

61. $V = LWH$

(B)

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

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

c) $V = (4\sqrt{3})(3\sqrt{6})(5\sqrt{10}) = 720$ rational

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

62. Arc length = θr θ is in radians

(C)

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

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

(A)

64. $\frac{\sin \theta}{\sin \theta} \cdot \frac{\sin \theta}{\cos \theta} + \frac{\cos \theta}{\sin \theta} \cdot \frac{\cos \theta}{\cos \theta} = \frac{\sin^2 \theta + \cos^2 \theta}{\sin \theta \cos \theta}$

(A)

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

65. $a_1 = 8$ $S_{2500} = \frac{8(1 - (-1/7)^{2500})}{1 - (-1/7)} = 7$

(B)

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

(B)

67. $\begin{array}{c|cccc} 6 & 1 & -2 & -20 & -24 \\ \hline & \downarrow & 6 & 24 & 24 \\ & 1 & 4 & 4 & 10 \end{array}$

$$x^2 + 4x + 4$$

(A)

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

68. 2 ways

#1: graph, find vertex

#2: complete the $\square$

vertex: $(-5, -33)$

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

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

(B)

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

$$x^2 + 10x + 25 = 33$$

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

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

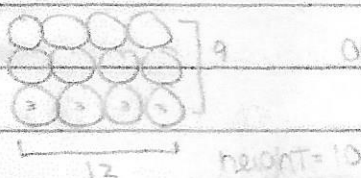
$\leftarrow$ inside, opposite!

69. Stat $\rightarrow$ calc $\rightarrow$ 5 $y_1 = \text{vars} \rightarrow 5 \rightarrow \text{edit} \rightarrow 1 \rightarrow \text{enter}$

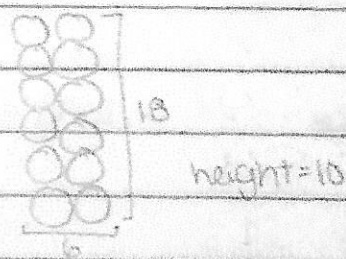
(A)

$$x = \frac{-190 \pm \sqrt{190^2 - 4(1)(110)}}{2(1)}$$

70. Option #1:



Option #2:



(C)

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

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

$$SA_1 = 636$$

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

$$SA_2 = 21816$$

$$71. \frac{4\pi}{3}, \frac{180}{\pi}, 240^\circ$$

$$270 + 240 = 510$$

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

(B)

$$(0, -1) = 270^\circ$$

$$150^\circ$$

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

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

(A)

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

(D)

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

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

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

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

$y_1 = 10000e^{0.075t}$

$y_2 = 5x^3 - 50x^2 + 4x + 1000$

Look at tables 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

(C)

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

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

left/right up/down

(D)

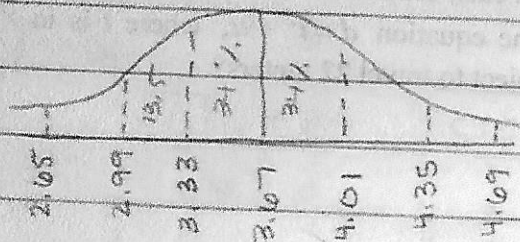
77. $y_1 = |x-3|$ Find both #1) (2,1) $d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$

$y_2 = \frac{1}{2}x$ intersection #2) (6,3) $d = \sqrt{(6-2)^2 + (3-1)^2}$

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

(B)

78.



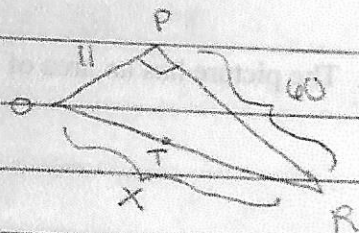
About 81.5%

$$685(0.815) = 558.3$$

or $\text{Normalcdf}(2.99, 4.01, 3.67, 0.34) = 81.8\%$

$$685(0.818) = 560$$

79.



$$11^2 + 60^2 = X^2$$

$$X^2 = 3721$$

$$X = 61$$

80.

$$\frac{12}{8} = \frac{3}{2} = \text{ratio}$$

$$\frac{\overline{MN}}{4} = \frac{3}{2}$$

$$2\overline{MN} = 12$$

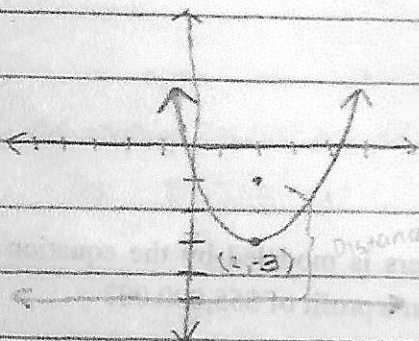
$$\frac{10}{\overline{OG}} = \frac{3}{2}$$

$$20 = 3\overline{OG}$$

$$\triangle AA \sim \triangle$$

$$m \neq NLM \cong m \neq 300$$

81.



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

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

$$8a = 1$$

$$y = \frac{1}{8}(x-2)^2 - 3$$

82.

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

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

graph, find intersection

$$x = -4.797$$

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

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

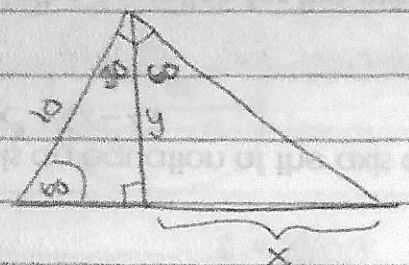
$$-1.52x = 7.3$$

$$x = -4.8$$

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

$$x-1 = 2.52x + 6.3$$

83.



$$\sin 60 = \frac{y}{10}$$

$$\tan 60 = \frac{x}{y}$$

(D)

$$y = 10 \sin 60$$

$$x = 8.66 \times 1.732$$

$$y \approx 8.66$$

$$x = 15$$

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

$$-15 + 2(10) - (-1) = 22$$

(D)

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

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

$$85. 500 \text{ yds} = 4500 \text{ ft}$$

$$4500 \times 900 =$$

$$4050000 \text{ ft}^2$$

(D)

$$300 \text{ yds} = 900 \text{ ft}$$

$$= 92,975 \text{ acres}$$

$$\frac{\$87000}{92,975} = \$933.74$$

$$86. \text{Systematic} = \text{pattern w/ little bias}$$

(A)

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

$$87. (\sin^2 \theta - \cos^2 \theta)(\sin^2 \theta + \cos^2 \theta) = \sin^2 \theta + \cos^2 \theta = 1$$

(D)

$$\sin^2 \theta - \cos^2 \theta$$

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

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

(C)

$$36 = 4\pi r^2$$

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

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

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

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

90. way #1

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

way #2

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

$$1x^3 + 9x^2 + 27x + 27 - 9x^2 - 27x$$

$$x^3 + 27$$

(A)

91. $-1 \mid 1 \quad -2 \quad 13 \quad K$

$$\begin{array}{r} \downarrow \\ 1 \end{array} \quad \begin{array}{r} -1 \\ -3 \end{array} \quad \begin{array}{r} 3 \\ 16 \end{array} \quad \begin{array}{r} -16 \\ -8 \end{array}$$

$K-16 = -8$

$$1 \mid 1 \quad -2 \quad 13 \quad 8$$

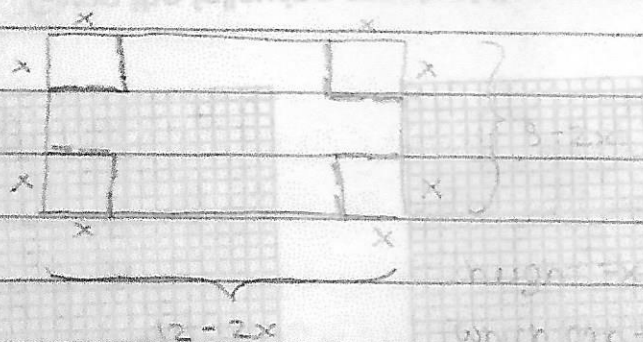
$$\begin{array}{r} \downarrow \\ 1 \end{array} \quad \begin{array}{r} -1 \\ -1 \end{array} \quad \begin{array}{r} 12 \\ 20 \end{array}$$

(D)

92. % of voters in the

(D)

93.



$V = LWH$

$V = (12-2x)(8-2x)(x)$

graph for all positive x-values

(A)

94. way #1:

graph find
 vertex

vertex: (1.25, 8.875)

way #2:

$y = 2x^2 - 5x + 12$

$y - 12 = 2x^2 - 5x$

$\frac{y-12}{2} = x^2 - 2.5x$

$\frac{y-12}{2} + 1.5625 = x^2 - 2.5x + 1.5625$

$\frac{y}{2} - 4.4375 = (x - 1.25)^2$

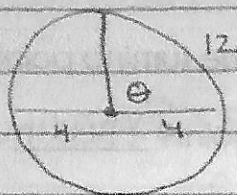
$\frac{y}{2} = (x - 1.25)^2 + 4.4375$

$y = 2(x - 1.25)^2 + 8.875$

↑
q

(B)

95.

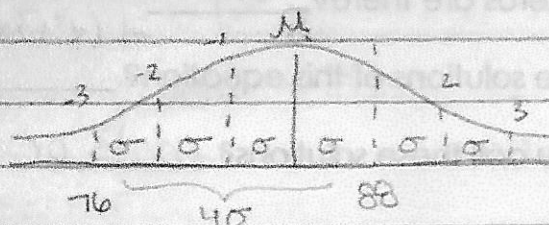
Arc length = θr

$$12 = \theta r$$

$$\theta = 3$$

(B)

96.



$$76 + 4\sigma = 88$$

$$\mu = 88 - 3$$

$$4\sigma = 12$$

$$\mu = 85$$

$$\sigma = 3$$

(D)

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

(B)

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

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

$$14x^3 + 28x^2 - 70x - 84 = 0 \quad \leftarrow \text{graph, find x-intercepts}$$

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

98.

$$\frac{2x-3}{x-1} = \frac{8x+1}{4x+5}$$

 $\leftarrow$ cross multiply!

(D)

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

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

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

$$5x = 14$$

$$x = 14/5$$

99.

$$4^2 + 2^2 = z^2$$

$$16 + 4 = z^2$$

$$20 = z^2$$

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

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

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

$$c) 4 + 2 + 2\sqrt{5} = 6 + 2\sqrt{5} \quad \leftarrow \text{irrational!}$$

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

(C)

100. Car #1

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

Car #2

$$\$2437.50 - 650 = \$1787.50 \div 3.25 = 550 \text{ tanks}$$

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

$$\begin{array}{r} 27.3 \\ - 20 \\ \hline 7.3 \end{array}$$

(B)

101. Way #1: $\frac{8}{3} = y(A)$

$$y_1 = 500(1.048)^x$$

$$y_2 = 446(1.068)^x$$

Find intersection

$$x = 6.04$$

Way #2: $\frac{8}{4} = y(S)$

plug in values (round)

and see which one is

closest to being equal

Ex: The roots of the equation $3x^2 - 27x = 0$ are

(A) 0 and -3

(B) 0 and 9

(C) 0 and -9

(D) 0 and 3

(A)

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

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

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

$$3 = 9a$$

$$a = \frac{1}{3}$$

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

103. Stat $\rightarrow$ calc $\rightarrow$ 4

$$y = 4.79x - 167.96$$

(B)

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

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

$$9.42$$

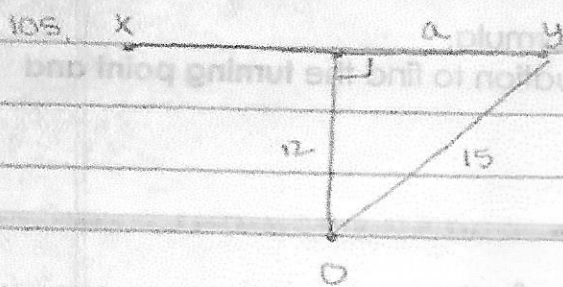
$$- 1.05$$

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

$$8.37$$

(D)

GRAPHING QUADRATIC FUNCTIONS (DAY 2)



$$a^2 + b^2 = c^2$$

$$a^2 = 81$$

$$a = 9$$

$$\text{chord} = 2(9) = 18$$

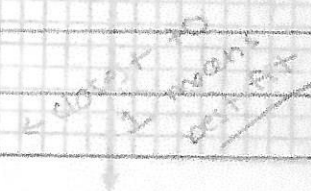
106. Best fits means use the correlation coefficient (r^2)

2nd $\rightarrow$ 0 $\rightarrow$ Diagnostic on $\rightarrow$ Enter $\rightarrow$ Enter

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

$$\text{linear: } r^2 = 0.962$$

$$\text{quad: } r^2 = 0.997$$



$$y = \text{vars} \rightarrow \text{Range} \rightarrow \text{Window} \rightarrow \text{Graph}$$

Don't forget

$$y = 18.001 = y$$

is the above graph a function? Explain.

107. way #1: $f(x) = -x^2 + 8x - 12$

$$\text{way #2: } y - 20 = -x^2 + 8x$$

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

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

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

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

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

Vertex: (4, 36)

108. y-int: initial price of the stock

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

110. $y_1 = x^2 - 5x^2 + 2x + 6$

$x = -0.856$

(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)

$x^2 + 3x - 4 \quad (x+4)(x-1) \leftarrow \text{Vertical Asymptote}$

$x = -4 \quad x = 1 \leftarrow$

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

112. vertex: $(5, -4) = \text{minimum}$

(E)