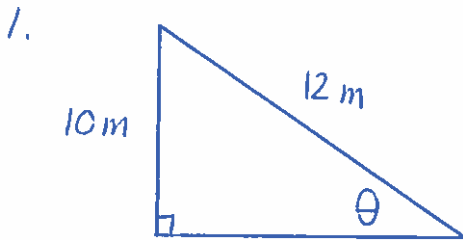


# Course End Review

## Trigonometry



$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\sin \theta = \frac{10}{12}$$

$$\sin \theta = 0.83$$

$$\theta = 56^\circ$$

$\sin^{-1}$

2. Angle B

$$\cos B = \frac{200}{225}$$

$$\cos B = 0.89$$

$$B = 27^\circ$$

Angle A

$$\sin A = \frac{200}{225}$$

$$\sin A = 0.89$$

$$A = 63^\circ$$

Side AC

$$200^2 + b^2 = 225^2$$

$$b^2 = 10625$$

$$b = 103.08$$

3. Angle M

$$\frac{\sin 42^\circ}{14.7} = \frac{\sin M}{18.6}$$

$$0.85 = \sin M$$

$$58^\circ = M$$

Angle L

$$K + M + L = 180^\circ$$

$$42^\circ + 58^\circ + L = 180^\circ$$

$$L = 80^\circ$$

Side KM

$$\frac{14.7}{\sin 42^\circ} = \frac{KM}{\sin 80^\circ}$$

$$21.6 = KM$$

4.

$$a.) \quad a^2 = 21^2 + 26^2 - 2(21)(26)\cos 37^\circ$$

$$a^2 = 244.89$$

$$a = 15.6$$

$$b.) \quad F = 180^\circ - 46^\circ - 53^\circ$$

$$F = 81^\circ$$

$$\frac{9}{\sin 81^\circ} = \frac{e}{\sin 53^\circ}$$

$$7.3 = e$$

$$5. \quad \frac{d}{\sin 40^\circ} = \frac{350}{\sin 52^\circ}$$

$$d = 285.5$$

6.

$$\cos 52^\circ = \frac{125}{x}$$

$$x = \frac{125}{\cos 52^\circ}$$

$$x = 147.4$$

$$\tan 42^\circ = \frac{172}{x}$$

$$x = \frac{172}{\tan 42^\circ}$$

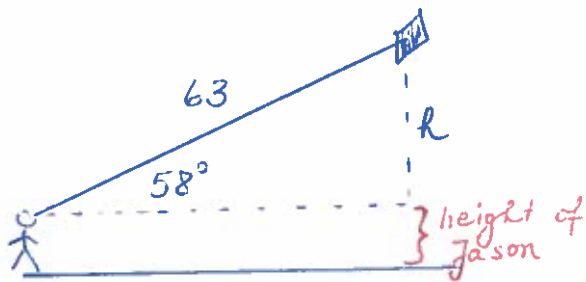
$$x = 191.03$$

$$\sin x = \frac{8}{14}$$

$$\sin x = 0.57$$

$$x = 35^\circ$$

7.



$$\sin 58^\circ = \frac{r}{63}$$

$$53.4 = r$$

$$\text{Altitude} = 53.4 + \text{height of Jason}$$

# Probability

$$8. \quad P(\text{even}) = \frac{22}{50}$$

$$P(\text{odd}) = 1 - \frac{22}{50} = \frac{28}{50} = \frac{14}{25} = 0.56 = 56\%$$

$$9. \quad \text{total} = 11$$

$$P(\text{pencil}) = \frac{4}{11} = 36\%$$

$$P(\text{marker or highlighter}) = \frac{4}{11} = 36\%$$

$$10. \quad P(\text{red ace}) = \frac{2}{52} = \frac{1}{26}$$

$$P(J) = \frac{4}{52} = \frac{1}{13}$$

$$P(2, 3, 4) = \frac{12}{52} = \frac{3}{13}$$

$$P(\text{black 6}) = \frac{2}{52}$$

$$P(\text{NOT a black 6}) = 1 - \frac{2}{52}$$

$$= \frac{50}{52}$$

$$= \frac{25}{26}$$

11. a.)  $\frac{135}{225} = \frac{x}{30}$

$x = 18$

b.)  $\frac{135}{225} = \frac{x}{2400}$

$x = 1440$

12. Total =  $25 + 77 + 30 + 68$   
 $= 200$

$P(\text{black face C.}) = \frac{30}{200} = \frac{3}{20}$

### One Variable Statistics

13. mean =  $\frac{595}{10} = 59.5$

median

37 37 41 47 55 64 71 75 81 87

$\frac{55 + 64}{2} = 59.5$

mode  $37$

range  $87 - 37 = 50$

variance } must make  
SD } a chart

	$x - \text{mean}$	$(x - \text{mean})^2$
37	$37 - 60 = -23$	529
37	-23	529
41	-19	361
47	-13	169
55	-5	25
64	4	16
71	11	121
75	15	225
81	21	441
87	27	729
	total	<u>3145</u>
	$\frac{\text{total}}{n}$	314.5

$\therefore$  variance is 314.5

$$\text{SD} = \sqrt{\text{variance}} = \sqrt{314.5} = 17.7$$

14. Slightly skewed

## Quadratics I.

15

a.)  $y = 2x^2 - 2$

b.)  $y = -0.6x^2$

c.)  $y = -(x + 10) + 1$

16.) a.) C

b.) B

c.) A

17. a.) V. Stretch

H. Translation right 3

b.) H. Translation left 4

V. Translation down 1

c.) V. Reflection

V. Compression by 0.5

V. Translation up 3

d.) V. Compression by 0.3

H. Translation right 2

V. Translation down 1

18.	vertex	opening	max/min
a.)	(2, 5)	up	min
b.)	(-2, -3)	down	max
c.)	(3, 0)	down	max
d.)	(0, -3)	up	min

- 19.
- a.) C
  - b.) B
  - c.) A

20.  $h = -5.25(t-4)^2 + 96$

vertex (4, 96)

↑

takes 4s to reach max height

the max height is 96 m

height of small hill → y-int ∴ t=0

$$y = -5.25(0-4)^2 + 96$$

$$= 12$$

∴ 12 m

6 seconds t=6

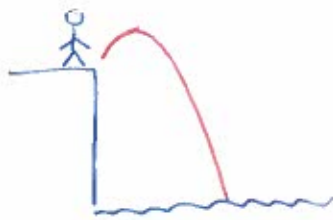
$$y = -5.25(6-4)^2 + 96$$

$$= 75$$

∴ 75 m



21.



a.)  $t = 0$

$$h = -4.9(0)^2 + 45$$

$$= 45$$

 $\therefore 45 \text{ m}$ 

b.)  $t = 2$

$$h = -4.9(2)^2 + 45$$

$$= 25.4$$

 $\therefore$  height of stone is  $25.4 \text{ m}$ Quadratics II

22. a.)  $(x+6)(x-2)$

$$= x^2 - 2x + 6x - 12$$

$$= x^2 + 4x - 12$$

c.)  $(3x+4)(2x-1)$

$$= 6x^2 - 3x + 8x - 4$$

$$= 6x^2 + 5x - 4$$

b.)  $(x+6)(x-6)$

$$= x^2 - 6x + 6x - 36$$

$$= x^2 - 36$$

d.)  $(5x+2)^2$

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

$$= 25x^2 + 10x + 10x + 4$$

$$= 25x^2 + 20x + 4$$

23.

$$\begin{aligned} \text{a.) } & x^2 + 12x + 27 \\ & = (x + 3)(x + 9) \end{aligned}$$

$$\begin{aligned} \text{b.) } & x^2 + 2x - 48 \\ & = (x - 6)(x + 8) \end{aligned}$$

$$\begin{aligned} \text{c.) } & x^2 - 11x + 28 \\ & = (x - 7)(x - 4) \end{aligned}$$

$$\begin{aligned} \text{d.) } & x^2 - 169 \\ & = (x - 13)(x + 13) \end{aligned}$$

$$\begin{aligned} \text{e.) } & 4x^2 - 49 \\ & = (2x + 7)(2x - 7) \end{aligned}$$

$$\begin{aligned} \text{f.) } & 2x^2 + 4x - 48 \\ & = 2(x^2 + 2x - 24) \\ & = 2(x + 6)(x - 4) \end{aligned}$$

$$\begin{aligned} \text{g.) } & 3x^2 - 18x - 21 \\ & = 3(x^2 - 6x - 7) \\ & = 3(x - 7)(x + 1) \end{aligned}$$

$$\begin{aligned} \text{h.) } & -4x^2 - 20x + 96 \\ & = -4(x^2 + 5x - 24) \\ & = -4(x + 8)(x - 3) \end{aligned}$$

$$\begin{aligned} 24. \quad a.) \quad y &= 3(x-6)^2 + 4 \\ &= 3(x-6)(x-6) + 4 \\ &= 3(x^2 - 6x - 6x + 36) + 4 \\ &= 3(x^2 - 12x + 36) + 4 \\ &= 3x^2 - 36x + 108 + 4 \\ &= 3x^2 - 36x + 112 \end{aligned}$$

$$\begin{aligned} b.) \quad y &= -(x+10)^2 - 3 \\ &= -(x+10)(x+10) - 3 \\ &= -(x^2 + 10x + 10x + 100) - 3 \\ &= -(x^2 + 20x + 100) - 3 \\ &= -x^2 - 20x - 100 - 3 \\ &= -x^2 - 20x - 103 \end{aligned}$$

$$\begin{aligned} c.) \quad y &= (2x-3)(5x+1) \\ &= 10x^2 + 2x - 15x - 3 \\ &= 10x^2 - 13x - 3 \end{aligned}$$

$$\begin{aligned} d.) \quad y &= 3(x+2)(x-4) \\ &= 3(x^2 - 4x + 2x - 8) \\ &= 3(x^2 - 2x - 8) \\ &= 3x^2 - 6x - 24 \end{aligned}$$

25 a,  $y = 3(x - \underline{6})^2 + \underline{4}$  vertex  $(6, 4)$

y-int  $\Rightarrow x = 0$

$$\begin{aligned} y &= 3(0 - 6)^2 + 4 \\ &= 3(6)^2 + 4 \\ &= 3(36) + 4 \\ &= 112 \end{aligned}$$

y-int is 112

from #24 a  $y = 3x^2 - 36x + 112$

b.,  $y = -(x + 10)^2 - 3$  vertex  $(-10, -3)$   
y-int (from 24b) is  $-103$

c.)  $y = (2x - 3)(5x + 1)$

zeros  $2x - 3 = 0$

$$\begin{aligned} 2x &= 3 \\ x &= \frac{3}{2} \end{aligned}$$

$5x + 1 = 0$

$$\begin{aligned} 5x &= -1 \\ x &= -\frac{1}{5} \end{aligned}$$

y-int  
 $-3$

$$\underline{\text{vertex}} = \frac{s+t}{2} = \frac{\frac{3}{2} + (-\frac{1}{5})}{2} = \frac{13}{20}$$

$$y = \left(2\left(\frac{13}{20}\right) - 3\right)\left(5\left(\frac{13}{20}\right) + 1\right) = \frac{-289}{40}$$

$$\therefore \text{vertex} \left(\frac{13}{20}, \frac{-289}{40}\right)$$

$$\begin{aligned} 26. \quad a.) \quad y &= (x-8)^2 - 16 \\ &= (x-8)(x-8) - 16 \\ &= x^2 - 8x - 8x + 64 - 16 \\ &= x^2 - 16x + 48 \\ &= (x-4)(x-12) \end{aligned}$$

$$\begin{aligned} b.) \quad y &= 2(x-4)^2 - 8 \\ &= 2(x^2 - 4x - 4x + 16) - 8 \\ &= 2x^2 - 16x + 32 - 8 \\ &= 2x^2 - 16x + 24 \\ &= 2(x^2 - 8x + 12) \\ &= 2(x-6)(x-2) \end{aligned}$$

$$\begin{aligned} c.) \quad y &= -3(x+3)^2 + 12 \\ &= -3(x^2 + 6x + 9) + 12 \\ &= -3x^2 - 18x - 27 + 12 \\ &= -3x^2 - 18x - 15 \\ &= -3(x^2 + 6x + 5) \\ &= -3(x+1)(x+5) \end{aligned}$$

27. a.) vertex (vertex form)  $(8, -16)$   
y-int (standard form) 48  
zeros (factored form) 4, 12

b.) vertex  $(4, -8)$   
y-int 24  
zeros 6, 2

c.) vertex  $(-3, 12)$   
y-int -15  
zeros -1, -5

28. y-int  $x = 0$   
 $y = 2(0)^2 + 6(0) + 7$   
 $y = 7$

## Exponents

$$29. \quad a.) \quad 5^{-3} = \frac{1}{5^3} = \frac{1}{125} = 0.008$$

$$b.) \quad 1.5^4 = 5.0625$$

$$c.) \quad 10500^0 = 1$$

$$d.) \quad -2^4 = -16$$

$$e.) \quad \frac{1}{3^2} = 3^2 = 9$$

$$f.) \quad (-2)^4 = +16$$

$$30. \quad a.) \quad 2^3(2) = 2^4 = 16$$

$$b.) \quad 6^7(6^{-3}) = 6^4 = 1296$$

$$c.) \quad 7^8 \div 7^5 = 7^3 = 343$$

$$d.) \quad 4^3 \div 4^6 = 4^{-3} = 0.015625$$

$$e.) \quad (3^2)^3 = 3^6 = 729$$

$$f.) \quad (2^4)^{-3} = 2^{-12} = 0.000244$$

$$30., \text{ g. } 9^{-2} \div 9^{-4} = 9^2 = 81$$

$$\text{h.}, \quad 6^9 (6^{-13})(6) \div 6^{-5} = 6^2 = 36$$

$$\text{i.}, \quad 5^7 (5^{-2})(5^{-5}) = 7^0 = 1$$

$$\text{j.}, \quad \left(\frac{3}{2}\right)^2 \left(\frac{3}{2}\right)^{-4} = \left(\frac{3}{2}\right)^{-2} = \left(\frac{2}{3}\right)^2 = \frac{4}{9} = 0.44$$

$$\text{k.}, \quad \frac{4^{-4} (4^2)}{4^3} = 4^{-5} = \frac{1}{4^5} \doteq 0.000977$$

$$\text{l.}, \quad ((-3)^2)^0 = 1$$

31. Use your TI-Nspire to graph

32. Use your TI-Nspire to check your graph



$$33.) \quad A = 20000 (2)^{\frac{2}{50}}$$

$$= 20562.28 \quad \therefore 20562$$

$$34.) \quad a.) \quad M = 500 \left(\frac{1}{2}\right)^{\frac{t}{4}} \quad \therefore 500 \text{ mg}$$

$$b.) \quad M = 500 \left(\frac{1}{2}\right)^{\frac{8}{4}}$$

$$= 125 \quad \therefore 125 \text{ mg}$$

$$35.) \quad a.) \quad 3^5 (3^7) = 3^{12}$$

$$b.) \quad (5^3)^{10} = 5^{30}$$

$$c.) \quad \frac{7^3 (7)}{7^7} = 7^{-3} = \frac{1}{7^3}$$

$$d.) \quad 6^8 \div 6^6 + 2^2 (2^3) = 6^2 + 2^5$$

$$= 36 + 32$$

$$= 68$$

$$e.) \quad 5^7 (5^{-2})(5^{-5}) = 5^0 = 1$$

$$35. f.) \frac{2^7 (2^{-3})}{2^2} = 2^2 = 4$$

$$g.) \frac{3}{2^{-4}} = 3(2^4) = 48$$

$$h.) \frac{3^{-2}}{3^{-4}} = 3^2 = 9$$

$$i.) 8^{-6} \div 8^{-7} = 8^1 = 8$$

$$36. y = 3^x \quad \begin{array}{c} \text{1} \\ | \\ \text{---} \end{array} \quad y\text{-int} = 1$$

$$y = 5(3^x) \quad \begin{array}{c} \text{---} \\ | \\ \text{---} \end{array} \quad y\text{-int} = 5$$

$$37.) a.) t = 0 \quad V = 84\,000 (1.2)^0 \\ = 84\,000$$

$$b.) t = 40 \quad V = 84\,000 (1.2)^{40} \\ = 12\,346\,081.7$$

$$\begin{aligned}
 38. \quad PV &= A (1+i)^{-n} \\
 &= 1000 \left(1 + \frac{0.06}{4}\right)^{-4 \times 2} \\
 &= 887.71
 \end{aligned}$$

$$1000 - 887.71 = 112.29$$

∴ original loan was \$887.71  
interest payment is \$112.29

$$\begin{aligned}
 39. \quad a., \quad I &= P \cdot r \cdot t \\
 I &= 2100 (0.02)(3) \\
 &= 126
 \end{aligned}$$

$$\begin{aligned}
 \text{Total} &= P + I \\
 &= 2100 + 126 \\
 &= 2226
 \end{aligned}$$

$$\begin{aligned}
 b., \quad I &= 650 (0.035)(10) \\
 &= 227.50
 \end{aligned}$$

↶ 2 decimal places for money

$$\begin{aligned}
 \text{Total} &= 650 + 227.5 \\
 &= 877.50
 \end{aligned}$$

$$\begin{aligned}
 40. \quad a., \quad A &= P(1+i)^n \\
 &= 875 \left(1 + \frac{0.05}{4}\right)^{6 \times 4} \\
 &= 1178.9
 \end{aligned}$$

$$\begin{aligned}
 b., \quad A &= P(1+i)^n \\
 &= 2600 \left(1 + \frac{0.12}{12}\right)^{8 \times 12} \\
 &= 6758.11
 \end{aligned}$$

$$\begin{aligned}
 41. \quad \underline{\text{Plan A}} \quad I &= Prt \\
 &= 3000(0.065)(6) \\
 &= 1170
 \end{aligned}$$

$$\begin{aligned}
 \text{Total} &= 3000 + 1170 \\
 &= 4170
 \end{aligned}$$

$$\begin{aligned}
 \underline{\text{Plan B}} \quad A &= P(1+i)^n \\
 &= 3000 \left(1 + \frac{0.065}{2}\right)^{6 \times 2} \\
 &= 4403.54
 \end{aligned}$$

∴ Plan B

Compounding will always be better because you get interest on the interest and the principal.

$$\begin{aligned} 42. \quad PV &= A (1+i)^{-n} \\ &= 7549.73 \left(1 + \frac{0.04}{4}\right)^{-3 \times 4} \\ &= 6700.00 \end{aligned}$$

$$\begin{aligned} 43. \quad 10 \text{ transactions} &\rightarrow \$12 \\ 11 \text{ transactions} &\rightarrow 11(1.25) = 13.75 \\ \underline{\text{total}} &\quad \$25.75 \end{aligned}$$

$$\begin{aligned} 44. \quad PV &= A (1+i)^{-n} \\ &= 25000 \left(1 + \frac{0.06}{2}\right)^{-10 \times 2} \\ &= 13841.89 \end{aligned}$$

45. Same as 42.

$$46. A = P(1+i)^n$$

$$5000 = 3000 \left(1 + \frac{0.042}{2}\right)^{2 \times \text{years}}$$

simplify

$$5000 = 3000 (1.021)^{2y}$$

$$1.66 = 1.021^{2y}$$

Guess and Check

$$1.66 = 1.021^{24.6}$$

$$\therefore 2y = 24.6$$

$$y = 12.3$$

$\therefore$  a little over 12 years.

$$47. A = P(1+i)^n$$

$$5000 = 4000 \left(1 + \frac{i}{12}\right)^{5 \times 12}$$

$$1.25 = \left(1 + \frac{i}{12}\right)^{60}$$

$$\sqrt[60]{1.25} = \sqrt[60]{\left(1 + \frac{i}{12}\right)^{60}}$$

$$1.0037 = 1 + \frac{i}{12}$$

$$0.0037 = \frac{i}{12}$$

$$0.045 = i$$

$$\therefore 4.5\%$$

48.

$$\frac{45 \text{ L}}{x \text{ km}} = \frac{2.7 \text{ L}}{100 \text{ km}}$$

cross multiply

$$45(100) = 2.7x$$

$$4500 = 2.7x$$

$$1666.66 = x$$

$$\therefore 1666 \text{ km}$$

$$\frac{x \text{ L}}{750 \text{ km}} = \frac{2.7 \text{ L}}{100 \text{ km}}$$

$$100x = 2025$$

$$x = 20.25$$

$$\therefore 20.25 \text{ L}$$

49.

Vertex  $(5, -8)$

Another point  $(3, 0)$

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

$$0 = a(3-5)^2 - 8$$

$$0 = a(-2)^2 - 8$$

$$8 = a(4)$$

$$2 = a$$

$$\therefore y = 2(x-5)^2 - 8$$