = -476000$

$a = 400$

51. $y_1 = (x^2-2x-3)/(x^2+5x-14)$

look at table where $y = 0$

$x = 3$ $x = -1$ (A)

52. $f(x) = 2x^2 \Longrightarrow g(x) = \frac{1}{2}x^2$ (A)

"a" gets smaller = vertical compression = wider

53. $h = -16t^2 + 60t + 5$ (D)

↑ y-intercept = initial height.

54. f^{-1} means inverse. (D)

$x = \frac{4}{3}y - 9$

$x + 9 = \frac{4}{3}y$

$3x + 27 = 4y$

inverse!

$y = \frac{3x}{4} + \frac{27}{4}$

$f^{-1}(-3) = \frac{3(-3)}{4} + \frac{27}{4}$

$= 4.5$

← Multiply by the conjugate of denominator to rationalize

55. $\frac{(4-\sqrt{3})}{(2-\sqrt{3})} \cdot \frac{(2+\sqrt{3})}{(2+\sqrt{3})} = \frac{5+2\sqrt{3}}{1}$ (B)

★ Multiply denominator ★ in calc to save time

	2	$+\sqrt{3}$
4	8	$4\sqrt{3}$
$-\sqrt{3}$	$-2\sqrt{3}$	-3

$= 5+2\sqrt{3}$

56. $\frac{(3+6i)^2}{2i}$ ★ make life easy.

use calc & hit math → frac! (D)

$= \frac{18+\frac{27i}{2}}{\frac{36+27i}{2}}$

57. $3\log x + \log 2 = \log 3x - \log 2$ (D)

$\log x^3 + \log 2 = \log 3x - \log 2$

$\log 2x^3 = \log \frac{3x}{2}$

58. a decrease = negative a (think opposite) = right (C)

59. $P = Kd$ (C)

$8.6 = 20K$ $P = 0.43(25)$

$K = 0.43$ $P = 10.75$

60. $6x^2 - x - 1$ (D)

vertical asymptotes are restrictions in the denominator!

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

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

$3x+1=0 \quad 2x-1=0$

$3x=-1 \quad 2x=1$

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

-6, -3, 2, -1

61. $V = LWh$ (B)

a) $V = (4\sqrt{3})(3\sqrt{6})(2\sqrt{50}) = 720$ rational

b) $V = (4\sqrt{3})(3\sqrt{6})(4\sqrt{12}) = 705.45\ldots$ irrational

c) $V = (4\sqrt{3})(3\sqrt{6})(5\sqrt{2}) = 720$ rational

d) $V = (4\sqrt{3})(3\sqrt{6})(7\sqrt{18}) = 1512$ rational

62. Arc length $= \theta r$ θ is in radians (C)

Arc length $= \frac{4\pi}{3}(6) = 25.13$

63. $\frac{(x+7)}{(x+7)(x-3)} \cdot \frac{(x+5)(x+3)}{(x+5)} = \frac{(x+3)}{(x-3)}$ (A)

← Don't cancel w/ (x-3) my mistake!

64. $\frac{\sin\theta}{\sin\theta} \cdot \frac{\frac{\sin\theta}{\cos\theta} + \frac{\cos\theta}{\sin\theta} \cdot \frac{\cos\theta}{\cos\theta}}{\frac{1}{\sin\theta}} = \frac{\sin^2\theta + \cos^2\theta}{\sin\theta\cos\theta} \Big/ \frac{1}{\sin\theta}$ (A)

$= \frac{1}{\sin\theta\cos\theta} \cdot \frac{\sin\theta}{1} = \frac{1}{\cos\theta} = \sec\theta$

65. $a_1 = 8$ $r = -1/7$ $n = 2500$ $S_{2500} = \frac{8\left(1-(-1/7)^{2500}\right)}{1-(-1/7)} = 7$ (B)

66. $(4-3i)^2 + (6+i)^2 \Rightarrow$ use calc. $= 42-12i$ (B)

67. $\underline{6}\,|\,1 \quad -2 \quad -20 \quad -24$

$\downarrow \quad 6 \quad 24 \quad 24$

$1 \quad 4 \quad 4 \quad |0|$

$x^2 + 4x + 4$

$(x+2)(x+2)$

(A)

68. 2 ways

#1: graph, find vertex

#2: complete the □

vertex: $(-5, -33)$

$x^2+10x-8=0$

$x^2+10x=8$

$\left(\frac{10}{2}\right)^2 = 25$

$x^2+10x+25=8+25$

$(x+5)^2=33$

$(x+5)^2-33=0$

↑ inside, opposite!

(B)

69. Stat → calc → 5

$x = 2010 - 1900 = 110$

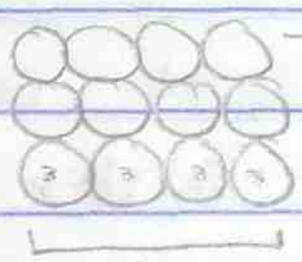
y_1 = vars → 5 → EQ → 1 → enter

change TblStart = 110

2010 = 13,893

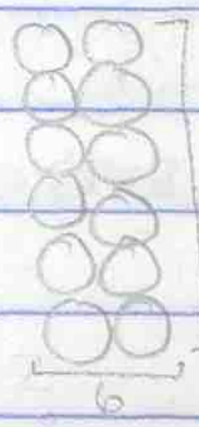
(A)

70. option #1:



height = 10

option #2:



height = 10

(C)

$SA = 2(LW + LH + HW)$

$SA_1 = 2[(12)(9) + (12)(10) + (10)(9)]$

$SA_1 = 636$

$SA_2 = 2[(6)(18) + (6)(10) + (10)(18)]$

$SA_2 = 21816$

71. $\frac{4\pi}{3} \cdot \frac{180}{\pi} = 240°$

$(0, -1) = 270°$

$270 + 240 = 510$

-360

$150°$

$150 \cdot \frac{\pi}{180} = \frac{5\pi}{6}$

(B)

72. $8x^2+3x+7=0$ (A)

$x = \frac{-3 \pm \sqrt{(3)^2-4(8)(7)}}{2(8)} = \frac{-3 \pm \sqrt{-215}}{16} = \frac{-3 \pm i\sqrt{215}}{16}$

73. (D)

A) $\frac{9}{6} = \boxed{\frac{3}{2}}$ $\frac{12}{9} = \boxed{\frac{4}{3}}$ NO

B) $\frac{6}{2} = \boxed{\frac{3}{1}}$ $\frac{8}{4} = \boxed{\frac{2}{1}}$ NO

C) $\frac{5}{4}$ $\frac{4}{5}$ NO

D) $\frac{6}{3} = \boxed{\frac{2}{1}}$ $\frac{8}{4} = \boxed{\frac{2}{1}}$ yes!

74. Plan M = Pe^{rt} = $y = 10000e^{0.075t}$ (C)

$y_1 = 10000e^{0.075x}$

$y_2 = 5x^3 - 50x^2 + 4x + 10000$

Look at table for values and compare!

A) $x=1$ to $x=28$

B) $x=15$ to $x=42$

C) $x=29$ to $x=60$ ← at yr 29, Plan N surpasses plan M

D) never

76. $y = (x-h)^3 + k$ $y = (x-3)^3 - 2$ (D)

left/right ↑ up/down

77. $y_1 = |x-3|$ Find both intersections. $y_2 = \frac{1}{2}x$ (B)

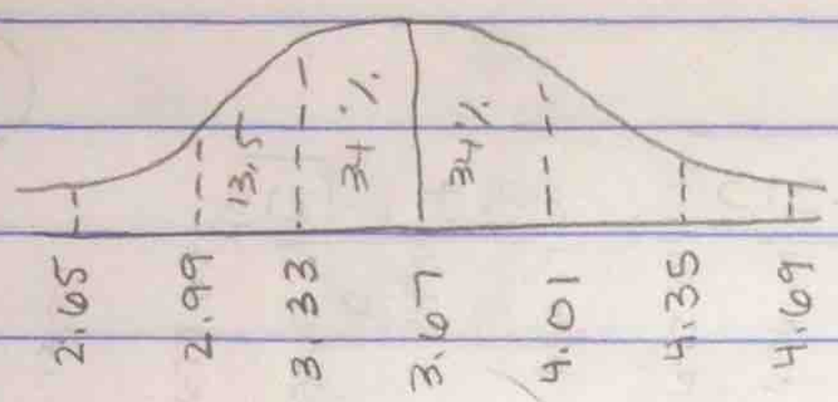
#1) (2,1) #2) (6,3)

$d = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$d = \sqrt{(6-2)^2+(3-1)^2}$

$d = \sqrt{16+4} = \sqrt{20}$

78.



About 81.5%

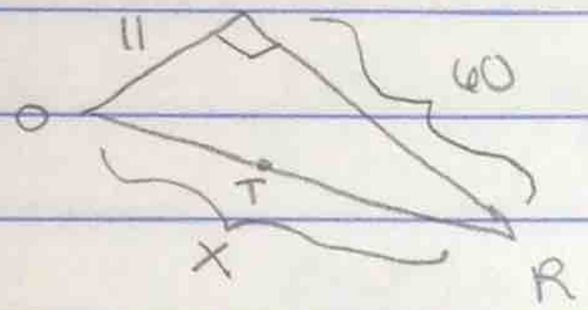
685(0.815) = 558.3

(C)

or Normalcdf(2.99, 4.01, 3.67, 0.34) = 81.8%

685(0.818) = 560

79.



$11^2 + 60^2 = x^2$

$x^2 = 3721$

$x = 61$

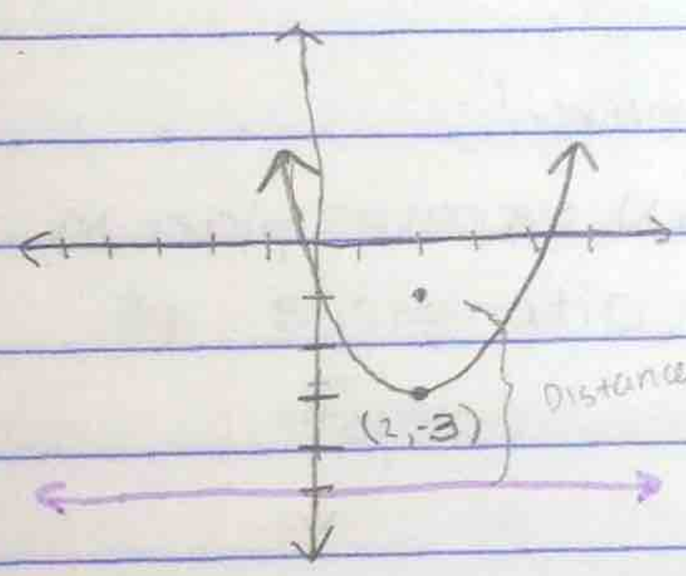
(A)

80. $\frac{12}{8} = \frac{3}{2}$ = ratio $\quad \frac{\overline{MN}}{4} = \frac{3}{2} \quad 2\overline{MN} = 12 \quad \overline{MN} = 6 \quad \frac{10}{\overline{OQ}} = \frac{3}{2} \quad 20 = 3\overline{QO} \quad \overline{OQ} = 20/3$

(D)

* AA~ * $m\angle NLM \cong m\angle QOP$

81.



(C)

distance between focus & vertex $= \frac{1}{4a}$

$2 = \frac{1}{4a}$

$8a = 1$

$y = 1/8(x-2)^2 - 3$

82. $y_1 = 3^{x-1}$

$y_2 = 4^{2x+5}$

graph, find intersection

$x = -4.797$

or

$(x-1)\log 3 = (2x+5)\log 4$

$x - 1 = (2x+5)\left(\frac{\log 4}{\log 3}\right)$

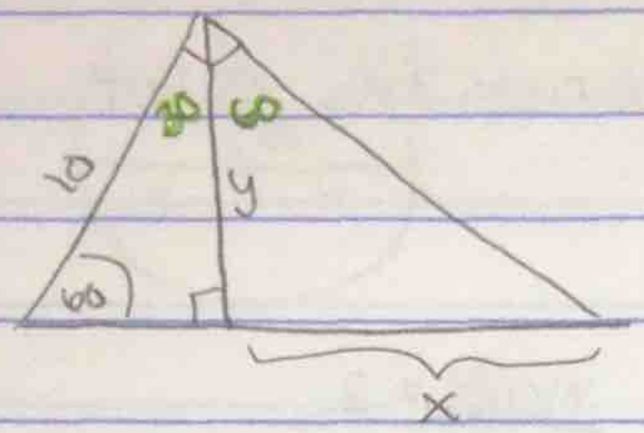
$x - 1 = (2x+5)1.26$

$x - 1 = 2.52x + 6.3$

$-1.52x = 7.3$

$x = -4.8$

(D)

83. 

$\sin 60 = \frac{y}{10}$ $\quad y = 10\sin 60$ $\quad y \approx 8.660$

$\tan 60 = \frac{x}{8.660}$ $\quad x = 8.660 \tan 60$ $\quad x = 15$

(D)

84. $f(-3) = -1(-3)^2 + 2(-3) = -15$

$f(-1) = 2\left(\frac{1}{3}\right)^{2(-1)} = 18$

$f(4) = \frac{2(4)-5}{4-7} = \frac{3}{-3} = -1$

$-15 + 2(18) - (-1) = 22$ (D)

85. 1500 yds = 4500 ft

300 yds = 900 ft

$4500 \times 900 = 4{,}050{,}000\ ft^2$

$= 92.975$ acres ✓

$\frac{\$87000}{92.975} = \$935.74$ X

(D)

86. systematic = pattern w/ little bias.

cafeteria = bias b/c not all kids eat there.

(A)

87. $\frac{(\sin^2\theta - \cos^2\theta)(\sin^2\theta + \cos^2\theta)}{\sin^2\theta - \cos^2\theta} = \sin^2\theta + \cos^2\theta = 1$ (D)

88. $SA = 4\pi r^2$

$36 = 4\pi r^2$

$r^2 = \frac{36}{4\pi} = \frac{9}{\pi}$

$r = \sqrt{\frac{9}{\pi}} = \frac{3}{\sqrt{\pi}}$

$V = \frac{4}{3}\pi\left(\frac{3}{\sqrt{\pi}}\right)\left(\frac{3}{\sqrt{\pi}}\right)\left(\frac{3}{\sqrt{\pi}}\right)$

$V = 4\pi\left(\frac{9}{\pi\sqrt{\pi}}\right) = \frac{36}{\sqrt{\pi}}$

(C)

89. Graph each one and see which one rises the fastest.
or focus on the "a" value!

90. (A)

Way #1
equivalent means same!
graph & see which one is the same as the original.

Way #2
$1x^3 + 3x^2(3) + 3x(3)^2 + 1(3)^3 - 9x^2 - 27x$
$1x^3 + 9x^2 + 27x + 27 - 9x^2 - 27x$
$x^3 + 27$

91. (D)

-1 | 1 -2 13 K
↓ -1 3 -16
1 -3 16 | -8

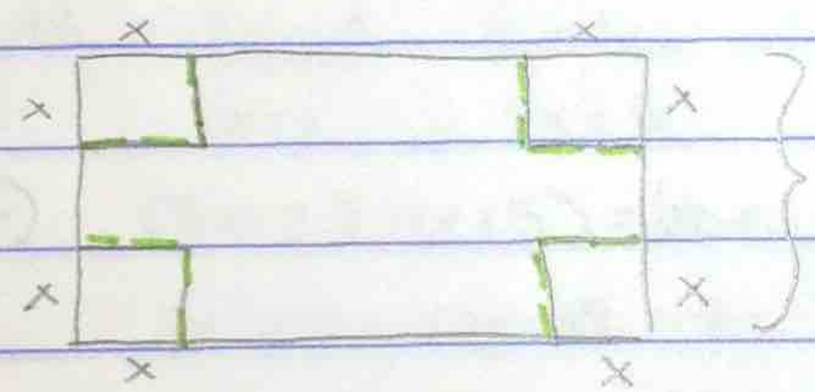
$K - 16 = -8$
$K = 8$

1 | 1 -2 13 8
↓ 1 -1 12
1 -1 12 | 20

92. (D)

% of voters in the state
= entire population

93. (A)



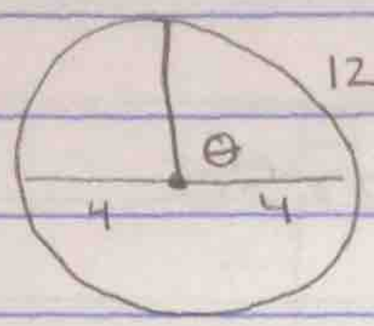
$V = LWh$
$V = (12-2x)(8-2x)(x)$
graph, look at positive x-values
height = x
which can't = 0 or negative. ±

94. (B)

Way #1:
graph, find vertex
vertex: (1.25, 8.875)

Way #2:
$y = 2x^2 - 5x + 12$
$y - 12 = 2x^2 - 5x$
$\frac{y}{2} - 6 = x^2 - 2.5x$
$\frac{y}{2} - 6 + 1.5625 = x^2 - 2.5x + 1.5625$

$y/2 - 4.4375 = (x - 1.25)^2$
$y/2 = (x-1.25)^2 + 4.4375$
$y = 2(x-1.25)^2 + 8.875$
↑
qr

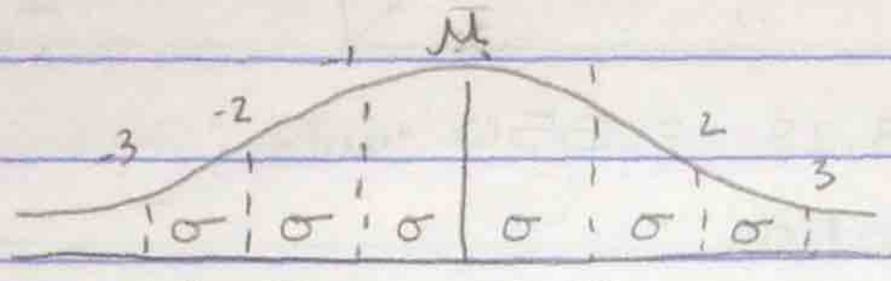
95. 

Arc length $= \theta r$

$12 = \theta r$

$\theta = 3$

(B)

96. 

$76 + 4\sigma = 88$

$4\sigma = 12$

$\sigma = 3$

$\mu = 88 - 3$

$\mu = 85$

(D)

97. $\frac{1}{12}(14x^3 + 28x^2 - 46x) = 2x + 7$

$14x^3 + 28x^2 - 46x = 12(2x + 7)$

$14x^3 + 28x^2 - 46x = 24x + 84$

$14x^3 + 28x^2 - 70x - 84 = 0$ ← graph, find x-intercepts

$x = -3, \quad x = -1, \quad x = 2$

(B)

98. $\frac{2x-3}{x-1} = \frac{8x+1}{4x+5}$ ← cross multiply!

$(2x-3)(4x+5) = (8x+1)(x-1)$

$8x^2 + 10x - 12x - 15 = 8x^2 - 8x + 1x - 1$

$8x^2 - 2x - 15 = 8x^2 - 7x - 1$

$5x = 14$

$x = 14/5$

(D)

99. $4^2 + 2^2 = z^2$

$16 + 4 = z^2$

$20 = z^2$

$\sqrt{20} = 2\sqrt{5} = z$

a) $x^2 + y^2 = 20$

b) $\frac{1}{2}(4)(2) = 4$

c) $4 + 2 + 2\sqrt{5} = 6 + 2\sqrt{5}$ ← irrational!

d) $4^2 - (\sqrt{20})^2 = 16 - 20 = -4$

(C)

100. Car #1 (B)

$\frac{15000}{20} = 750$ tanks of gas $\times \$3.25 = \$2437.50$

Car #2

$\$2437.50 - 1050 = \$1787.50 \div 3.25 = 550$ tanks

$\frac{15000}{550} = 27.3$ miles per gallon

27.3
$-\ 20$
7.3

101. Way #1: (B)

$y_1 = 500(1.048)^x$

$y_2 = 446(1.0698)^x$

Find intersection

$x = 6.04$

Way #2:

plug in answer choices and see which one is closest to being equal.

102. $y = a(x-h)^2 + k$ (A)

$y = a(x+3)^2 + 1$

$4 = a(0+3)^2 + 1$

$3 = 9a$

$a = 1/3$

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

103. Stat → calc → 4 (B)

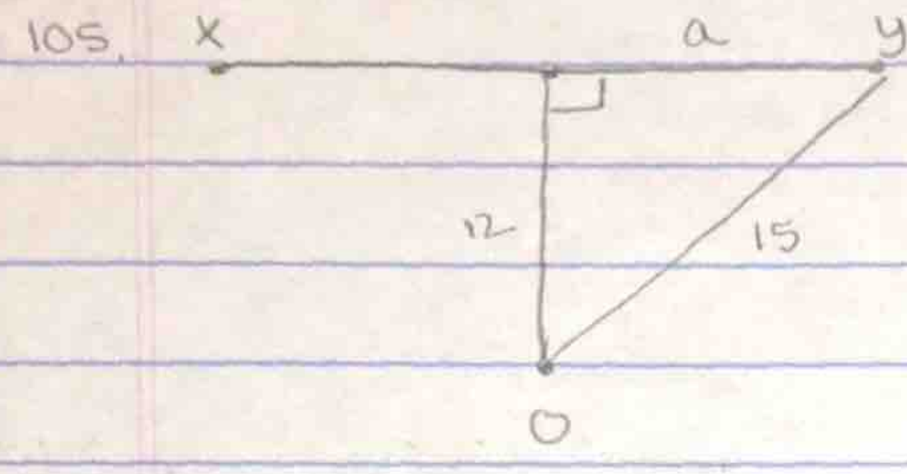
$y = 4.79x - 167.96$

104. $\text{Area} = \frac{\pi r^2 \cdot \theta}{360}$ (D)

$A_{small} = \frac{(3.14)(2^2)(30)}{360} = 1.05$

$A_{Big} = \frac{(3.14)(6)^2(30)}{360} = 9.42$

9.42
$-\ 1.05$
8.37

105. 

$a^2 + 12^2 = 15^2$

$a^2 = 81$

$a = 9$

chord $= 2(9) = 18$ (C)

106. Best fits means use the correlation coefficient (r^2) (C)

2nd → 0 → Diagnostic on → Enter → Enter

year (x)	0	10	20	30	47	48
Acres	213	297	374	426	436	435

linear: $r^2 = 0.862$ quad: $r^2 = 0.997$ ← closest to 1 means best fit

$y =$ vars → 5 → EQ → 1 $\quad \frac{2010}{-1950}$ $\quad x = 60$ $\quad y = 400.81$

107. (C)

way #1: graph

way #2: $y - 20 = -1x^2 + 8x$

$-1y + 20 = x^2 - 8x$

$-1y + 20 + 16 = x^2 - 8x + 16$

$-1y + 36 = (x-4)^2$

$-1y = (x-4)^2 - 36$

$y = -1(x-4)^2 + 36$ vertex: (4, 36)

108. y-int: initial price of the stock (C)

109. $y = a(x-h)^2 + k \Rightarrow y = a(x-5)^2 + 3$ (A)

110. $y_1 = x^3 - 5x^2 + 2x + 6$ $\quad x = -0.856$ (C)

$y_2 = 0$

Find intersection furthest to the left

111. $f(x) = \frac{x^2+2x+1}{x^2+3x-4} = \frac{(x+1)(x+1)}{(x+4)(x-1)}$ (D)

$\leftarrow$ vertical Asy.

$x = -4 \quad x = 1$ ↙

Horizontal Asy: $y = \frac{1x^2}{1x^2} \quad y = 1$

112. vertex : $(5, -4)$ = minimum (D)