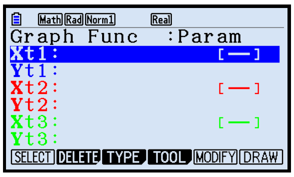
CHAPTER 1 - GRAPHING PARAMETRIC EQUATIONS

Casio fx-CG50

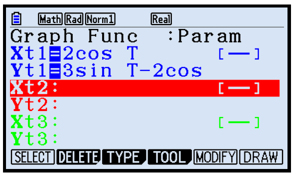
Use technology to plot $\{(x, y) \mid x = 2\cos t,\ \ y = 3\sin t - 2\cos t,\ \ 0 \leqslant t \leqslant 2\pi\}$.

Select **Graph** from the Main Menu, and press F3 (**TYPE**), F3 (**Param**).



Enter $2\cos t$ into **Xt1**, and $3\sin t - 2\cos t$ into **Yt1**.

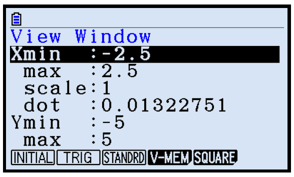
Note: t is entered by pressing **X, θ, T**.



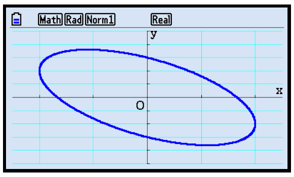
Press SHIFT F3 (**V-WIN**) to adjust the size of the viewing window.

We set **Xmin** $= -2.5$, **Xmax** $= 2.5$, **Ymin** $= -5$, and **Ymax** $= 5$.

Make sure that **T*θ*min** $= 0$, and **T*θ*max** $= 2\pi$.



Press EXIT to return, and press F6 (**DRAW**) to plot the graph.

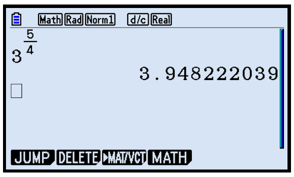


CHAPTER 2 - CALCULATING RATIONAL EXPONENTS

Casio fx-CG50

Exponents are calculated using ∧.

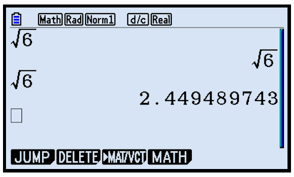
To find $3^{\frac{5}{4}}$, enter 3 ∧ 5 [fraction] 4 EXE.



Square roots are calculated by pressing SHIFT x^2 ($\sqrt{\ }$).

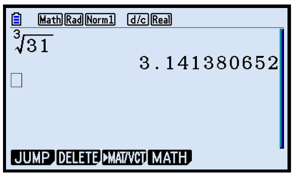
To find $\sqrt{6}$, press SHIFT x^2 ($\sqrt{\ }$) 6 EXE.

Note: Pressing S ↔ D switches between exact and decimal expressions (where possible).



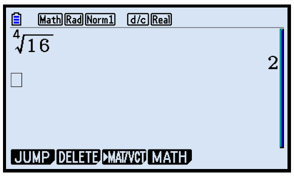
Cube roots are calculated by pressing SHIFT (($\sqrt[3]{\ }$).

To find $\sqrt[3]{31}$, press SHIFT (($\sqrt[3]{\ }$) 31 EXE.



Higher roots are calculated by pressing SHIFT ∧ ($\sqrt[x]{\ }$).

To find $\sqrt[4]{16}$, enter 4 SHIFT ∧ ($\sqrt[x]{\ }$) 16 EXE.

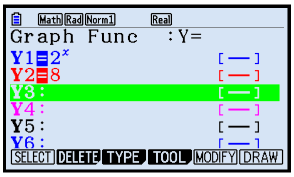


CHAPTER 2 - EXPONENTIAL EQUATIONS

Casio fx-CG50

To solve the equation $2^x = 8$, we find the point of intersection of the graphs $y = 2^x$, and $y = 8$.

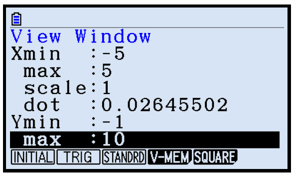
Select **Graph** from the Main Menu, then store 2^x into **Y1**, and 8 into **Y2**.



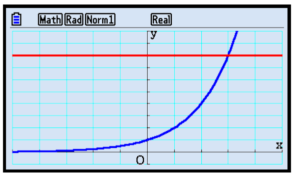
Press **SHIFT** **F3** (**V-WIN**) to adjust the size of the viewing window.

We set **Xmin** $= -5$, **Xmax** $= 5$, **Ymin** $= -1$, and **Ymax** $= 10$.

Note: The viewing window should show the point of intersection.



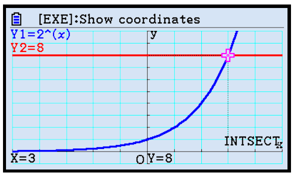
Press **F6** (**DRAW**) to draw the graphs of the functions.



To find the point of intersection, press **F5** (**G-SOLVE**), then **F5** (**INTSECT**).

The graphs intersect at $(3, 8)$.

So, the solution to $2^x = 8$ is $x = 3$.



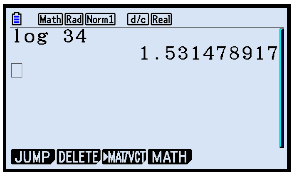
CHAPTER 3 - LOGARITHMS IN BASE 10

Casio fx-CG50

We can perform operations involving logarithms in base 10 using the **log** button.

To evaluate $\log 34$, press **log** 34 **EXE**.

So, $\log 34 \approx 1.53$.



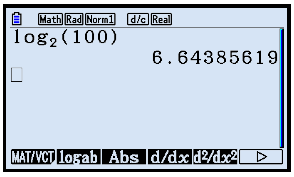
CHAPTER 3 - LOGARITHMS IN BASE a

Casio fx-CG50

We can perform operations involving logarithms in base a using the **logab** function.

To find $\log_2 100$, press F4 (**MATH**), F2 (**logab**), then 2 ▶ 100 EXE.

So, $\log_2 100 \approx 6.64$.



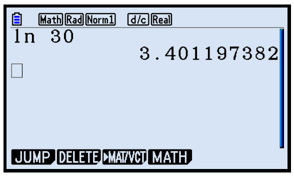
CHAPTER 3 - NATURAL LOGARITHMS

Casio fx-CG50

We can perform operations involving natural logarithms using the **ln** button.

To evaluate $\ln 30$, press **ln** 30 **EXE**.

So, $\ln 30 \approx 3.40$.



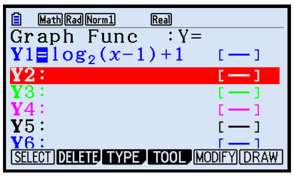
CHAPTER 3 - GRAPHING LOGARITHMIC FUNCTIONS

Casio fx-CG50

To draw the graph of the function $f(x) = \log_2(x-1)+1$, first select **Graph** from the Main Menu.

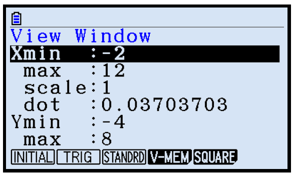
To enter $\log_2(x-1)+1$ into **Y1**, press **OPTN**, **F2** (**CALC**), then **F4** (**logab**).

Then press 2 ▶ X, θ, T − 1 ▶ + 1 **EXE**.

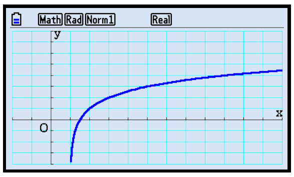


Press **SHIFT** **F3** (**V-WIN**) to adjust the viewing window.

We set **Xmin** $= -2$, **Xmax** $= 12$, **Ymin** $= -4$, and **Ymax** $= 8$.



Press **EXE**, then **F6** (**DRAW**) to graph the function.



CHAPTER 4 - OPERATIONS WITH COMPLEX NUMBERS

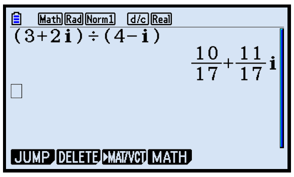
Casio fx-CG50

The imaginary number i is entered by pressing **SHIFT** **0** (i).

For example, suppose $z = 3 + 2i$, and $w = 4 - i$.

To calculate $\frac{z}{w}$, enter $(3 + 2i) \div (4 - i)$, then press **EXE**.

Note: Press **S ↔ D** to display the answer in fractional form.



So, $\frac{z}{w} = \frac{10}{17} + \frac{11}{17}i$.

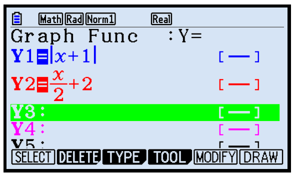
CHAPTER 6 - SOLVING MODULUS EQUATIONS

Casio fx-CG50

To solve $|x+1| = \frac{x}{2} + 2$ graphically, we find the intersection points of the graphs $y = |x+1|$, and $y = \frac{x}{2} + 2$.

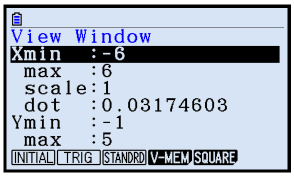
First select **Graph** from the Main Menu.

Enter $|x+1|$ into **Y1**, and $\frac{x}{2} + 2$ into **Y2**.



Note: To enter modulus functions, we use the **Abs** function which we access by pressing **OPTN** **F5** (**NUMERIC**), **F1** (**Abs**).

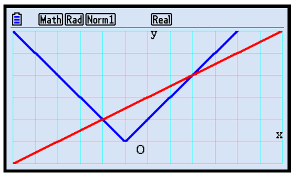
Press **SHIFT** **F3** (**V-WIN**) to adjust the size of the viewing window.



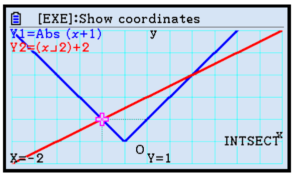
We set **Xmin** $= -6$, **Xmax** $= 6$, **Ymin** $= -1$, and **Ymax** $= 5$.

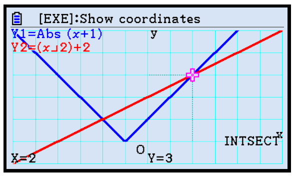
Note: The viewing window should show the points of intersection.

Press **EXE** to return, and press **F6** (**DRAW**) to plot the graphs.



To find the points of intersection, press **F5** (**G-Solv**), **F5** (**INTSECT**), and use ◀ ▶ to move between the points of intersection.





The graphs intersect at $(-2, 1)$ and $(2, 3)$.

So, the solutions to $|x+1| = \frac{x}{2} + 2$ are $x = -2$ or 2.

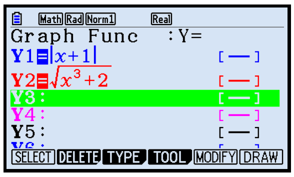
CHAPTER 6 - SOLVING MODULUS INEQUALITIES

Casio fx-CG50

To solve $|x+1| > \sqrt{x^3+2}$ graphically, we find the intersection points of the graphs $y = |x+1|$, and $y = \sqrt{x^3+2}$.

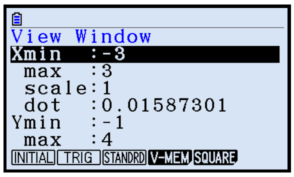
First select **Graph** from the Main Menu.

Enter $|x+1|$ into **Y1**, and $\sqrt{x^3+2}$ into **Y2**.



Note: To enter modulus functions, we use the **Abs** function which we access by pressing **OPTN** **F5** (**NUMERIC**), **F1** (**Abs**).

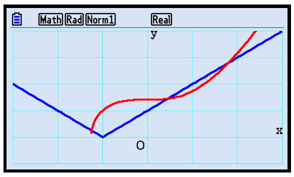
Press **SHIFT** **F3** (**V-WIN**) to adjust the size of the viewing window.



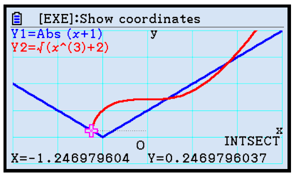
We set **Xmin** $= -3$, **Xmax** $= 3$, **Ymin** $= -1$, and **Ymax** $= 4$.

Note: The viewing window should show the points of intersection.

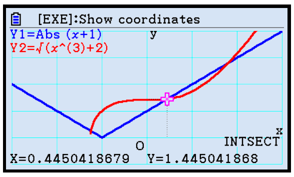
Press **EXE** to return, and press **F6** (**DRAW**) to plot the graphs.

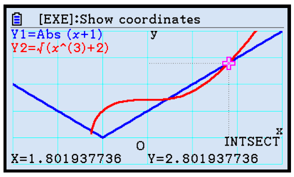


To find the points of intersection, press **F5** (**G-Solv**), **F5** (**INTSECT**).



Use ◀ ▶ to move between the points of intersection.





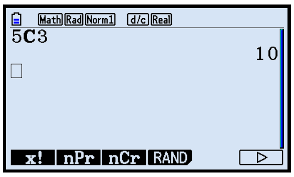
The graphs intersect at $x \approx -1.2470$, $x \approx 0.4450$, and $x \approx 1.8019$.

So, $|x+1| > \sqrt{x^3+2}$ when $-\sqrt[3]{2} \leqslant x < -1.247$ and when $0.445 < x < 1.802$.

CHAPTER 7 - COMBINATIONS

Casio fx-CG50

To find $\binom{5}{3}$, press 5 **OPTN** **F6** (▷) **F3** (**PROB**) **F3** (**nCr**) 3 **EXE**.

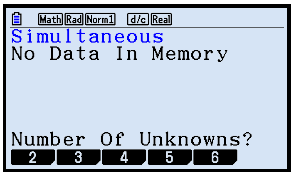


So, $\binom{5}{3} = 10$.

CHAPTER 11 - SOLVING SYSTEMS OF LINEAR EQUATIONS

Casio fx-CG50

To solve systems of linear equations, select **Equation** from the Main menu, and press F1 (**SIMUL**).

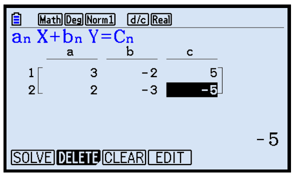


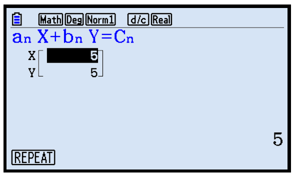
Unique solution

Consider the following system of linear equations: $\begin{cases} 3x - 2y = 5 \\ 2x - 3y = -5. \end{cases}$

Press F1 (**2**) to select 2 unknowns, and set up the screen as shown.

Press F1 (**SOLVE**) to view the results.





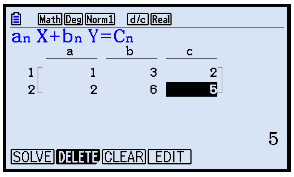
So, $x = 5$, $y = 5$.

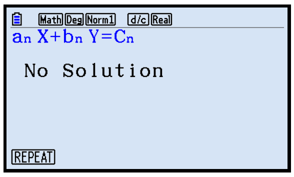
No solution

Consider the following system of linear equations: $\begin{cases} x + 3y = 2 \\ 2x + 6y = 5. \end{cases}$

Press F1 (**2**) to select 2 unknowns, and set up the screen as shown.

Press F1 (**SOLVE**) to view the results.





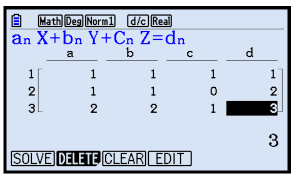
So, the system has no solutions.

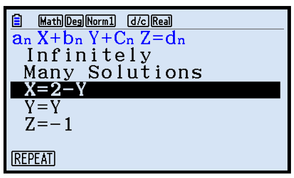
Infinitely many solutions

Consider the following system of linear equations: $\begin{cases} x + y + z = 1 \\ x + y = 2 \\ 2x + 2y + z = 3. \end{cases}$

Press F2 (**3**) to select 3 unknowns, and set up the screen as shown.

Press F1 (**SOLVE**) to view the results.





So, letting $y = t$ we get $x = 2 - t$, $y = t$, $z = -1$, $t \in \mathbb{R}$.

CHAPTER 14 - CONVERTING BETWEEN POLAR AND CARTESIAN FORM

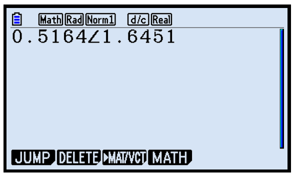
Casio fx-CG50

Select **Run-Matrix** from the Main Menu. Press **SHIFT** **MENU** (**SET UP**), and ensure that **Angle** is set to **Rad**. Press **EXIT** to return.

Polar to Cartesian form

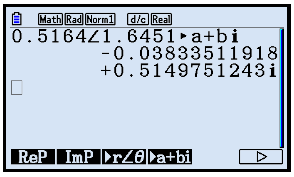
Enter complex numbers in polar form using the angle function $\angle$.

For example, to input $0.5164\,\text{cis}(1.6451)$, enter 0.5164 **SHIFT** **X, θ, T** ($\angle$) 1.6451.



To convert complex numbers in polar form to Cartesian form, use the **▶a+bi** function.

For example, to convert $0.5164\,\text{cis}(1.6451)$ to Cartesian form, enter $0.5164\,\text{cis}(1.6451)$, then press **OPTN** **F3** (**COMPLEX**), **F6** (▷), **F4** (**▶a+bi**), then **EXE**.



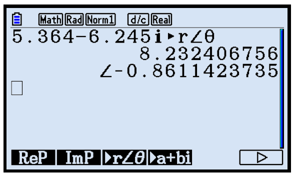
So, $0.5164\,\text{cis}(1.6451) \approx -0.0383 + 0.515i$.

Cartesian to polar form

To convert complex numberts in Cartesian form to polar form, use the **▶r∠θ** function.

For example, to convert $5.364 - 6.245i$ to polar form, first enter $5.364 - 6.245i$, then press **OPTN** **F3** (**COMPLEX**), **F6** (▷), **F3** (**▶r∠θ**), then **EXE**.

Note: i is entered by pressing **SHIFT** **0** (i).



So, $5.364 - 6.245i \approx 8.23\,\text{cis}(-0.861)$.

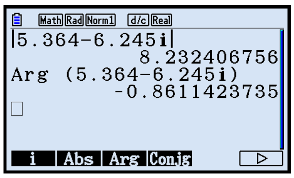
Alternatively, the modulus and argument may be calculated separately using the **Abs** and **Arg** functions.

To find the modulus, press **OPTN** **F3** (**COMPLEX**), **F2** (**Abs**).

Enter $5.364 - 6.245i$, then press **EXE**.

To find the argument, press **OPTN** **F3** (**COMPLEX**), **F3** (**Arg**).

Enter $5.364 - 6.245i$, then press **EXE**.



So, $|5.364 - 6.245i| \approx 8.23$, and $\arg(5.364 - 6.245i) \approx -0.861$.

$\therefore\;\; 5.364 - 6.245i \approx 8.23\,\text{cis}(-0.861)$.

Note: The calculator has a **Complex Mode** setting, accessed by pressing **SHIFT** **MENU** (**SET UP**).

When set to **a+bi**, complex numbers in polar form are converted to Cartesian form after pressing **EXE**.

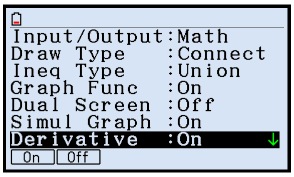
When set to **r∠θ**, complex numbers in Cartesian form are converted to polar form after pressing **EXE**.

CHAPTER 16 - GRADIENT OF A TANGENT

Casio fx-CG50

To find the gradient of the tangent to $y = x^2$ when $x = 2$, we first select **Graph** from the Main Menu.

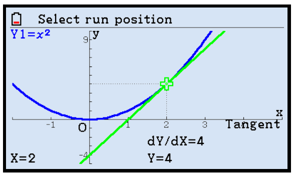
Press **SHIFT** **MENU** (**SET UP**), and make sure the **Derivative** setting is **On**.



Draw the graph of $y = x^2$, then press **SHIFT** **F4** (**SKETCH**) **F2** (**Tangent**).

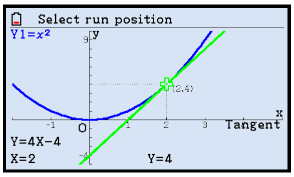
Press 2 **EXE**.

We can see that the tangent has a gradient of 4 at this point.



Press **EXE** again to find the equation of the tangent.

The tangent has equation $y = 4x - 4$.



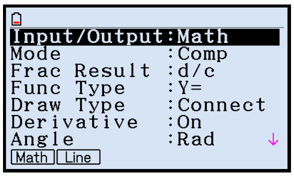
CHAPTER 20 - ESTIMATING AREA USING RECTANGLES

Casio fx-CG50

To calculate the lower and upper sums for the area between the graph of $y = x^2$ and the x-axis on the interval $0 \leqslant x \leqslant 1$ using 4 equal subdivisions, select **Run-Matrix** from the Main Menu.

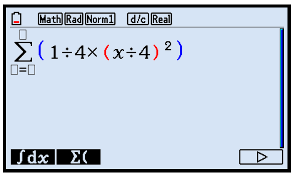
Press **SHIFT** **MENU** (**SET UP**) and make sure **Input/Output** is set to **Math**.

Then press **EXIT**.



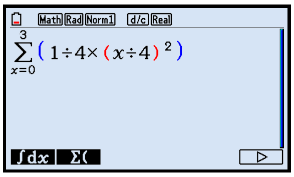
Press **F4** (**MATH**), **F6** (▷), **F2** ($\sum$() to insert a sum operator.

Enter the expression $(1 \div 4) \times (x \div 4)^2$.

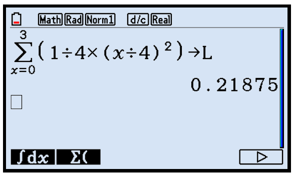


We will first calculate the lower sum.

Press ▶ **X, θ, T** ▶ 0 ▶ 3 to indicate that x ranges from 0 to 3.

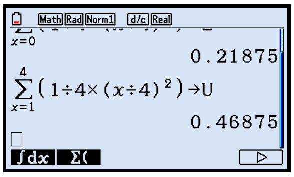


Press ▶ → **ALPHA** → (**L**) followed by **EXE** to calculate the lower sum and store it in the variable **L**.

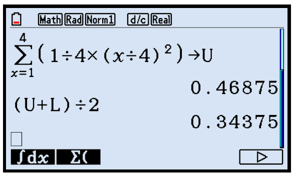


We can repeat this process to calculate the upper sum.

The only difference is that x ranges from 1 to 4 instead of 0 to 3 and we store the result in a different variable **U**.



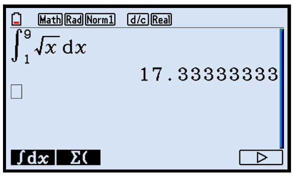
Finally, calculate the average of the upper and lower sums $(\mathbf{U} + \mathbf{L}) \div 2$ to obtain an estimate of the area.



Note: You should be able to adapt these instructions to calculate lower and upper sums for different values of n (the number of subdivisions).

CHAPTER 20 - DEFINITE INTEGRALS

Casio fx-CG50



To find $\int_1^9 \sqrt{x}\,dx$, select **Run-Matrix** from the Main Menu, and press F4 (**MATH**), F6 (▷), F1 ($\int$ dx).

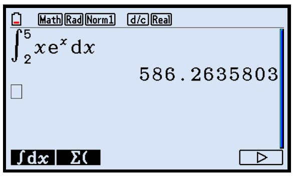
Set up the screen as shown and press **EXE**.

So, $\int_1^9 \sqrt{x}\,dx = 17\frac{1}{3}$.

CHAPTER 22 - EVALUATING DEFINITE INTEGRALS

Casio fx-CG50

To find $\int_2^5 xe^x\,dx$, select **Run-Matrix** from the Main Menu, and press F4 (**MATH**) F6 (▷) F1 ($\int\ dx$).



Set up the screen as shown and press EXE.

Note: e is accessed by pressing SHIFT ln (e^x).

So, $\int_2^5 xe^x\,dx \approx 586.3$.

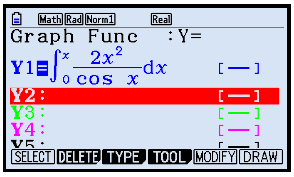
Casio fx-CG50

To solve $\int_0^a 2x^2 \sec x \, dx = \frac{2}{5}$, $0 < a < 1$ directly using technology, select **Graph** from the Main Menu.

Enter $\int_0^x 2x^2 \sec x \, dx$ into **Y1**.

Note: To enter the integral sign, press **OPTN** **F2** (**CALC**), then **F3** ($\int \, dx$).

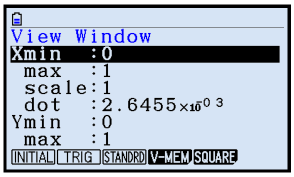
To enter $\sec x$, we enter $\frac{1}{\cos x}$.



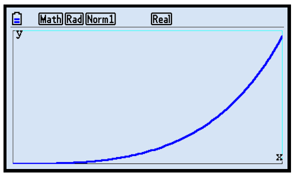
Press **SHIFT** **F3** (**V-WIN**) to adjust the viewing window.

We set **Xmin** $= 0$, **Xmax** $= 1$, **Ymin** $= 0$, and **Ymax** $= 1$.

Note: Ensure that the viewing window does not include any asymptotes of the function you are integrating.

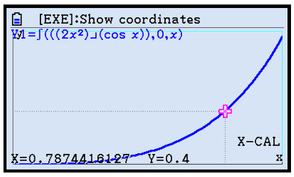


Press **EXIT**, then **F6** (**DRAW**) to draw the graph.



Press **SHIFT** **F5** (**G-SOLVE**), **F6** (▷), then press **F2** (**X-CAL**).

Enter $\frac{2}{5}$ then press **EXE** to find the value of a such that $\int_0^a 2x^2 \sec x \, dx = \frac{2}{5}$.

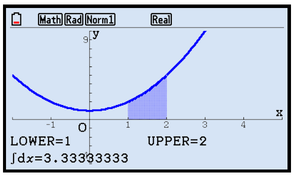


So, $a \approx 0.787$.

CHAPTER 22 - AREA UNDER CURVES

Casio fx-CG50

To find the area enclosed by $y = x^2 + 1$, the x-axis, $x = 1$, and $x = 2$, we first draw the graph of $y = x^2 + 1$.



Press F5 (G-SOLVE) F6 (▷) F3 ($\int dx$) F1 ($\int dx$) to select the integral tool.

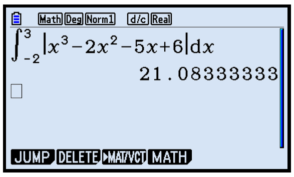
Press 1 EXE 2 EXE to specify the lower and upper bounds of the integral.

So, the area of the region is $3\frac{1}{3}$ units^2.

CHAPTER 22 - FINDING THE AREA ENCLOSED BY A CURVE AND THE x-AXIS

Casio fx-CG50

To find $\int_{-2}^{3} |\, x^3 - 2x^2 - 5x + 6 \,|\, dx$, start by selecting **Run-Matrix** from the Main Menu.



Press F4 (**MATH**), F6 (▷), F1 ($\int$ dx) to access the integral template.

Set up the screen as shown, then press EXE.

Note: To access the modulus function, press OPTN F6 (▷), F4 (**NUMERIC**), F1 (**Abs**).

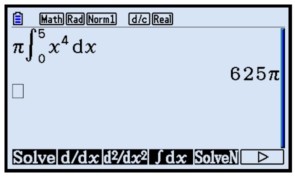
So, $\int_{-2}^{3} |\, x^3 - 2x^2 - 5x + 6 \,|\, dx \approx 21.1$.

CHAPTER 22 - VOLUMES OF REVOLUTION

Casio fx-CG50

The volume of the solid formed when the graph of the function $y = x^2$ for $0 \leqslant x \leqslant 5$ is revolved through 2π about the x-axis, is given by $\pi \int_0^5 x^4\,dx$.

To evaluate this integral, first select **Run-Matrix** from the Main Menu.



Enter the expression as shown alongside, and press **EXE**.

Note: π is entered by pressing **SHIFT** **×10^x** (**π**).

To enter the integral sign, press **OPTN** **F4** (**CALC**), then **F4** ($\int$ $\boldsymbol{dx}$).

So, volume of revolution $= 625\pi$ units^3.

CHAPTER 24 - MACLAURIN POLYNOMIALS

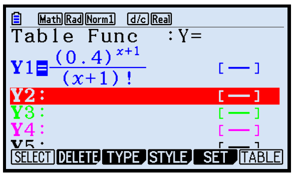
Casio fx-CG50

To obtain a Maclaurin polynomial which estimates $e^{0.4}$ with error less than $0.000\,01$, we must find n such that

$$\frac{(0.4)^{n+1}}{(n+1)!} < 3.676 \times 10^{-6}.$$

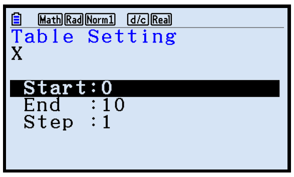
First select **Table** from the Main Menu.

Enter $\dfrac{(0.4)^{x+1}}{(x+1)!}$ into **Y1**.



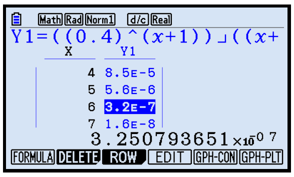
Note: ! is entered by pressing OPTN F4 (**PROB**), then F1 (x**!**).

Press F5 (**SET**), set up the screen as shown, and press EXE.



Press F6 (**TABLE**) to view the table of values.

The first time that **Y1** falls below 3.676×10^{-6} is when $x = 6$.



So, for $n \geqslant 6$ the nth Maclaurin polynomial estimates $e^{0.4}$ with error less than $0.000\,01$.

CHAPTER 25 - EULER'S METHOD

Casio fx-CG50

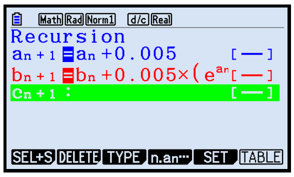
Consider the differential equation $\frac{dy}{dx} = e^x + 1$ with $y(0) = 1$.

To estimate $y(0.5)$ using Euler's method with step size 0.005, we have $x_0 = 0$, $y_0 = 1$, and

$$\begin{cases} x_i = x_{i-1} + 0.005 \\ y_i = y_{i-1} + 0.005(e^{x_{i-1}} + 1). \end{cases}$$

Select **Recursion** from the Main Menu, press F3 (**TYPE**), then F2 (**a_{n+1}**).

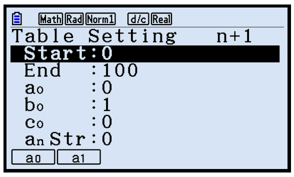
Enter $a_n + 0.005$ into **a_{n+1}**, and $b_n + 0.005(e^{a_n} + 1)$ into **b_{n+1}**.



Note: a_n is entered by pressing F4 (**n.a_n···**), then F2 (**a_n**).

b_n is entered by pressing F4 (**n.a_n···**), then F3 (**b_n**).

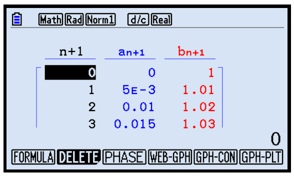
Press F5 (**SET**) and adjust the table settings.



Set **Start** $= 0$, and **End** $= 100$ since we are taking $\frac{0.5}{0.005} = 100$ steps.

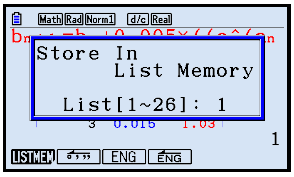
Set **a_0** $= 0$ since $x_0 = 0$, and **b_0** $= 1$ since $y_0 = 1$.

Press **EXIT**, then F6 (**TABLE**) to view the table of values.



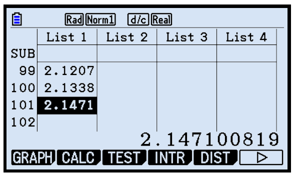
Press ▶ ▶ to highlight the first entry in the **b_{n+1}** column.

Press **OPTN** F1 (**LISTMEM**), then enter 1 **EXE** to save the values of **b_{n+1}** into **List 1**.



To view **List 1** press **MENU** and select **Statistics**.

Press ▲ until the 101st entry is shown.



So, $y(0.5) \approx 2.1471$.

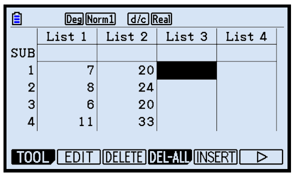
CHAPTER 26 - DRAWING SCATTER DIAGRAMS

Casio fx-CG50

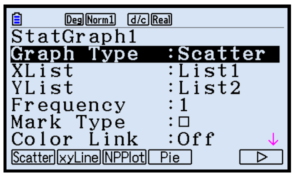
Draw a scatter diagram of the following data set:

x	7	8	6	11	6	4	5
y	20	24	20	33	18	10	13

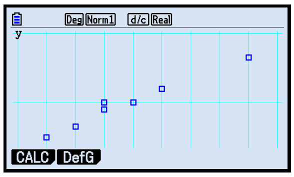
Enter the x-values into **List 1** and the y-values into **List 2**.



Press F1 (**GRAPH**), F6 (**SET**), and set up **StatGraph1** as shown.



Press **EXIT**, then F1 (**GRAPH1**) to draw the scatter diagram.



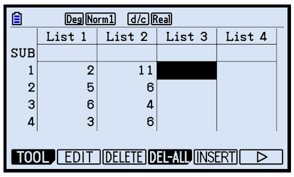
CHAPTER 26 - CALCULATING r

Casio fx-CG50

Find the correlation coefficient r for the data alongside.

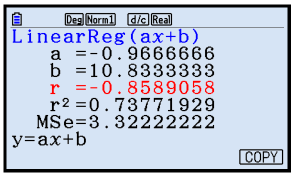
x	2	5	6	3	9
y	11	6	4	6	3

Enter the x-values into **List 1**, and the y-values into **List 2**.



Press F2 (**CALC**), F6 (**SET**), and set up the screen as shown alongside.

Press **EXIT**, F3 (**REG**), F1 (**X**), then F1 (**ax+b**).



So, $r \approx -0.859$.

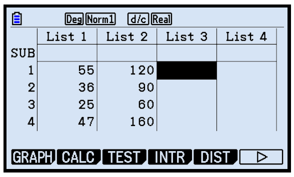
CHAPTER 26 - REGRESSION LINE

Casio fx-CG50

Find the regression line for the data alongside.

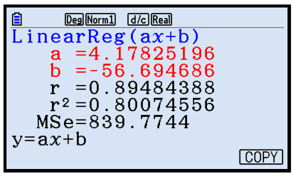
x	55	36	25	47	60	64	42	50
y	120	90	60	160	190	250	110	150

Enter the x-values into **List 1**, and the y-values into **List 2**.



Press **F2** (**CALC**), **F6** (**SET**), and set up the screen as shown alongside.

Press **EXIT**, **F3** (**REG**), **F1** (**X**), then **F1** (**ax+b**).



So, the regression line is $y \approx 4.18x - 56.7$.

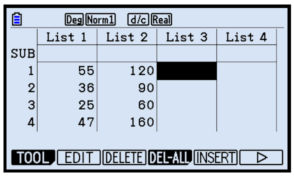
CHAPTER 26 - REGRESSION LINE ON A SCATTER DIAGRAM

Casio fx-CG50

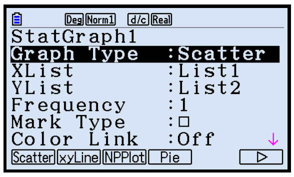
Plot the regression line on the scatter diagram of the data below:

x	55	36	25	47	60	64	42	50
y	120	90	60	160	190	250	110	150

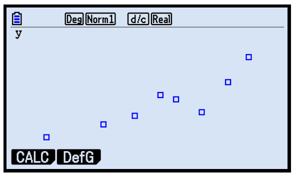
First enter the x-values into **List 1**, and the y-values into **List 2**.



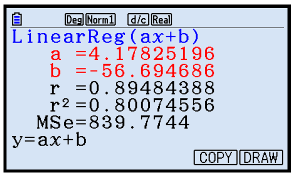
Press F1 (**GRAPH**), F6 (**SET**), and set up **StatGraph1** as shown.



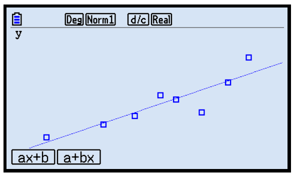
Press **EXIT**, then F1 (**GRAPH1**) to draw a scatter diagram of the data.



Press F1 (**CALC**), F2 (**X**), F1 (**ax+b**) to perform a linear regression on the data.
So, the regression line is $y \approx 4.18x - 56.7$.



Press F6 (**DRAW**) to plot the regression line on the scatter diagram.



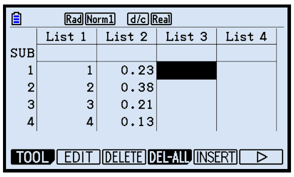
CHAPTER 27 - STANDARD DEVIATION OF A DISCRETE RANDOM VARIABLE

Casio fx-CG50

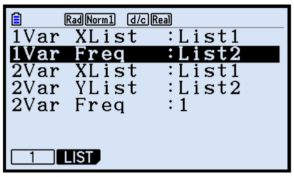
Find the standard deviation of the probability distribution alongside.

x_i	1	2	3	4	5
p_i	0.23	0.38	0.21	0.13	0.05

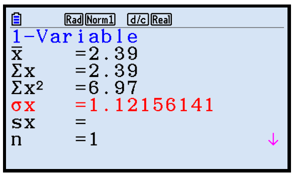
To find the standard deviation, first select **Statistics** from the Main Menu, enter the values for x_i into **List 1**, and the values for p_i into **List 2** as shown.



Press F6 (▷) until the **GRAPH** icon is in the bottom left corner of the screen, then press F2 (**CALC**), F6 (**SET**), and make sure the screen is set up as shown.



Press **EXIT**, then F1 (**1-VAR**) to view the statistics.



So, $\sigma \approx 1.12$.

CHAPTER 27 - MEAN AND STANDARD DEVIATION OF A DISCRETE RANDOM VARIABLE

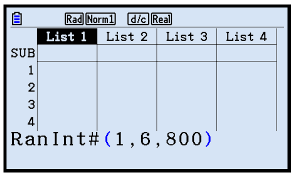
Casio fx-CG50

Calculate the mean and standard deviation of 800 randomly generated integers between 1 and 6.

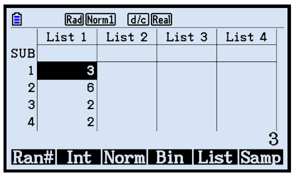
To generate random integers, use the **RandInt#** function.

First select **Statistics** from the Main Menu.

Move the cursor to highlight the header of **List 1** and press **OPTN** **F5** (**PROB**), **F4** (**RAND**), **F2** (**Int**), then 1 **,** 6 **,** 800 **)**.



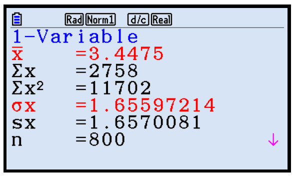
Press **EXE** to populate **List 1** with 800 random integers from 1 to 6.



Press **SHIFT** **EXIT** (**QUIT**), **F2** (**CALC**), **F6** (**SET**).

Set up the screen as shown alongside.

Press **EXIT**, then **F1** (**1-VAR**) to view the statistics.



So, $\mu \approx 3.45$ and $\sigma \approx 1.66$.

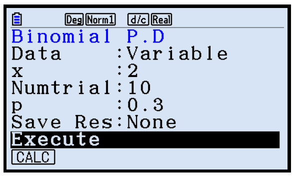
Note: Your values of μ and σ may not be exactly the same, but should be close (within ± 0.1).

CHAPTER 27 - BINOMIAL PROBABILITIES

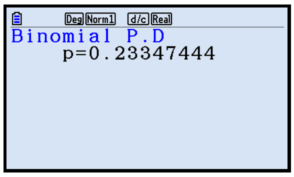
Casio fx-CG50

To find $\mathrm{P}(X = 2)$ for $X \sim \mathrm{B}(10, 0.3)$, select **Statistics** from the Main Menu.

Press F5 (**DIST**), F5 (**BINOMIAL**), then F1 (**Bpd**).



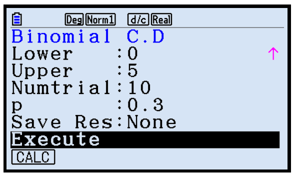
Set up the screen as shown, then press **EXE**.



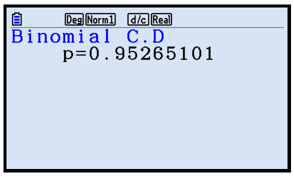
So, $\mathrm{P}(X = 2) \approx 0.233$.

To find $\mathrm{P}(X \leqslant 5)$ for $X \sim \mathrm{B}(10, 0.3)$, select **Statistics** from the Main Menu.

Press F5 (**DIST**), F5 (**BINOMIAL**), then F2 (**Bcd**).



Set up the screen as shown, then press **EXE**.



So, $\mathrm{P}(X \leqslant 5) \approx 0.953$.

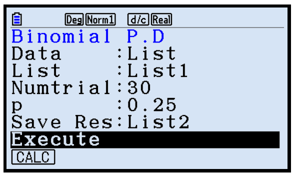
CHAPTER 27 - MEAN AND STANDARD DEVIATION OF A BINOMIAL DISTRIBUTION

Casio fx-CG50

Calculate the mean and standard deviation for the variable $X \sim \mathrm{B}(30, 0.25)$.

First enter the values $0, 1, ..., 30$ into **List 1**.

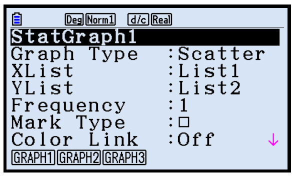
Press **F5** (**DIST**), **F5** (**BINOMIAL**), **F1** (**Bpd**), set up the screen as shown, then press **EXE**.



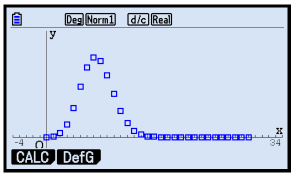
Note: This calculates $\mathrm{P}(X = x)$ for every value of x from 0 to 30, and saves the results in **List 2**.

Press **EXIT** to return to the List screen.

To draw a scatter plot of the data, press **F1** (**GRAPH**), **F6** (**SET**), and set up **StatGraph1** as shown.

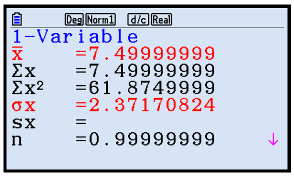


Press **EXIT**, then **F1** (**GRAPH1**) to draw the scatter plot.



To calculate the descriptive statistics, press **SHIFT** **EXIT** (**QUIT**), **F2** (**CALC**), **F6** (**SET**), and set up the screen as shown.

Press **EXIT**, then **F1** (**1-VAR**).



So, $\mu = 7.5$ and $\sigma \approx 2.3717$.

CHAPTER 28 - FINDING THE MEAN OF A CONTINUOUS RANDOM VARIABLE

Casio fx-CG50

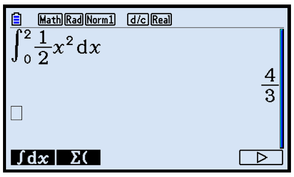
The mean of the distribution with probability density function $f(x) = \frac{1}{2}x,\ 0 \leqslant x \leqslant 2$ is

$$\mu = \int_0^2 x f(x)\, dx = \int_0^2 \tfrac{1}{2}x^2\, dx.$$

To evaluate this, select **Run-Matrix** from the Main Menu.

Set up the screen as shown alongside and press **EXE**.

Note: The integral is entered by pressing **F4** (**MATH**), **F6** (▷), **F1** ($\int$ dx).



So, $\mu = \frac{4}{3}$.

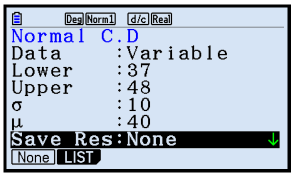
CHAPTER 28 - NORMAL PROBABILITIES

Casio fx-CG50

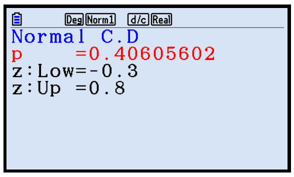
Suppose X is normally distributed with mean 40 and standard deviation 10.

To find $\mathrm{P}(37 < X < 48)$, first select **Statistics** from the Main Menu.

Press F5 (**DIST**), F1 (**NORM**), F2 (**Ncd**), and set up the screen as shown.



Scroll down to **Execute**, and press **EXE** to display the result.



So, $\mathrm{P}(37 < X < 48) \approx 0.406$.

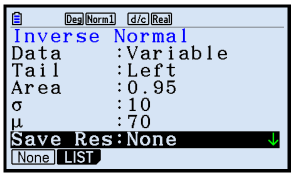
CHAPTER 28 - CALCULATING QUANTILES

Casio fx-CG50

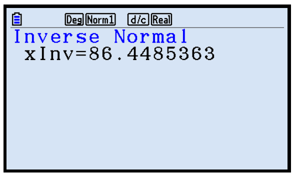
Suppose X is normally distributed with mean 70 and standard deviation 10.

To find k such that $\mathrm{P}(X \leqslant k) = 0.95$, select **Statistics** from the Main Menu.

Press F5 (**DIST**), F1 (**NORM**), F3 (**InvN**), and set up the screen as shown.



Scroll down to **Execute**, and press EXE to display the result.



So, $k \approx 86.45$.