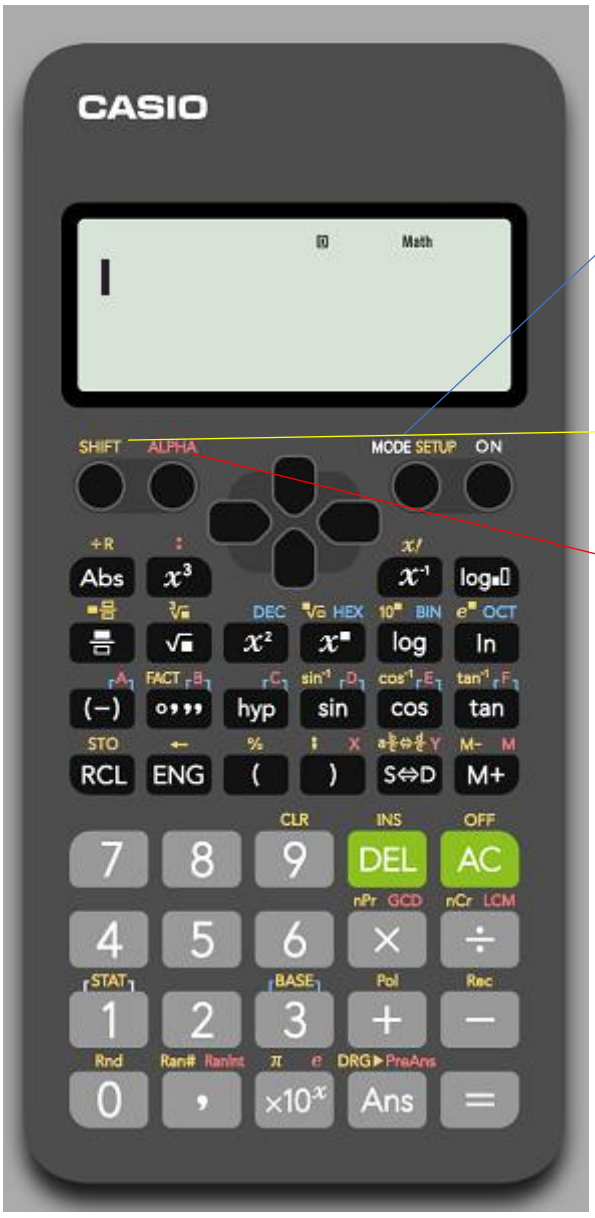
FX 82 ZA+ II Grade 10- 12 Workbook

By Lauren Izaaks



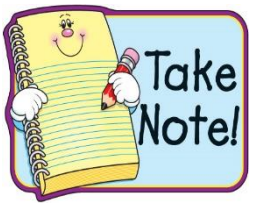
MODE

SHIFT

Selects second options

ALPHA

Selects variables or third options



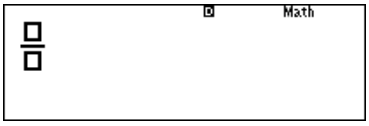
There is a difference between OFF AC and ON

Important Tips and Tricks 😊

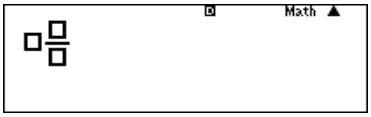
Resetting/ Clearing the Calculator	Rounding Off
[SHIFT] [9] Clear? 1:Setup 2:Memory 3:All [3] Reset All? [=] :Yes [AC] :Cancel [=] Reset All Press [AC] key	We are able to set our calculator to round off to a set number of decimal places. Eg: $\frac{2}{3} =$ _____ (Round to 2 decimal places) [SHIFT] [MODE] 1:MthIO 2:LineIO 3:Deg 4:Rad 5:Gra 6:Fix 7:Sci 8:Norm Choose Option [6] Fix 0~9? Choose how many decimal places you want the answer to be rounded off to. We want 2 decimal places so Press [2] Press [S⇔D] FIX Math $\frac{2}{3}$ 0,67 Note the word FIX on the top of your screen. From now on every answer will be rounded to 2 decimal places. Go back to Norm Mode 2 to return back to normal. [SHIFT] [MODE] 1:MthIO 2:LineIO 3:Deg 4:Rad 5:Gra 6:Fix 7:Sci 8:Norm [8]: Norm Norm 1~2? Select Option 2 for Maths

Let's look at some of the basics:

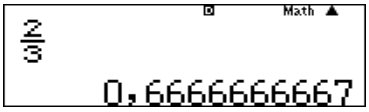
Fraction Button



Mixed Fraction SHIFT



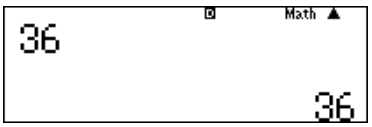
Decimal Button



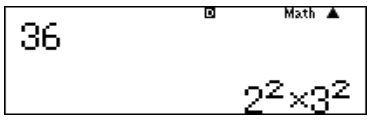
Prime Factors/ Exponential Format:

Calculate the prime factors of 36. _____

3 6 =



SHIFT



Time Calculations:

Rule 1: Always work in Hours, Minutes and Seconds!

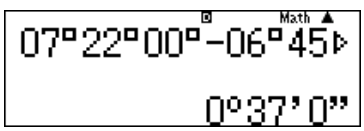
Rule 2: Always remember to push the Time Button after every Hour, Minute and Second!

Adding/ Subtracting Time:

Eg 1) Your train departs Pinetown at 06:45am, it arrives at Durban Station at 07:22am. You then have to walk for 17 minutes to get to school. How long did it take you to get to school altogether?

Step 1: Calculate how long the train ride was.

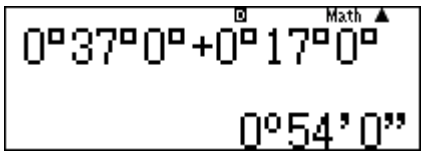
0 7 ° ' ' ' 2 2 ° ' ' ' 0 0 ° ' ' ' − 0 6 ° ' ' ' 4 5 ° ' ' ' 0 0 ° ' ' ' =



Step 2: Add 17 minutes to this answer.

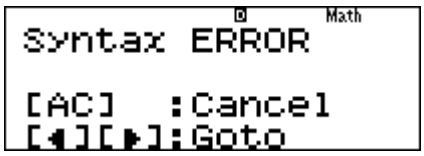
NB: If there are no hours a zero must be put into the calculator!!

0 ,,, 3 7 ,,, 0 ,,, + 0 ,,, 1 7 ,,, 0 ,,, =



Therefore it took you 54 minutes altogether.

Syntax Error… Now What???



Use your left or right arrows!

Converting fractions/ decimals into time:

Eg 2) Which is longer $\frac{3}{5}$ or 0.45 hours?

Step 1: Convert $\frac{3}{5}$ ▤ 3 ▼ 5 = ,,,

It is 36 minutes

Step 2: Convert 0.45 Hours 0 , 4 5 = ,,,

It is 27 minutes

Therefore $\frac{3}{5}$ is longer.

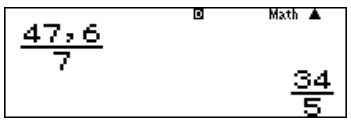
Rate:

Eg 3) If I run a race at an average pace of 7km/h across a distance of 47.6km. How long will it take me to complete the race?

Step 1: $Time = \frac{\text{Distance}}{\text{Speed}}$

Distance is 47.6km and speed is 7km/h.

▤ 4 7 , 6 ▼ 7 =



Step 2: Convert this into a time by pressing ,,,

It takes 6 Hours and 48 minutes to run the race.

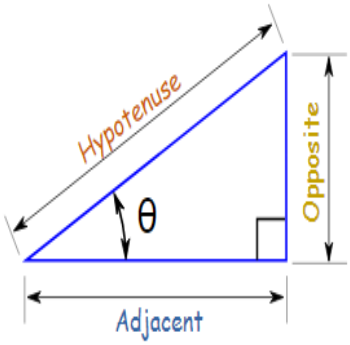
Trigonometry:

Let's start with the basics :

$\sin\theta = \frac{\text{Opposite}}{\text{Hypotenuse}}$

$\cos\theta = \frac{\text{Adjacent}}{\text{Hypotenuse}}$

$\tan\theta = \frac{\text{Opposite}}{\text{Adjacent}}$

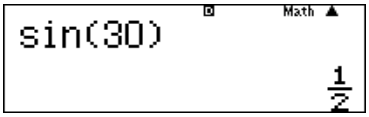


	0°	30°	45°	60°	90°
$\sin\theta$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$\cos\theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
$\tan\theta$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	$\pm\infty$

How to find a trig ratio when given an angle:

Eg 1: Sin30

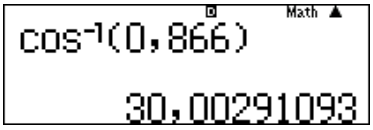
[sin] [3] [0] [)] [=]



How to find angles when given a trig ratio:

Eg 2: CosΘ=0.866

[SHIFT] [cos] [0] [,] [8] [6] [6] [)] [=]



What happens when we do this Tan90?

[tan] [9] [0] [)] [=]

Why? _____

Now try this:

If A=37 and Tan B=1/2 (B is an Acute Angle). Write answers correct to 1 decimal place.

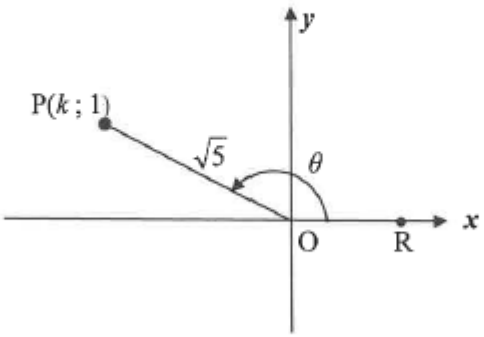
a) SinA _____
b) CosA _____
c) B _____

Did you know that $\text{Cos}^2 30$ is the same as $\text{Cos}(30)^2$

Grade 11 and 12's let's look at an exam question

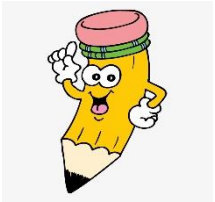
QUESTION 5

5.1 In the diagram, P(k ; 1) is a point in the 2nd quadrant and is $\sqrt{5}$ units from the origin. R is a point on the positive x-axis and obtuse $\hat{ROP} = \theta$.



5.1.1 Calculate the value of k. (2)

5.1.3 **Use a calculator** to calculate the value of $\tan(2\theta - 40°)$ correct to ONE decimal place. (3)



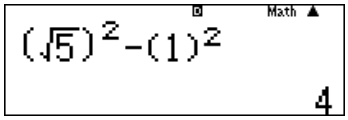
If the question says without the use of a calculator remember that you may use a calculator to check your answers!

5.1.1) To work out k, we will make use of pythagoras.

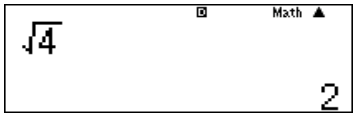
$k^2 = (\sqrt{5})^2 - (1)^2$

Follow the key sequence:

[(] [√■] [5] [▶] [)] [x^2] [−] [(] [1] [)] [x^2] [=]



[√■] [4] [=]

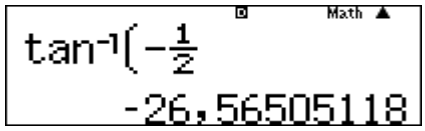


But k= -2 (on the negative x axis)

5.1.3) $\tan(2\theta - 40°)$

Calculate tanθ first

Follow the key sequence: SHIFT tan (−) (-) 1 ▼ 2 ▶) =



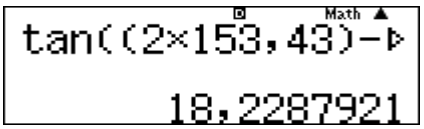
Therefore tanθ = 26.57°

θ= 180°-26.57°

θ= 153.43°

$\tan(2\theta - 40°) =$

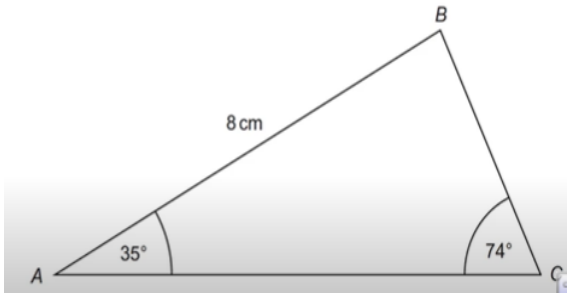
tan (2 × 1 5 3 • 4 3) − 4 0) =



Therefore =18.2

Using Ratio Mode to find the lengths of a side using the Sine Rule:

Find the length of side BC.

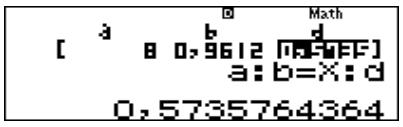


Step 1: Change into Ratio Mode MODE 5

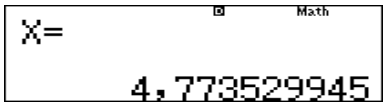
Step 2: Choose where our unknown is. Select Option 1

Step 3: Enter in the values 8 = sin 7 4) = sin 3 5) =

Notice how the sin values are automatically calculated.



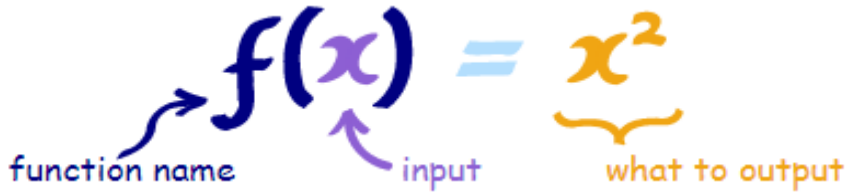
Step 4: Press =



The length of BC is 4.77cm.

Functions:

What is a function?



When can I use Tables mode on the calculator? _____

_____

Let's start with something very basic to get used to Tables Mode.

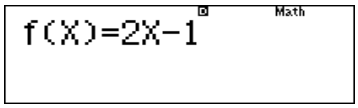
Eg 1) Complete the following table:

F(x)=2x-1

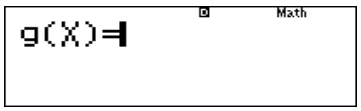
X	-3	-2	-1	0	1	2	3
F(x)							

Step 1: Go into Tables Mode MODE 3

Step 2: Enter in the function given. 2 ALPHA) − 1



Step 3: Press =



What is a g(x)? _____

Step 4: Press =

Step 5: Refer back to the table and choose the start.

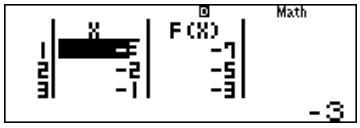
Enter in − 3 Press =

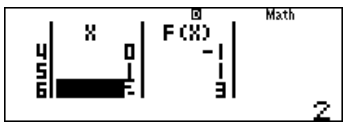
Step 6: Refer back to the table and choose the end.

Enter in 3 Press =

Step 7: Refer back to the table and choose the step.

Enter in 1 Press =





You now have the ordered pairs/ co- ordinates and can complete the table.

What is a start?

This is the point you would like to start at.

Use the lowest x- value as our starting point.

What is an end?

The point that you would like to end at.

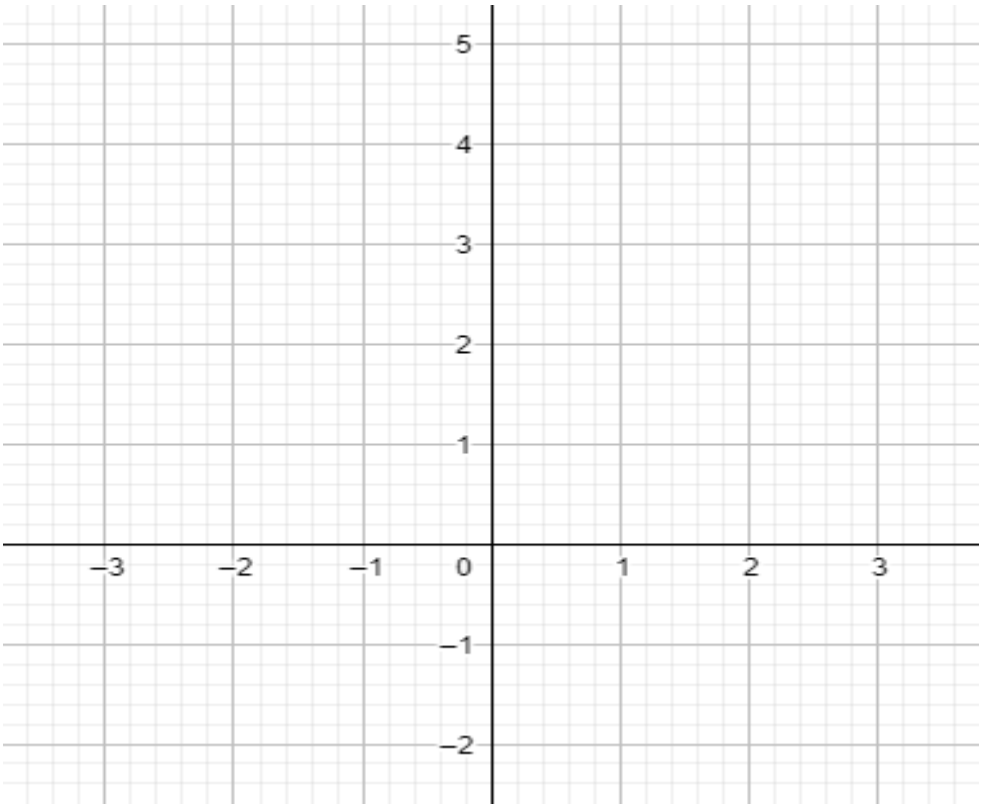
Use the highest x- value as our end point.

What is a step?

A step is the intervals you want to go up in.

Eg 2: Draw the following graphs on the same set of axes. Use the grid provided.

$F(x)= -x^2+4$ and $G(x)= x+4$



Follow the same steps as above.

Step 1: Go into Tables Mode [MODE] [3]

Step 2: Enter the function [−] [ALPHA] [)] [x^2] [+] [4] Press [=]

Step 3: Enter in the g(x). [ALPHA] [)] [+] [4] Press [=]

Step 4: Where are we starting? _____? Use the X- axis to help you.

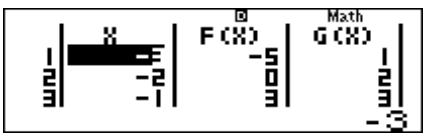
Press [=]

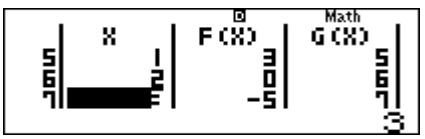
Step 5: Where are we ending? _____? Use the X- axis to help you.

Press [=]

Step 6: What is the step? _____? Use the X- axis to help you.

Press [=]



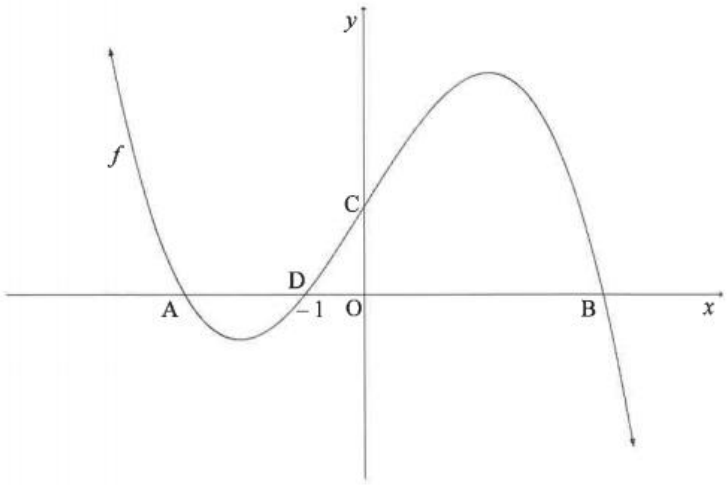


Without looking at the graphs drawn what can we find by using the table?

Apply this to an exam question now:

QUESTION 8

The graph of $f(x) = -x^3 + 13x + 12$ is sketched below.
A, B and D(–1 ; 0) are the x-intercepts of f.
C is the y-intercept of f.

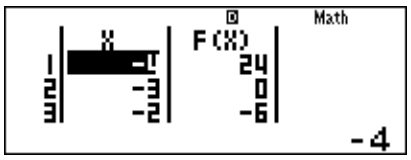


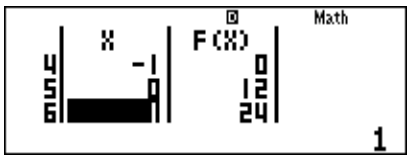
8.1 Write down the coordinates of C. (1)

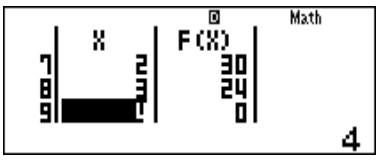
8.2 Calculate the coordinates of A and B. (5)

Is this how you feel when you look at this question?

Key Log	Screen Capture
(–) ALPHA) x^3 + 1 3 ALPHA) + 1 2 then =	f(X)=−X³+13X+12
We do not have a g(x) so we do not need to enter anything in here. Just press =	g(X)=
No start point is given so you can choose where you would like to start	Start? -4
No end point is given so you can choose where you would like to end	End? 4
Try where you can to step in whole numbers.	Step? 1







How does this help us?

Look for where x=0 to find the y- intercept.

Look for where y=0 to find the x- intercept.

8.1) Co- ordinates of C (0;12)

8.2) Co- ordinates of A (-3;0) and B (4;0)

Remember that no working means no marks. Use the calculator to check answers.

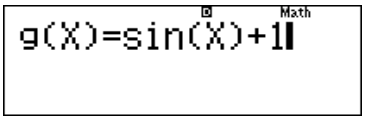
Eg 3: Draw the graphs of F(x)= sinx and G(x)= sinx+1 (0≤x≤360)

Again we follow what we have done.

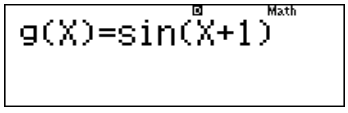
Step 1: Go into Tables Mode [MODE] [3]

Step 2: Enter in the function given. [sin] [ALPHA] [)] [)] Press [=]

Step 3: Enter in the g(x). [sin] [ALPHA] [)] [)] [+] [1] Press [=]



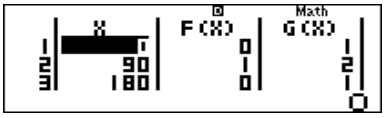
Take note of how it is put in.

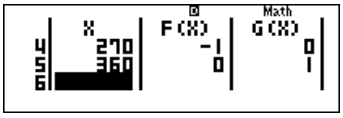


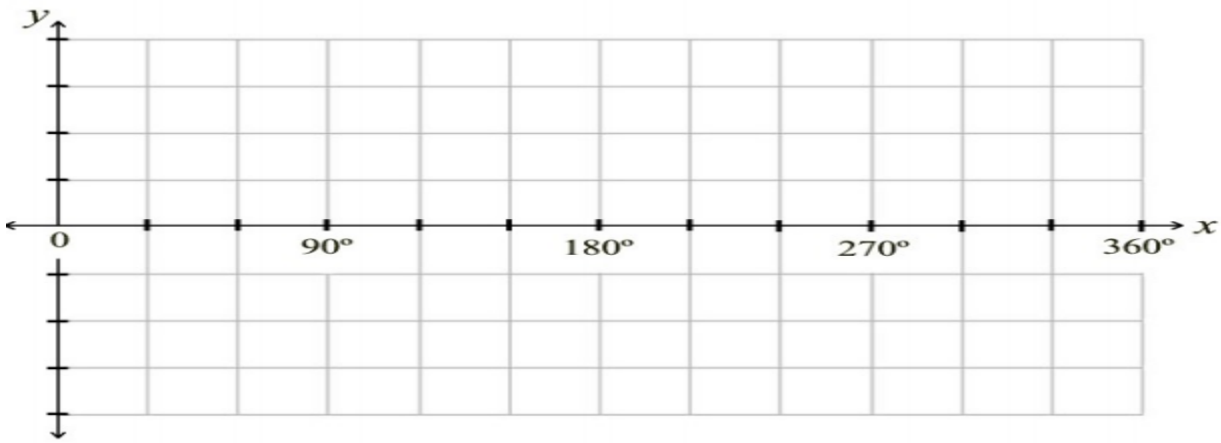
Step 4: Enter in the Start [0] Press [=]

Step 5: Enter in the End [3] [6] [0] Press [=]

Step 6: Enter in the Step [9] [0] Press [=]





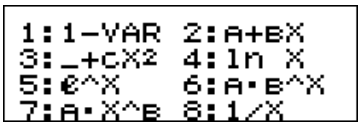


Statistics:

Data Handling:

QGHS hosts a 3km fun run event. The following list shows the time (in minutes) it took the top 10 runners to complete the race. 18, 21, 17, 21, 19, 20, 18, 20, 22, 19.

Step 1: Go into Stats Mode [MODE] [2]



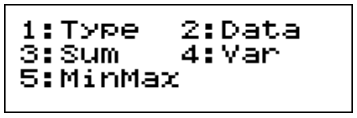
Step 2: Select [1]

Step 3: Enter the data

[1] [8] [=] [2] [1] [=] [1] [7] [=] [2] [1] [=] [1] [9] [=] [2] [0] [=] [1] [8] [=]

[2] [0] [=] [2] [2] [=] [1] [9] [=] Always check the data is correct!

Step 4: [AC] [SHIFT] [1]

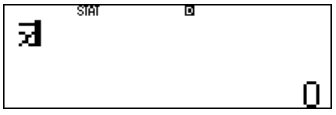


Key	Menu Item	Explanation
1. Type	Stats Menu	Changes stats type
2. Data		Displays the data that you input
3. Sum	1. Σx^2 2. Σx	1. Sum of the squares 2. Sum/ Total of data
4. Var	1. n 2. $\bar{x}$ 3. δx 4. $s x$	Number of samples Mean Population standard deviation Sample standard deviation
5. MinMax	1. Min 2. Max	1. Indicates the minimum value 2. Indicates the maximum value

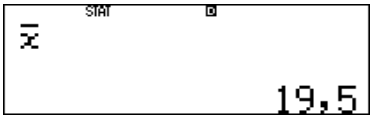
Answer the following questions:

A) Calculate the average time it took a runner to complete the race.

Go into [4]: Var and Select Option [2]: Mean



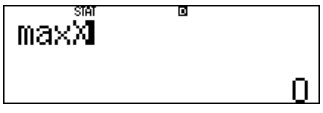
Press [=]



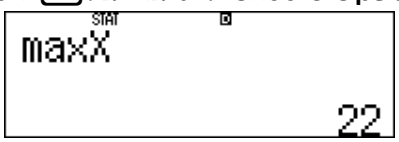
B) What is the slowest time it took a runner in the Top 10 to complete the race?

Go back into the Stats Menu [AC] [SHIFT] [1]

Choose Option [5]: MinMax. Choose Option [2]: Max



Press [=]



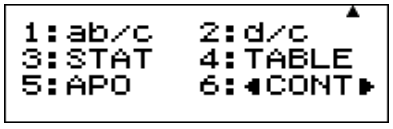
Grouped Data with a Frequency Table:

The following grouped frequency table shows the Maths marks (given as a percentage) of Grade 11 learners from Mobi High.

Percentages (t)	Frequency (No of Learners)
$10 \leq t < 20$	2
$20 \leq t < 30$	4
$30 \leq t < 40$	4
$40 \leq t < 50$	7
$50 \leq t < 60$	11
$60 \leq t < 70$	10
$70 \leq t < 80$	7
$80 \leq t < 90$	5

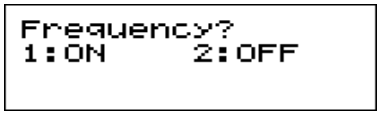
Step 1: Turn on a Frequency Table

Follow the Key Sequence [SHIFT] [MODE] ▼



Select Option [3]: Stat

Select Option [1]: On



Step 2: Calculate the midpoints of each of the grouped data as this is what we will enter into the calculator. $\frac{10+20}{2}$ = 15 etc...

Step 3: Enter in the Midpoints

[1] [5] [=] [2] [5] [=] [3] [5] [=] [4] [5] [=] [5] [5] [=] [6] [5] [=] [7] [5] [=] [8] [5] [=]

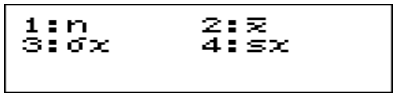
Followed by the Frequency

[2] [=] [4] [=] [4] [=] [7] [=] [1] [1] [=] [1] [0] [=] [7] [=] [5] [=]

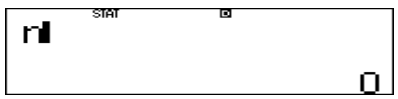
Step 4: [AC] [SHIFT] [1]

Eg 1: How many learners wrote the maths test?

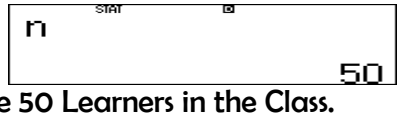
Go into Option [4]: Var



Select Option [1]: n



Press [=]



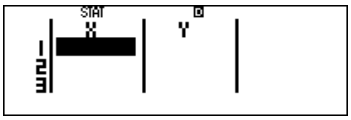
n= 50 Therefore there were 50 Learners in the Class.

For Grade 12 Only

Linear Regression:

Linear regression is used to determine if there is a linear relationship between different variables.

Step 1: Set your calculator to calculate bi- variate data [MODE] [2] [2]



QUESTION 1

The table below shows the monthly income (in rands) of 6 different people and the amount (in rands) that each person spends on the monthly repayment of a motor vehicle.

MONTHLY INCOME (IN RANDS)	9 000	13 500	15 000	16 500	17 000	20 000
MONTHLY REPAYMENT (IN RANDS)	2 000	3 000	3 500	5 200	5 500	6 000

1.1 Determine the equation of the least squares regression line for the data. (3)

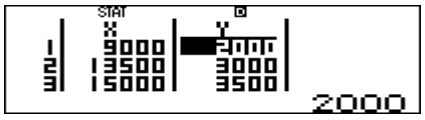
1.2 If a person earns R14 000 per month, predict the monthly repayment that the person could make towards a motor vehicle. (2)

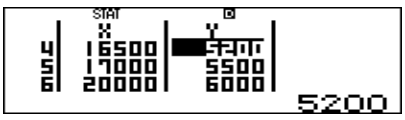
1.3 Determine the correlation coefficient between the monthly income and the monthly repayment of a motor vehicle. (1)

Step 2: Enter in the data. Do the X- Values first and then the Y- Values.

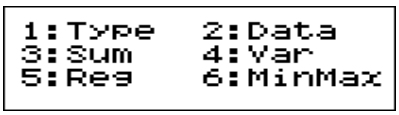
[9] [0] [0] [0] [=] [1] [3] [5] [0] [0] [=] [1] [5] [0] [0] [0] [=] [1] [6] [5] [0] [0] [=] [1] [7] [0] [0] [0] [=] [2] [0] [0] [0] [0] [=] [▼] [▶]

[2] [0] [0] [=] [3] [0] [0] [0] [=] [3] [5] [0] [0] [=] [5] [2] [0] [0] [=] [5] [5] [0] [0] [=] [6] [0] [0] [0] [=]

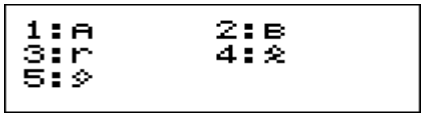




Step 3: Go into the Stats Menu [AC] [SHIFT] [1]



Select Option [5]: Reg



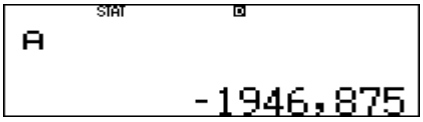
Menu Item	Explanation
1. A	Regression co- efficient of A
2. B	Regression co- efficient of B
3. R	Correlation co- efficient
4. $\hat{x}$	Estimated value of x
5. $\hat{Y}$	Estimated value of y

Now you can answer the questions:

1.1) Least squares regression line is y= A + Bx

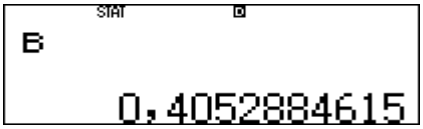
We need to find A and B

[1] [=]



[AC] [SHIFT] [1] followed by [5]

[2] [=]



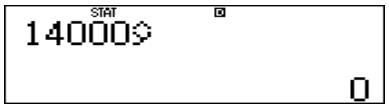
Therefore y= - 1946.875 + 0.41x

[AC] [SHIFT] [1] followed by [5]

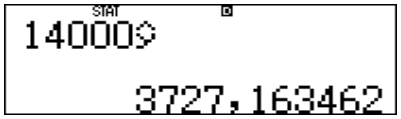
1.2) Interpolation (inside the data set)

We have been given the estimated x- value of R14 000. We need to find the estimated value of y.

[5] [◀] [1] [4] [0] [0] [0]



[=]

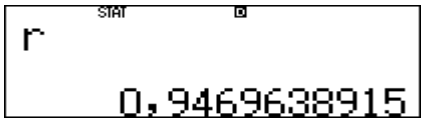


The monthly repayment would be R 3 727.16.

[AC] [SHIFT] [1] followed by [5]

1.3) Correlation Co- efficient (r)

[3] [=]



Therefore r = 0.946/ 0.95

What is a correlation Co- efficient?

r tells us the strength of the relationship between x and y. (Strong/ Weak Correlation)

$-1 \leq r \leq 1$

The closer r is to 1 or -1 the stronger the correlation

The closer r is to Zero the weaker the correlation

r = 0 means there is No correlation

It also tells us the direction the graph will go in (Positive/ Negative)