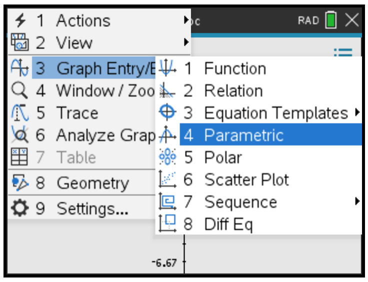
CHAPTER 1 - GRAPHING PARAMETRIC EQUATIONS

TI-$n$spire

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

Press **on** and select **B Graph** or **Add Graph**.

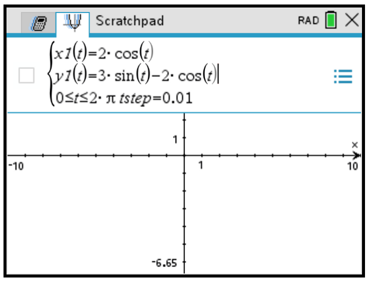
Press **menu** and select **3 Graph Entry/Edit**, then **4 Parametric**.



Enter $2\cos t$ into **x1(t)**, and $3\sin t - 2\cos t$ into **y1(t)**.

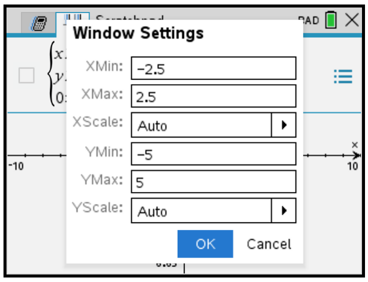
Ensure that $0 \leqslant$ **t** $\leqslant 2\pi$, and **tstep** $= 0.01$.

Note: To input π, press **π ▶**, and select π.

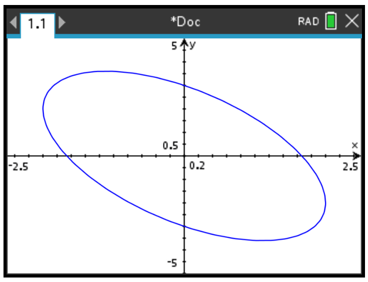


Press **menu**, select **4 Window/Zoom**, then **1 Window Settings...** to adjust the size of the viewing window.

We set **XMin** $= -2.5$, **XMax** $= 2.5$, **YMin** $= -5$, and **YMax** $= 5$.



Press **enter** to return, and press **enter** to plot the graph.



CHAPTER 2 - CALCULATING RATIONAL EXPONENTS

TI-$n$spire

Exponents are calculated using [∧].

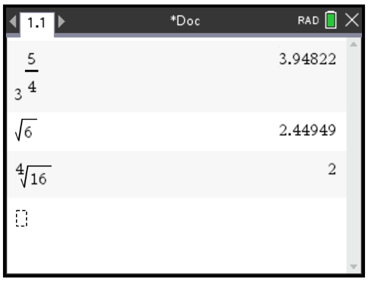
To find $3^{\frac{5}{4}}$, enter 3 [∧] 5 [÷] 4 [enter].

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

To find $\sqrt{6}$, press [ctrl] [x^2] ($\sqrt{\ }$) 6 [enter].

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

To find $\sqrt[4]{16}$, press [ctrl] [∧] ($\sqrt[n]{x}$) 4 [▶] 16 [enter].



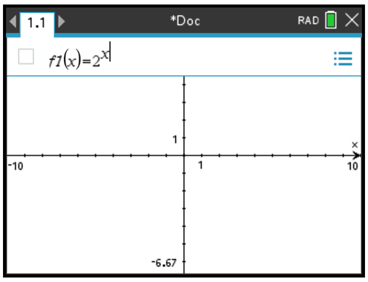
CHAPTER 2 - EXPONENTIAL EQUATIONS

TI-$n$spire

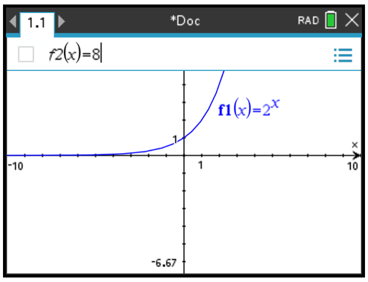
To solve the equation $2^x = 8$, we find the point of intersection of the graphs $y = 2^x$, and $y = 8$.

Press **on** and select **B Graph**, or **Add Graph**.

Enter 2^x into **f1(x)** and press **enter**.



Press **ctrl** **G**, enter 8 into **f2(x)**, and press **enter**.

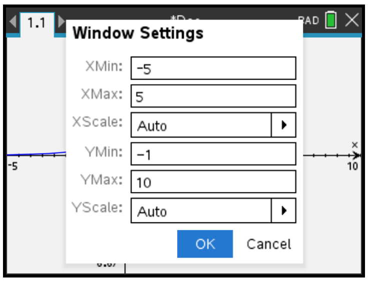


Press **menu**, select **4 Window/Zoom**, and **1 Window Settings...** to adjust the size of the viewing window.

We set **XMin** $= -5$, **XMax** $= 5$, **YMin** $= -1$, and **YMax** $= 10$.

Press **OK**.

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

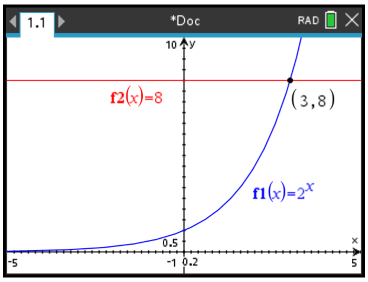


To find the point of intersection, press **menu**, select **6 Analyze Graph**, and **4 Intersection**.

Select the lower bound to the left of the intersection point, and the upper bound to the right of the intersection point.

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

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



CHAPTER 3 - LOGARITHMS IN BASE 10

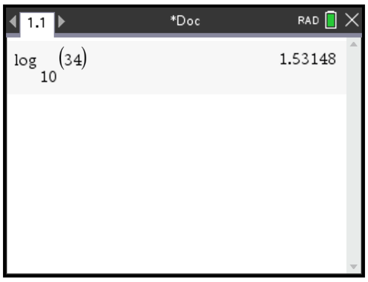
TI-$n$spire

We can perform operations involving logarithms in base 10 by pressing **ctrl** **10^x** (**log**).

Press **on**, and select **A Calculate**, or **Add Calculator**.

To evaluate $\log 34$, press **ctrl** **10^x** (**log**) 10 **▶** 34 **enter**.

So, $\log 34 \approx 1.53$.



CHAPTER 3 - LOGARITHMS IN BASE a

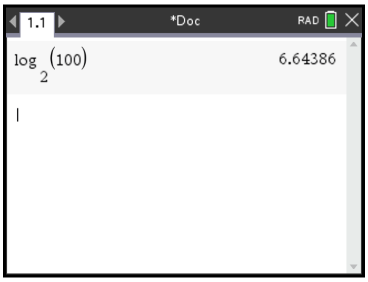
TI-$n$spire

We can perform operations involving logarithms in base a by pressing **ctrl** **10^x** (**log**).

Press **on**, and select **A Calculate**, or **Add Calculator**.

To find $\log_2 100$, press **ctrl** **10^x** (**log**) 2 **▶** 100 **enter**.

So, $\log_2 100 \approx 6.64$.



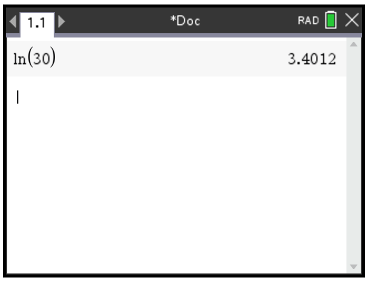
CHAPTER 3 - NATURAL LOGARITHMS

TI-$n$spire

We can perform operations involving natural logarithms by pressing **ctrl** e^x (**ln**).

To evaluate $\ln 30$, press **ctrl** e^x (**ln**) 30 **enter**.

So, $\ln 30 \approx 3.40$.

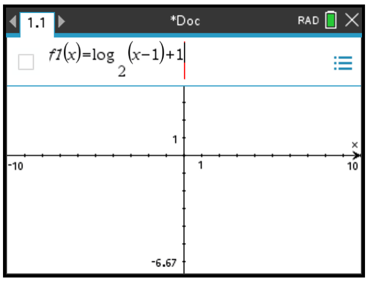


CHAPTER 3 - GRAPHING LOGARITHMIC FUNCTIONS

TI-$n$spire

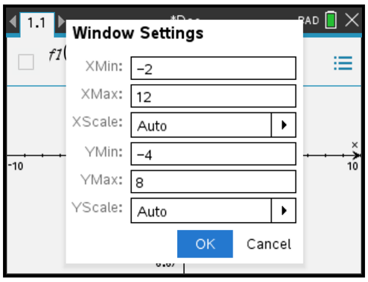
To draw the graph of the function $f(x) = \log_2(x-1)+1$, press [home] and select **B Graph** or **Add Graph**.

To enter $\log_2(x-1)+1$ into **f1(x)**, first press **ctrl** **10^x** (**log**). Press 2 ▶ X – 1 ▶ + button1 **enter** .

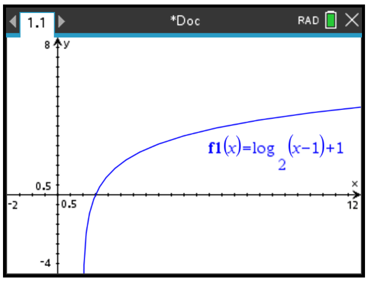


Press **menu**, select **4 Window/Zoom**, then **1 Window Settings...** to adjust the viewing window.

We set **XMin** $= -2$, **XMax** $= 12$, **YMin** $= -4$, and **YMax** $= 8$.



Press **enter** to graph the function.



CHAPTER 4 - OPERATIONS WITH COMPLEX NUMBERS

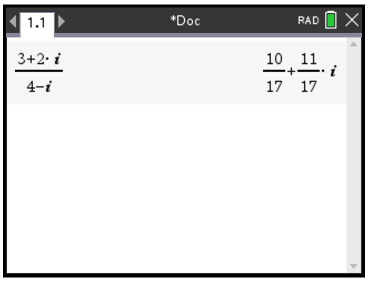
TI-$n$spire

Press **on** and select **A Calculate** or **Add Calculator**.

The imaginary number i is entered by pressing **π ▶** and selecting i.

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

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



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

CHAPTER 6 - SOLVING MODULUS EQUATIONS

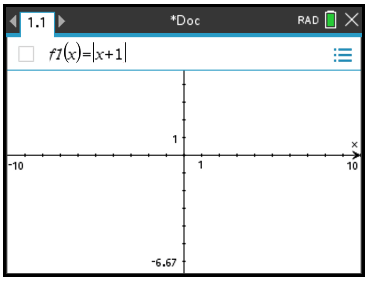
TI-$n$spire

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

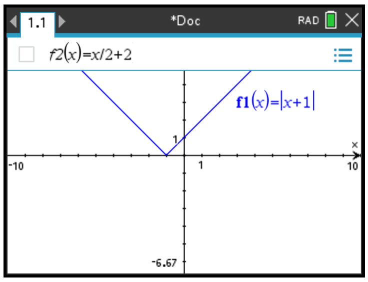
Press **on** and select **B Graph** or **Add Graph**.

Enter $|x+1|$ into **f1(x)**.

Note: To enter modulus functions, we use the $|\square|$ function which we access by pressing $|\square|\ \{\boxminus$ and selecting $|\square|$.



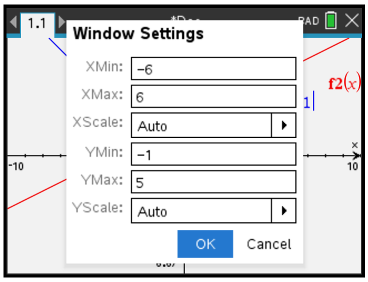
Press **ctrl** **G** and enter $\frac{x}{2}+2$ into **f2(x)**.



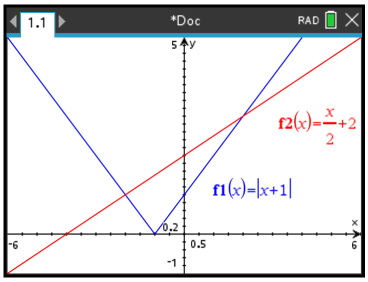
Press **menu**, and select **4 Window/Zoom**, then **1 Window Settings...** to adjust the size of the viewing window.

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

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



Press **enter** to plot the graphs.

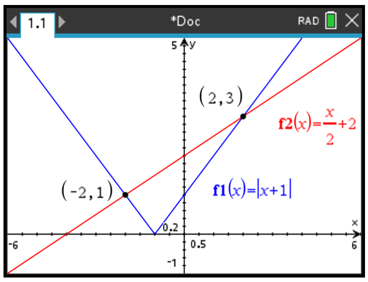


To find the points of intersection, press **menu**, select **6 Analyze Graph**, then **4 Intersection**.

Set the lower bound to the left of the first intersection point, and the upper bound to the right.

Repeat for the remaining intersection points.

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



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

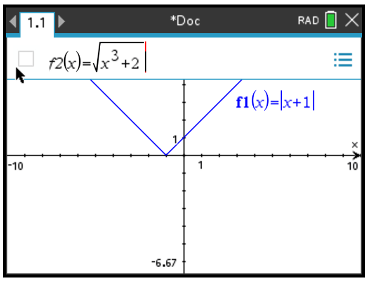
CHAPTER 6 - SOLVING MODULUS INEQUALITIES

TI-$n$spire

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

Press **on** and select **B Graph** or **Add Graph**.

Enter $|x+1|$ into **f1(x)**, and $\sqrt{x^3+2}$ into **f2(x)**.

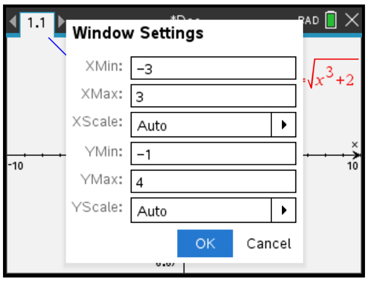


Note: To enter modulus functions, we use the $|\square|$ function which we access by pressing $|\square|\ \{\square$ and selecting $|\square|$.

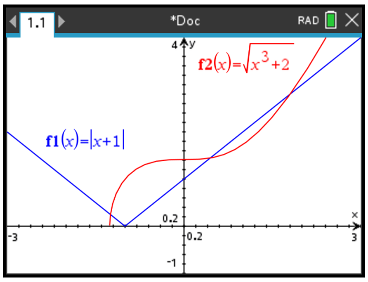
Press **menu**, and select **4 Window/Zoom**, then **1 Window Settings...** to adjust the size of the viewing window.

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

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



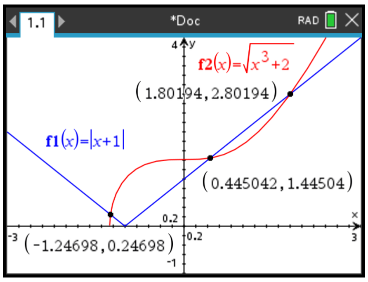
Press **enter** to plot the graphs.



To find the points of intersection, press **menu**, select **6 Analyze Graph**, then **4 Intersection**.

Set the lower bound to the left of the first intersection point, and the upper bound to the right.

Repeat for the remaining intersection points.



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 $0.445 < x < 1.802$.

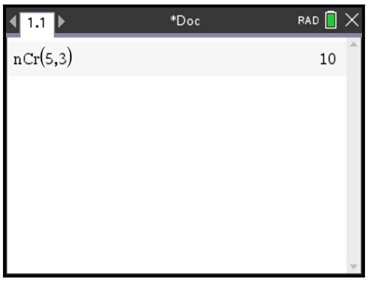
CHAPTER 7 - COMBINATIONS

TI-$n$spire

To find $\binom{5}{3}$, press **on** and select **A Calculate** or **Add Calculator**.

Press **menu**, select **5 Probability**, **3 Combinations**, then press 5 **,** 3 **)** **enter**.

Note: The function **nCr** may also be accessed by using the letter buttons and **⇑ shift** to type **nCr**.



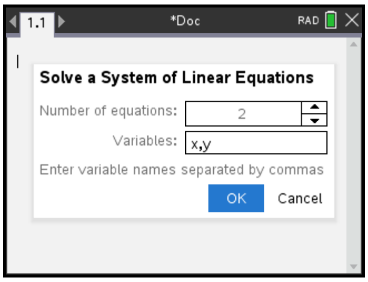
So, $\binom{5}{3} = 10$.

CHAPTER 11 - SOLVING SYSTEMS OF LINEAR EQUATIONS

TI-$n$spire

To solve systems of linear equations, press **on** and select **A Calculate** or **Add Calculator**.

Press **menu**, then select **3 Algebra**, and **2 Solve System of Linear Equations...**.

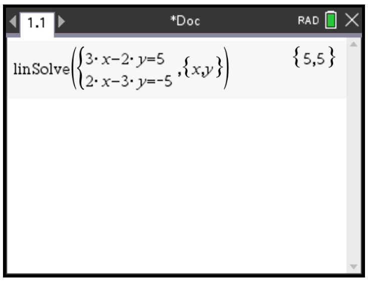


Unique solution

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

Enter 2 for **Number of equations**, and press **OK**.

Set up the screen as shown, and press **enter**.



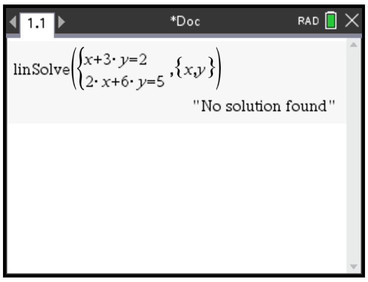
So, $x = 5$, $y = 5$.

No solution

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

Enter 2 for **Number of equations**, and press **OK**.

Set up the screen as shown, and press **enter**.



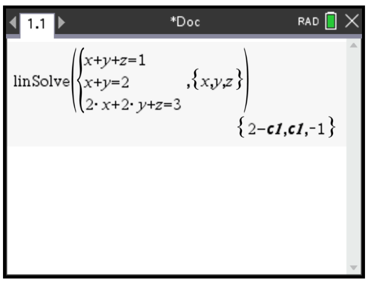
So, the system has no solutions.

Infinitely many solutions

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

Enter 3 for **Number of equations**, and press **OK**.

Set up the screen as shown, and press **enter**.



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

TI-$n$spire

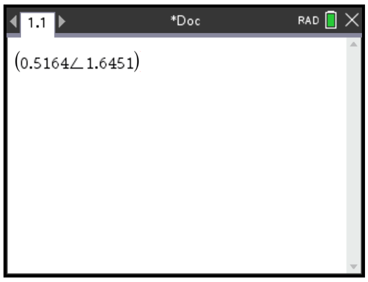
Press **on**, select **5 Settings...**, then **2 Document Settings...**, and ensure that **Angle** is set to **Radian**.

Press **OK** and select **Add Calculator**.

Polar to Cartesian form

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

For example, to enter $0.5164 \operatorname{cis}(1.6451)$, press **(** 0.5164 **ctrl** **📖** $(\infty\beta°)$, select $\angle$, and enter 1.6451.

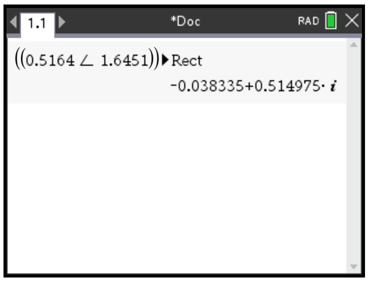


To convert complex numbers in polar form to Cartesian form, use the ▶ **Rect** function.

For example, to convert $0.5164 \operatorname{cis}(1.6451)$ to Cartesian form, enter $0.5164 \operatorname{cis}(1.6451)$ as above, then press **menu**, select **2 Number**, **9 Complex Number Tools**, **7 Convert to Rectangular**, then press **enter**.

Note: The calculator will automatically convert from polar to cartesian form if **Real or Complex** is set to either **Real** or **Rectangular**.

This can be changed in **Document Settings**.



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

Cartesian to polar form

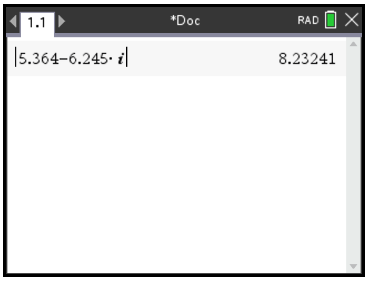
To convert complex numbers in Cartesian form to polar form, use the $|\square|$ and **angle** functions separately.

To find the modulus, press $|\square|$ $\{\,$, then select $|\square|$.

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

Note: i is entered by pressing **π ▶** and selecting i.

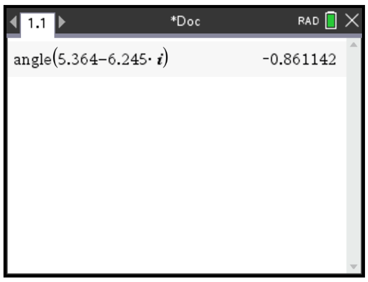
So, $|5.364 - 6.245i| \approx 8.23$.



To find the argument, press **menu**, select **2 Number**, **9 Complex Number Tools**, **4 Polar Angle**.

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

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



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

Note: The **TI-$n$spire** does have a ▶ **Polar** function which converts complex numbers in Cartesian form to polar form. However, the polar form $r \operatorname{cis}\theta$ is instead displayed in exponential form $re^{i\theta}$.

CHAPTER 16 - GRADIENT OF A TANGENT

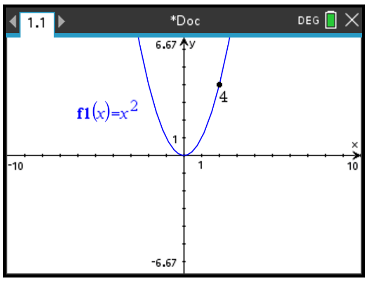
TI-$n$spire

To find the gradient of the tangent to $y = x^2$ when $x = 2$, press **on**, select **Add Graph**, and draw the graph of $y = x^2$.

Press **menu**, select **6 Analyze Graphs**, then select **5 dy/dx**.

Press 2 **enter**.

So, at $x = 2$ the tangent a has gradient of 4.



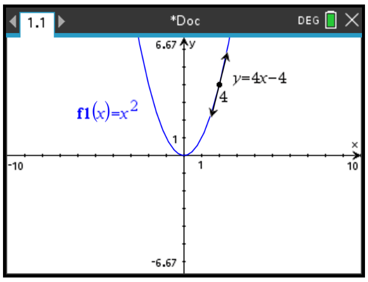
Press **menu**, select **8 Geometry**, **1 Points & Lines**, then **8 Tangent**.

Move the cursor towards the point $(2, 4)$ until the phrase *point on* appears.

Press **enter** to draw the tangent.

The equation of the tangent will appear next to the drawn tangent.

So, the tangent has equation $y = 4x - 4$.



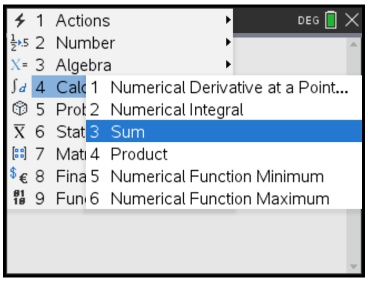
CHAPTER 20 - ESTIMATING AREA USING RECTANGLES

TI-$n$spire

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:

Press **on** and select **A Calculate** or **Add Calculator**.

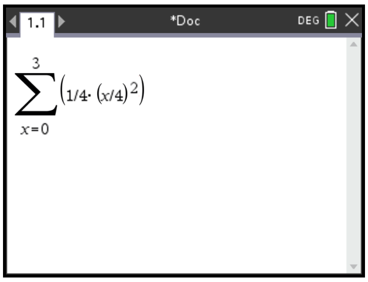
Press **menu**, select **4 Calculus**, then select **3 Sum** to insert a sum operator.



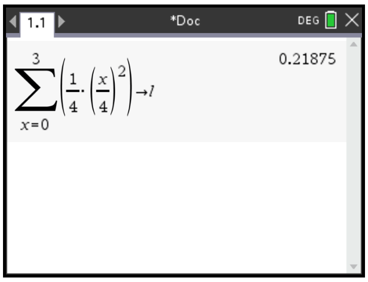
We will first calculate the lower sum.

Press **X** **▶** 0 **▲** **▲** 3 to indicate that x ranges from 0 to 3.

Then press **▶** and enter the expression $(1 \div 4) \times (x \div 4)^2$.

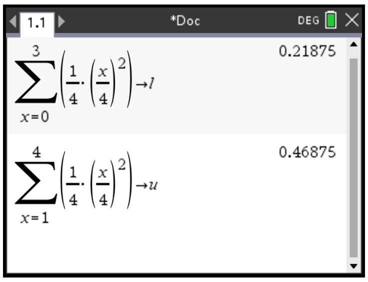


Press **▶** **ctrl** **var** **(sto ▶)** **L** followed by **ctrl** **enter** (≈) to calculate the lower sum and store it in the variable **l**.

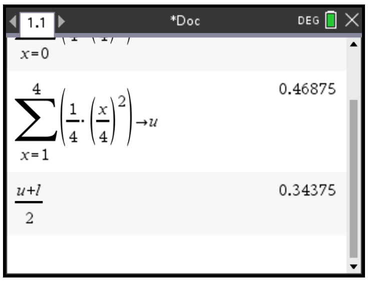


We can repeat this process to calculate the upper sum.

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

TI-$n$spire

To find $\int_1^9 \sqrt{x}\,dx$, press **on** and select **A Calculate** or **Add Calculator**.

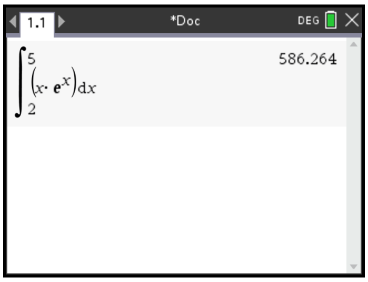
Press **menu**, select **4 Calculus**, then select **2 Numerical Integral**.

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

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

CHAPTER 22 - EVALUATING DEFINITE INTEGRALS

TI-$n$spire



To find $\int_2^5 xe^x \, dx$, press **on**, and select **Add Calculator**.

Press **menu**, select **4 Calculus**, then select **2 Numerical Integral**.

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

Note: e is accessed by pressing **π ▶** and selecting e, or by pressing **e^x**.

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

CHAPTER 22 - SOLVING EQUATIONS WITH DEFINITE INTEGRALS

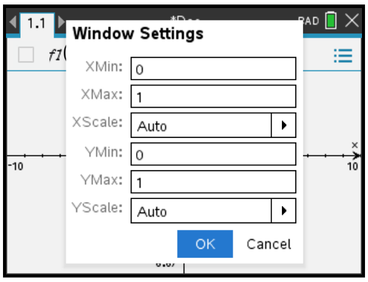
TI-$n$spire

To solve $\int_0^a 2x^2 \sec x \, dx = \frac{2}{5}$, $0 < a < 1$ directly using technology, press **on** and select **Add Graph**.

Press **menu**, select **4 Window/Zoom**, **1 Window Settings...** to adjust the viewing window.

We set **XMin** $= 0$, **XMax** $= 1$, **YMin** $= 0$, **YMax** $= 1$, and press **OK**.

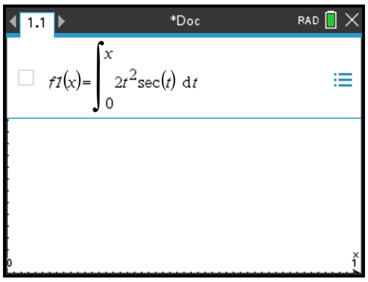
Note: Ensure that the viewing window does not include any asymptotes of the function you are integrating.



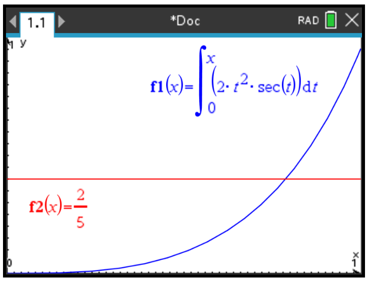
Enter $\int_0^x 2t^2 \sec t \, dt$ into **f1(x)**.

Note: To enter the integral sign, press and select $\int_{\square}^{\square} \square \, d\square$.

To enter $\sec t$, press **trig** and select **sec**.



Press **ctrl** **G**, set **f2(x)** $= \frac{2}{5}$, then press **enter** to view the graphs.

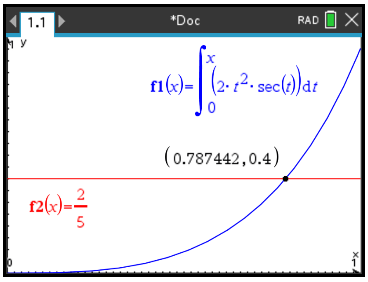


To find the value of a such that $\int_0^a 2x^2 \sec x \, dx = \frac{2}{5}$, we find the intersection point between **f1(x)** and **f2(x)**.

Press **menu** and select **6 Analyze Graph**, **4 Intersection**.

Set the lower bound to the left of the intersection point, and the upper bound to the right.

The graphs intersect at $\approx (0.787, 0.4)$.



So, $a \approx 0.787$.

CHAPTER 22 - AREA UNDER CURVES

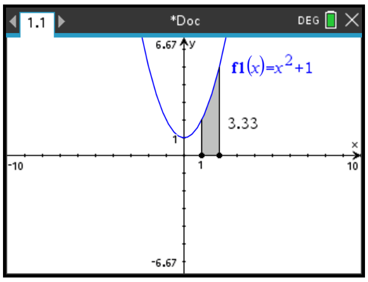
TI-$n$spire

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 **menu**, select **6 Analyze Graph**, then select **6 Integral**.

Press 1 **enter** to specify the lower bound.

Press 2 **enter** to specify the upper bound.



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

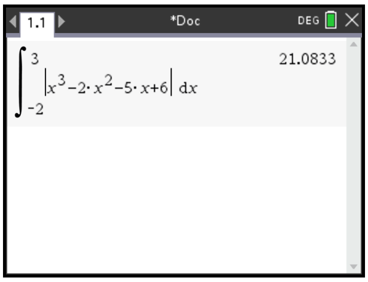
CHAPTER 22 - FINDING THE AREA ENCLOSED BY A CURVE AND THE x-AXIS

TI-$n$spire

To find $\int_{-2}^{3} |\, x^3 - 2x^2 - 5x + 6 \,|\, dx$, press **on** and select **A Calculate** or **Add Calculator**.

Press **menu**, select **4 Calculus**, then select **2 Numerical Integral**.

Set up the screen as shown.



Note: To access the modulus function, press **|□| {□}**, then select |□|.

Press **enter** to evaluate the integral.

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

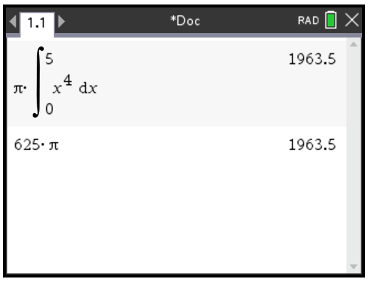
CHAPTER 22 - VOLUMES OF REVOLUTION

TI-$n$spire

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, press **on** and select **A Calculate** or **Add Calculator**.

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



Note: π is entered by pressing **π ▶** and selecting π.

To enter the integral sign, press **|□| {□** and select $\int_{\square}^{\square} \square \, d\square$.

Check your answer by evaluating 625π.

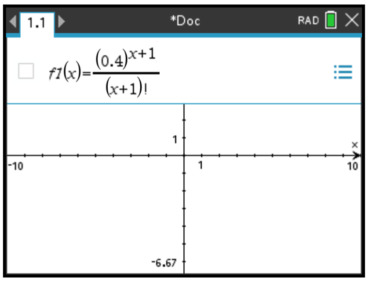
So, volume of revolution $= 625\pi$ units^3.

CHAPTER 24 - MACLAURIN POLYNOMIALS

TI-$n$spire

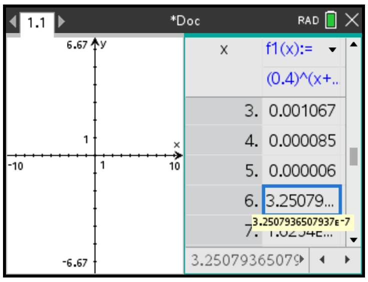
To obtain a Maclaurin polynomial which estimates $e^{0.4}$ with error less than $0.000\,01$, we must find n such that

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



First press **on**, select **B Graph** or **Add Graph**, and enter $\frac{(0.4)^{x+1}}{(x+1)!}$ into **f1(x)**.

Note: ! is entered by pressing **ctrl** (∞β°) and selecting **!**.



Press **enter** then **ctrl** **T** to view the table of values.

The first time that **f1(x)** 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

TI-$n$spire

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

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

The **TI-$n$spire** has the inbuilt function **euler** to carry out Euler's method:

euler(Expr, Var, depVar, {Var0, VarMax}, depVar0, VarStep [, eulerStep]).

The argument **Expr** is for the right hand side of the differential equation. In this case, **Expr** is $e^x + 1$.

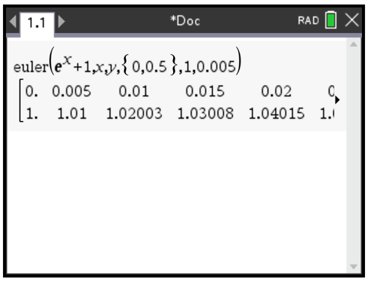
For this example, the rest of the arguments are as follows:

- **Var** is the variable x
- **depVar** is the variable y
- **Var0** is the value $x_0 = 0$
- **VarMax** is the value $x_{100} = 0.5$
- **depVar0** is the value $y_0 = 1$
- **VarStep** is the step size 0.005.

Note: **eulerStep** is an optional argument which is set to 1 by default.

The actual step size used by the calculator is $\frac{\textbf{VarStep}}{\textbf{eulerStep}}$, so we do not need this optional argument.

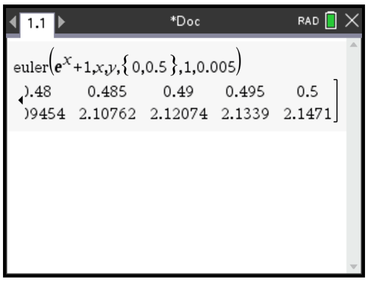
Set up the screen as shown alongside, and press **enter**.



Note: The Euler's method function can be accessed by typing **euler(**, or pressing [book key] **1**, and selecting **euler(** from the list.

e is entered by pressing **π ▶** and selecting **e**.

Press **▲** to highlight the output, and press **▶** to view the final entry.



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

CHAPTER 26 - DRAWING SCATTER DIAGRAMS

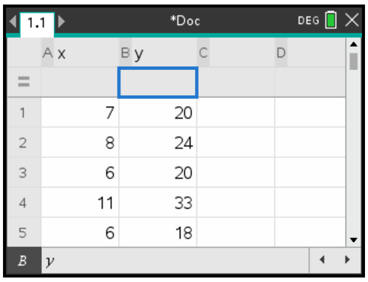
TI-$n$spire

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

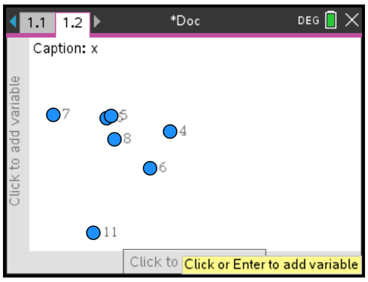
Press **on** and select **Add Lists & Spreadsheet**.

Enter the x-values into list **A**, and name the list **x**. Enter the y-values into list **B**, and name the list **y**.



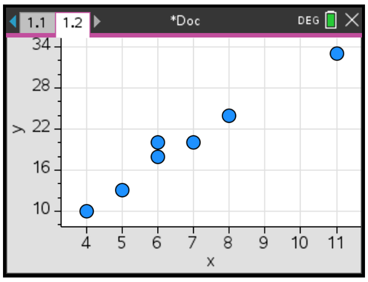
Press **on** and select **Add Data & Statistics**.

You will see the labelled data points scattered on the screen.



Move the cursor to the bottom of the screen until **Click or Enter to add variable** appears. Press **enter**, then select **x**.

Move the cursor to the left of the screen until **Click or Enter to add variable** appears. Press **enter**, then select **y**.



CHAPTER 26 - CALCULATING r

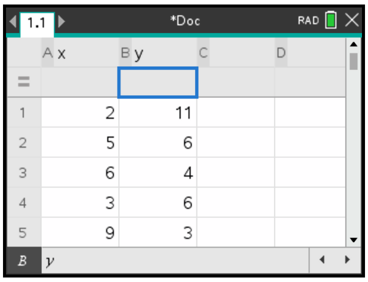
TI-$n$spire

Find the correlation coefficient r for the data alongside.

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

Press **on** and select **Add Lists & Spreadsheet**.

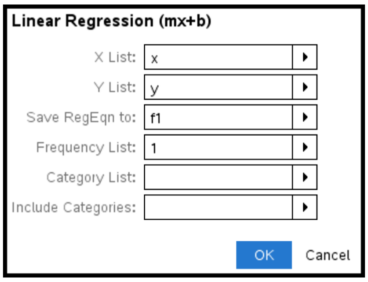
Enter the x-values into list **A** and name the list **x**, then enter the y-values into list **B** and name the list **y**.



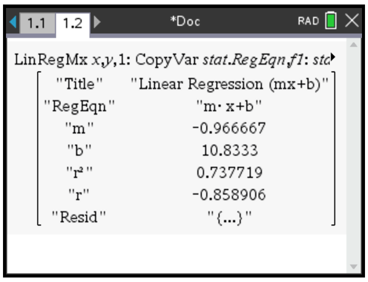
Press **on** and select **Add Calculator**.

Press **menu**, select **6 Statistics**, **1 Stat Calculations**, then **3 Linear Regression (mx+b)...**.

Set up the screen as shown, and press **enter**.



So, $r \approx -0.859$.



CHAPTER 26 - REGRESSION LINE

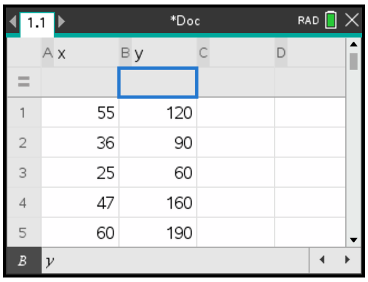
TI-$n$spire

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

Press **on** and select **Add Lists & Spreadsheet**.

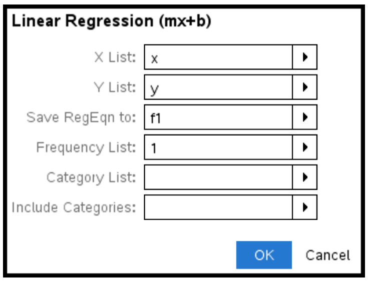
Enter the x-values into list **A** and name the list **x**, then enter the y-values into list **B** and name the list **y**.



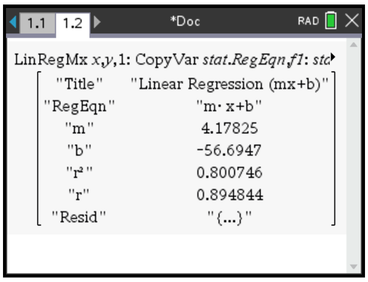
Press **on** and select **Add Calculator**.

Press **menu**, select **6 Statistics**, **1 Stat Calculations**, then **3 Linear Regression (mx+b)...**.

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



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



CHAPTER 26 - REGRESSION LINE ON A SCATTER DIAGRAM

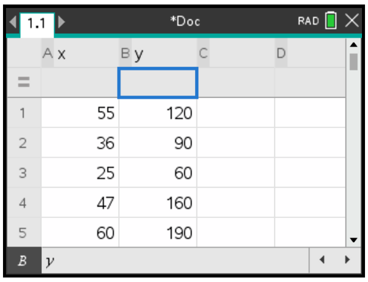
TI-$n$spire

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, press **on** and select **Add Lists & Spreadsheet**.

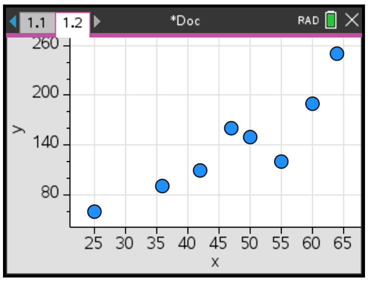
Enter the x-values into list **A** and name it **x**, then enter the y-values into list **B** and name it **y**.



Press **on** and select **Add Data & Statistics**.

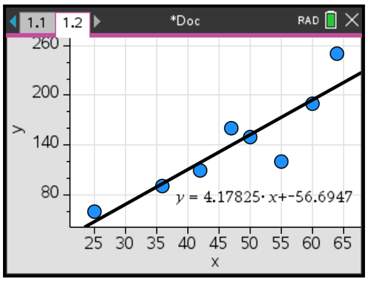
Move the cursor to the bottom of the screen until **Click or Enter to add variable** appears. Press **enter**, then select **x**.

Move the cursor to the left of the screen until **Click or Enter to add variable** appears. Press **enter**, then select **y**.



To add the regression line to the diagram, press **menu**, select **4 Analyze**, **6 Regression**, then **1 Show Linear (mx + b)**.

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



CHAPTER 27 - STANDARD DEVIATION OF A DISCRETE RANDOM VARIABLE

TI-$n$spire

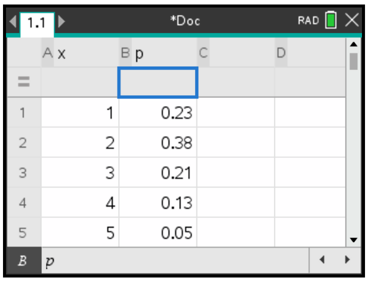
Find the standard deviation of the probability distribution alongside.

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

Press **on** and select **Add Lists & Spreadsheet**.

Enter the values for x_i into list **A**, and name the list **x**.

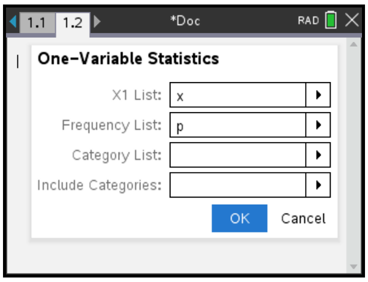
Enter the values for p_i into list **B**, and name the list **p**.



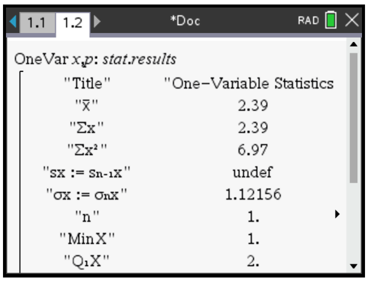
Press **on** and select **Add Calculator**.

Press **menu**, select **6 Statistics**, **1 Stat Calculations**, then select **1 One-Variable Statistics...**. Press **enter** to use 1 list.

Select **x** from the **X1 List:** drop-down, and select **p** from the **Frequency List:** drop-down.



Press **enter** to view the statistics.



So, $\sigma \approx 1.12$.

TI-$n$spire

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

To generate random integers, use the **seqGen** and **randInt** functions.

First press **on** and select **Add Lists & Spreadsheet**.

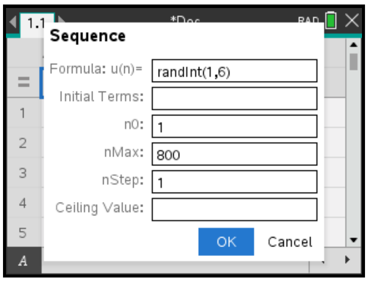
Move the cursor to the header of list **A**, and press **menu**.

Select **3 Data**, then **1 Generate Sequence**.

Enter **randInt(1, 6)** into **Formula: u(n)**.

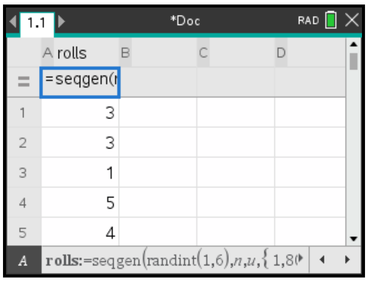
Set **n0** $= 1$, **Max** $= 800$, and **nStep** $= 1$.

Note: **randInt** is entered by pressing 1 and selecting **randInt(**.



Press **OK** to populate list **A** with 800 random integers from 1 to 6.

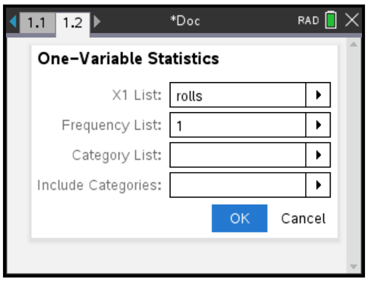
Name the list **rolls**.



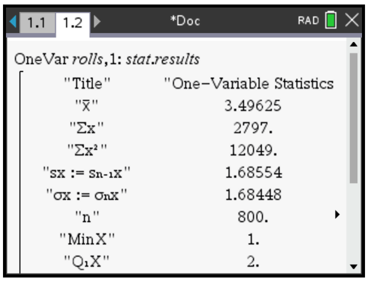
Press **on**, select **Add Calculator**, then press **menu**.

Select **6 Statistics**, **1 Stat Calculations**, then **1 One-Variable Statistics...**.

Select **OK** to use 1 list, and set up the screen as shown alongside.



Select **OK** to view the statistics.



So, $\mu \approx 3.50$ and $\sigma \approx 1.68$.

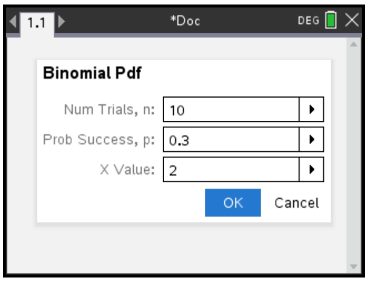
Note: Your values of μ and σ may not be exactly the same, but should be close (within ± 0.1).

TI-$n$spire

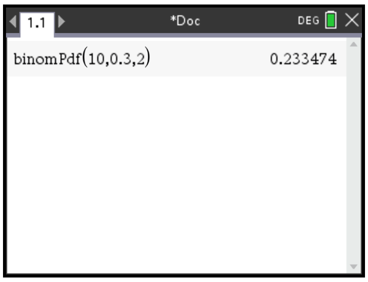
To find $P(X = 2)$ for $X \sim B(10, 0.3)$, press **on** and select **A Calculate** or **Add Calculator**.

Press **menu** and select **5 Probability**, **5 Distributions**, **A Binomial Pdf....**

Set up the screen as shown, then press **enter** to display the result.



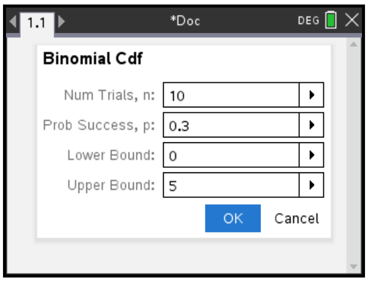
So, $P(X = 2) \approx 0.233$.



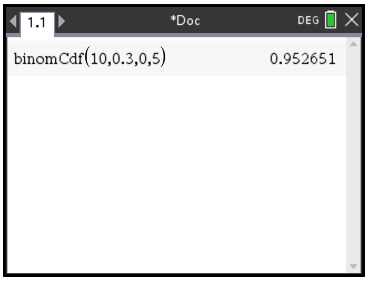
To find $P(X \leqslant 5)$ for $X \sim B(10, 0.3)$, press **on** and select **A Calculate** or **Add Calculator**.

Press **menu** and select **5 Probability**, **5 Distributions**, **B Binomial Cdf....**

Set up the screen as shown, then press **enter** to display the result.



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



CHAPTER 27 - MEAN AND STANDARD DEVIATION OF A BINOMIAL DISTRIBUTION

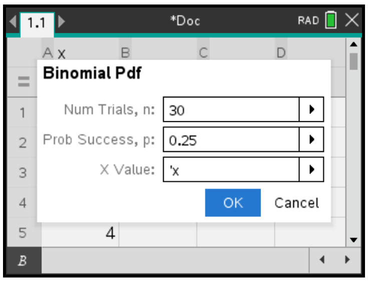
TI-$n$spire

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

Press **on**, select **Add Lists & Spreadsheet**, and enter the values $0, 1, ..., 30$ into list **A** and name it **x**.

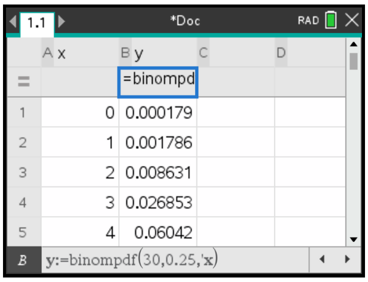
Move the cursor to the second row of list **B**, press **menu**, select **4 Statistics**, select **2 Distributions**, then select **A Binomial Pdf....**

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



This calculates $\text{P}(X = x)$ for every value of x from 0 to 30.

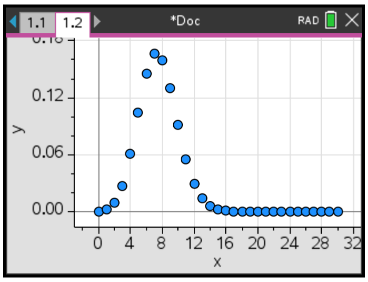
Name this list **y**.



To draw a scatter plot of the data, press **on** and select **Add Data & Statistics**.

Move the cursor to the bottom of the screen until **Click or Enter to add variable** appears. Press **enter**, then select **x**.

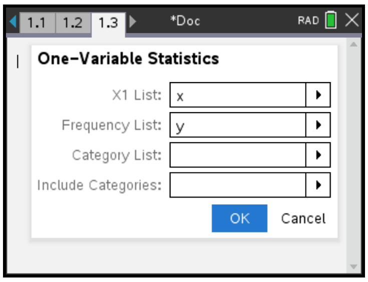
Move the cursor to the left of the screen until **Click or Enter to add variable** appears. Press **enter**, then select **y**.



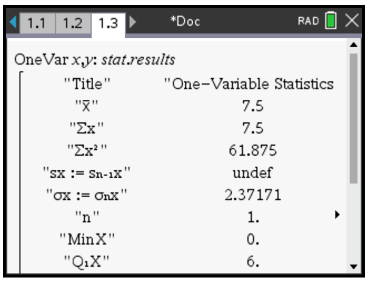
To calculate the descriptive statistics, press **on** and select **Add Calculator**.

Press **menu**, select **6 Statistics**, select **1 Stat Calculations**, then select **1 One-Variable Statistics....**

Press **enter** to use 1 list, then set up the screen as shown.



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



CHAPTER 28 - FINDING THE MEAN OF A CONTINUOUS RANDOM VARIABLE

TI-$n$spire

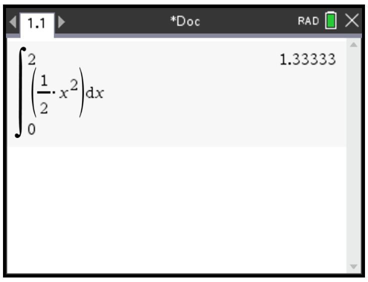
The mean of the distribution with probability density function $f(x) = \frac{1}{2}x,\ 0 \leqslant x \leqslant 2$ is

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

To evaluate this, press **on** and select **A Calculate** or **Add Calculator**.

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

Note: The integral is entered by pressing $|\square|\ \{\genfrac{}{}{0pt}{}{\square}{\square}$ and selecting $\int_{\square}^{\square} \square\, d\square$.



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

CHAPTER 28 - NORMAL PROBABILITIES

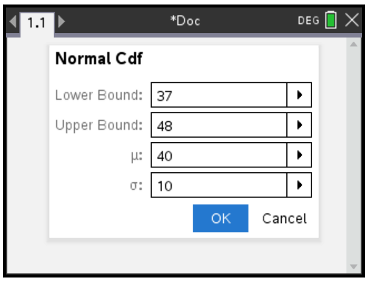
TI-$n$spire

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

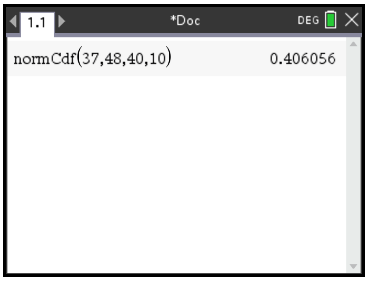
To find $\mathrm{P}(37 < X < 48)$, start in the Calculator application.

Press **menu** and select **5 Probability**, **5 Distributions**, **2 Normal Cdf...**.

Set up the screen as shown, then press **enter** to display the result.



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

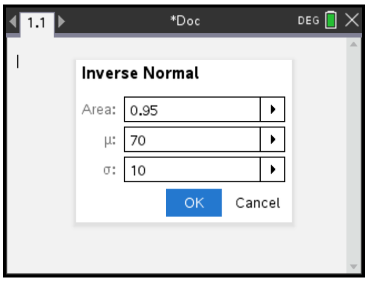


CHAPTER 28 - CALCULATING QUANTILES

TI-$n$spire

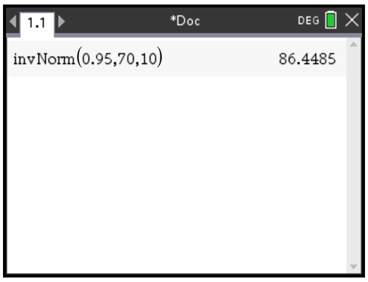
Suppose X is normally distibuted with mean 70 and standard deviation 10.

To find k such that $P(X \leqslant k) = 0.95$, start in the Calculator application.



Press **menu** and select **5 Probability**, **5 Distributions**, then select **3 Inverse Normal...**.

Set up the screen as shown then press **enter**.



So, $k \approx 86.45$.