

Manual



MyCalcApp 2.0

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Contents

- Contents 2
- Foreword 4
- Introducing MyCalcApp 5
- How it works..... 7
 - Start up 7
 - Two modes, two keyboards 7
 - Press and long press in superpower mode 7
 - Left and right handedness 8
 - Regular stuff: + - x : ^ 8
 - Using percentages and *absolute* percentages 9
 - Conversion to and from percentages 9
 - Percentages in operations 9
 - Fraction math 10
 - Conversion to/from decimals – percentages – fractions 10
 - Math with units of measure (part 1) 10
 - Math with units of measure (part 2) 11
 - Units of measure overview 11
 - Some examples 12
 - Clear and All Clear 14
 - Built in functions 14
 - Factorization 14
 - Degrees and radians 14
 - To and from decimal hours 14
 - Currency math 14
 - Setting the number format 15
 - Using formulas 15
 - The Muiswerk key 15
 - The Scroll 15
 - About the memory functions and parenthesis? 16
- Background 17

Differences between iOS- and Android-versions 18

Quick start 19

 Superpower mode..... 19

About us 20

Gallery 21

Copyrights..... 23

Index 24

Foreword

How come calculators have not changed at all in 40 years? The calculator on your iPhone today is the same as the 1973 MITS calculator.



MITS (1973)



iPhone (2013)

What calculations would you like to do ... but can't you do on your calculator? When did you last use the store/recall key on your calculator? Oh, you never used it?

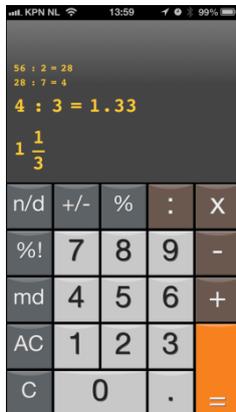
It is time for a revolution. It is time for ... MyCalcApp.

Have fun,

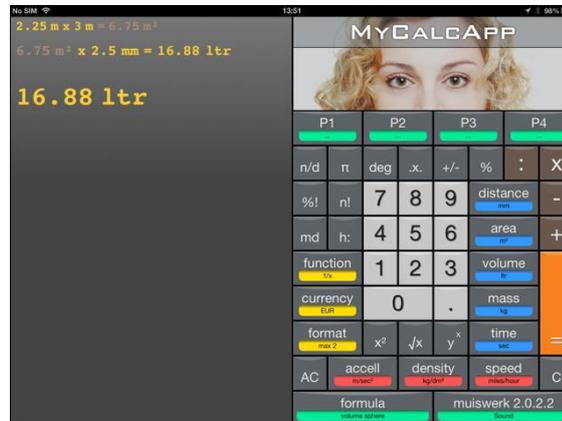
Muiswerk Educatief

Introducing MyCalcApp

MyCalcApp adds a new dimension to the hand held calculator.



MyCalcApp (2013)



MyCalcApp *superpower mode* (2013)

Percentages and Absolute percentages. Just adding a surcharge or subtracting a discount from a number is easy. Any calculator can do this. One uses the percentage or the % key. MyCalcApp also has an absolute percentage or %! key. Use the absolute percentage key to undo a surcharge (or a discount) from a number. If an amount including 4% VAT is \$ 99.50. What is the number before VAT. $\$99.50 - 4\ \%! = \$ 95.67$.

To get the same result on another calculator you would have to do: $\$99.50 / (100+4) * 100$.

Restore a previous result, any result. To be able to reuse the result of an earlier computation there is no need to first store it. Every line on the scroll is a visual memory *all the time*. Reusing that result is as easy as touching it. No more need for STO, RCL, M+, MR keys.

Fraction math. Adding and subtracting fractions is not a simple task. MyCalcApp can easily add, subtract, multiply and divide fractions. And it can convert fractions into decimals and percentages ... and back.

Units of measure. Besides simple arithmetic MyCalcApp also accepts units of measure in its calculations and performs all conversions automatically. Use the mode or MD key to switch to *superpower mode* to get access to the units of measure keys.

It takes Usain Bolt 9.58 seconds to run 100 meters. What is his average speed?

Divide *distance* by *time* to get *speed*.

Type: $100\ m : 9.58\ sec =$... and you get your answer: **23.35 miles/hour**. Converting meters to miles and seconds to hours happens at the same time.

If a sandbox is 1.5 yards in length, 30 inch in width and 6 inch deep how much sand do I need? Just type:

$1.5\ y \times 30\ i \times 6\ i =$... and you get the answer: **42.08 gallon** or **0.21 yard³** sand.

Any calculator can compute and any unit converter can convert units. Only MyCalcApp will do what most computations actually require:

Compute and convert units ... at the same time!

And there is more.

Currency math. MyCalcApp will add numbers in mixed currencies.

$5 \text{ dollar} + 12 \text{ euro} + 16 \text{ Yen} = 15.96 \text{ euro}^1$. MyCalcApp will ask Google for actual conversion rates and will convert as you type.

Popular formulas. If you know the formula for the volume of a sphere, it is still difficult to compute it on most calculators. Except if you use MyCalcApp. For starters, it knows the formula, pick it from the list (volume of sphere). Enter the radius 1 m radius and you get the answer $= 4.19 \text{ cubic meters}$.

We feel that MyCalcApp might just be the calculator for you. Please try it!



¹ On March 25, 2013

How it works

Start up



Two modes, two keyboards

MyCalcApp has two keyboard layouts. One is for the power-mode and the other for superpower mode. Use the mode or `md` key to switch.



Power mode



Superpower mode

← md →

Press and long press in superpower mode

Pressing a key invokes the standard function of the key. Some keys (yellow, red, green, blue) support multiple functions. Long press such a key to change its function. A menu appears. Select a menu item.

An example. By default the distance key is set to **yards**. Long press it to set the default distance to **inches**.

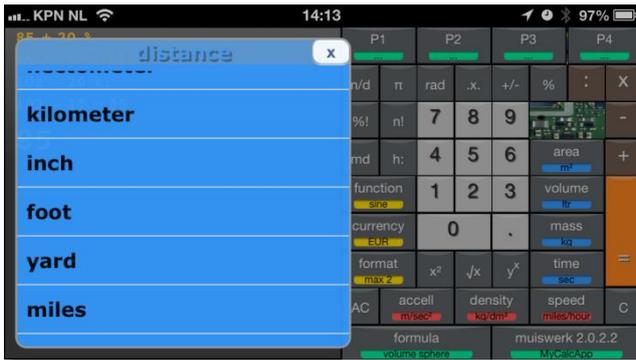


Figure 1 Switch yards to inches via long press

Left and right handedness

Putting your tablet in horizontal orientation will give the scroll extra room. If the keyboard is on the wrong side for you, swipe the scroll to the other side. The keyboard and the scroll will change place and MyCalcApp will remember it for the next time.



swipe →



MyCalcApp Right handed

MyCalcApp Left handed

Regular stuff: + - x : ^

Let's start with adding, subtracting, multiplication and division. The regular stuff:

$$5 \times 5 = 25$$

$$17 + 23 = 40$$

$$80 : 4 = 20$$

$$70 - 10 = 60$$

You don't have to press \square you can just continue adding and subtracting stuff. If possible MyCalcApp will compute and print intermediate answers. So:

$$17 + 15 = 32$$

$$32 + 16 = 48$$

MyCalcApp applies standard math rules. Power is the strongest, next come multiplication and division and weakest of course are adding and subtracting.

$$2 + 3 \times \text{(wait for strong x)}$$

$$2 + 3 \times 5 = (3 \times 5 = 15 \text{ add } 2) 17.$$

$3 + 4 \times 2^y$ (wait for strongest of all: power).

$3 + 5 \times 2^y \times 2 = (2^2=4, 5 \times 4=20, \text{ add } 3) 23$.

Using percentages and *absolute* percentages

The percentages key has two separate functions. One is to convert a decimal number or a fraction to and from a percentage. The other is to add or subtract a percentage to or from a number or to compute a percentage of a number.

Conversion to and from percentages

If 60 out of 80 students have black hair, what percentage is that?

$60 \div 80 = 0.75 \% 75\%$

Press it again to switch back.

$60 \div 80 = 0.75 \% 75\% \% 0.75 \% 75\%$

Note: the value of 75% is identical to 0.75.

Percentages in operations

How much is 21% of 80?

$80 \times 21 \% = 16.8$

Or add/subtract the percentage to/from a number:

$80 + 21 \% = 96.8$

$80 - 10 \% = 72$

Any calculator can do this. Now, suppose you want to compute this:

If the price including 21% VAT is \$ 96.80, how much is it before VAT?

On a regular calculator you would do:

$$96.8 : (100+21) \times 100 = 80$$

MyCalcApp makes this easier. Simply use the *Absolute percentage* or $\%!$ key. Type:

$96.8 - 21 \%! = 80$

Getting rid of a discount is also easy:

If the price including a 20% discount is 120 euro is. What was the original price?

$120 + 20 \%! = 150$

Another example:

$$110 - 20 \%! = 88 \text{ and } 88 + 20 \%! = 110$$

Fraction math

Adding, subtracting, multiplying and dividing fractions, is not easy, unless you use MyCalcApp. Let's start simple. The important key is the numerator/denominator or $\frac{n}{d}$ key. This key can be used in two ways: to convert a decimal number to and from a fraction; to enter a fraction or move from numerator to denominator.

Compute $\frac{1}{2} + \frac{2}{3}$ like this:

$$\frac{n}{d} \frac{1}{2} + \frac{n}{d} \frac{2}{3} = \dots 1 \frac{1}{6}$$

$$\frac{n}{d} \frac{1}{3} \times \frac{n}{d} \frac{2}{3} = \dots \frac{2}{9}$$

If you have wholes to enter, start with those first:

$$1 \frac{n}{d} \frac{1}{3} \times 2 = \dots 2 \frac{2}{3}$$

Conversion to/from decimals – percentages – fractions

Consider 0.25 and 25% and $\frac{1}{4}$ really represent exactly the same value. Conversion from decimals to percentages is always possible and vice versa. Conversion from decimals to fractions is not always possible. If it is not possible a good approximation is used. Use the $\frac{n}{d}$ key and $\%$ key to do the conversions:

$$0.25 \ \% \ 25\% \ \frac{n}{d} \ \frac{1}{4} \ \% \ 0.25$$

Math with units of measure (part 1)

The most important feature of MyCalcApp is that after you enter a number, if you like, you can also enter a unit of measure. And, MyCalcApp knows what to do with these units. Why an important feature? In most practical computations, the unit of measure plays an important role. Still regular calculators do not give any help.

Some examples:

What is the area of roof of 2 meters by 3 meters?

Type:

$$2 \text{ m} \times 3 \text{ m} = 6 \text{ m}^2$$

It starts raining and 3 mm of rain hits the roof. How much water does the roof catch?

$$\times 3 \text{ distance mm} = 18 \text{ liter}$$

To switch the distance key from meters to millimeters, long press it and select millimeters. MyCalcApp knows exactly what to do when multiplying m^2 by mm. The result is liters.

How much is 2 kg plus 1.5 stone?

$$\text{Type: } 2 \text{ kg} + 1.5 \text{ mass stone} = 1.81 \text{ stone}$$

MyCalcApp knows the difference between kilograms, ounces, pounds, stones, grains, even carats and takes those differences into account before handing you the answer. In short:

If you enter the units of measure, the answer will take care of all conversions ... automatically.

How much is that in ounces?

Just long press the mass key: `mass ounce` = 406.55 oz.

Long press a unit of measure to do a straight forward conversion.

Math with units of measure (part 2)

MyCalcApp will handle quite a few conversions automatically. The best way to demonstrate this is by means of some examples. But first let's look at an overview.

Units of measure overview

Units of distance

From nanometers to kilometers and also inches, feet etc.

Units of area

From square nanometers to square kilometers and also square inches, square feet etc.

Units of volume

From cubic nanometers to cubic kilometers and also cubic inches, cubic feet, gallons, barrels etc.

Units of mass

From micrograms to kilograms and also pounds, ounces, grains, carets etc.

Units of time

From milliseconds to weeks.

Units of speed

Meters per second, kilometers per hour, miles per hour. Also square meters per hour, liters per hour etc.

Density

This key by default has a value of 1 and the unit of measure is kg/liter. Its value can be modified into the density of one of many different materials. Metals, fluids, minerals etc. Use this key to compute the mass of a given volume of a material (multiply by density), or the other way around compute the volume of a certain mass of the material (divide by density).

Units of acceleration

Just the m/s^2 .

Some examples

If you want to check out the examples below, do use MyCalcApp. Regular calculators won't do the trick. ☺

A car is driving at 65 miles/hour. How far does it go in 40 minutes?

$$65 \text{ speed miles/hour} \times 40 \text{ time min} = 48.75 \text{ mile}$$

A car is driving at 55 miles/hour for 15 minutes and 65 miles/hour for another 1.5 hour. What distance does it cover?

$$55 \text{ miles/hour} \times 1 \text{ time quarter} = 13.75 \text{ mile}$$

$$65 \text{ miles/hour} \times 1.2 \text{ time hour} = 97.5 \text{ mile}$$

$$13.75 \text{ mile} + 97.5 \text{ mile} = 111.25 \text{ mile}$$

You can do computations one at the time and afterwards combine them. Just touch the previous answer to reuse it in a new computation. Or you could just type the whole thing in at once:

$$55 \text{ miles/hour} \times 1 \text{ time quarter} + 65 \text{ miles/hour} \times 1.2 \text{ time hour} = 111.25 \text{ mile}$$

A car drives for 1 hour and 15 minutes at a speed of 60 miles/hour. A cyclist covers the same distance at 14 miles/hour. How much time does the cyclist take?

$$1 \text{ h} : 15 \text{ h} : 0 \times 60 \text{ miles/hour} = 75 \text{ mile}$$

$$\div 14 \text{ miles/hour} = 5.36 \text{ hour}$$

$$\text{h} : 5:21:26$$

It takes the cyclist 5 hour, 21 minutes and 26 seconds. The $\text{h} :$ key is first used to enter time in an hh:mm:ss format and later to convert digital time back into hh:mm:ss format.

Usain Bolt holds the world record on 100 meter sprint: 9.58 seconds². What is his average speed?

$$100 \text{ m} \div 9.58 \text{ sec} = 23.35 \text{ miles/hour}$$

Note: all conversions from meters to miles and from seconds to hours happen automatically. All you have to know is: *distance* divided by *time* will give *speed*.

² Berlin August 16, 2009.

My swimming pool has a width of 3 meters and a length of 7 meters. The depth is 85 cm. To fill it up I am using a water tap that can deliver .8 liter per second. How long will it take to fill up my swimming pool?

$$3 \text{ meter} \times 7 \text{ meter} \times 85 \text{ afstand cm} = 17849 \text{ liter}$$

$$: 0.8 \text{ liter/sec} = 6.2 \text{ hour}$$

$$h: 6:12:00$$

It will take 6 hours and 12 minutes to fill up the pool.

A roof is 6.5 meters by 2.5 meters. The rain it catches is lead to a round water tank that has a diameter of 60 cm. After a rain shower, the water level in the tank is 20 cm higher, how much rain fell (in mm)?

$$\text{formula cylinder volume } 30 \text{ cm radius } 20 \text{ cm height cylinder volume} \rightarrow 56.55 \text{ liter}$$

$$6,5 \text{ meter} \times 2,5 \text{ meter} = 16.25 \text{ m}^2$$

$$56,55 \text{ liter} : 16.25 \text{ m}^2 = 3.58 \text{ millimeter}$$

Using the formula for cylinder volume we compute the total amount of water that was added to the tank. Next we compute area of the roof. By dividing volume by area we get the 'height' of the rain that fell on the roof. Note that the coloring happens as we reuse the data on the scroll by touching a previous result.

My trailer can handle 1.5 ton. It is 1.80 meter wide and 2.5 meters long. How much sand can I load in my trailer (height)?

First compute what 1 cm of sand weighs:

$$1.80 \text{ meter} \times 1.5 \text{ meter} \times 1 \text{ cm} \times \text{s.m. mineral dry sand} = 43.2 \text{ kg}$$

$$2 \text{ ton} : 43.2 \text{ kg} = 46.3$$

I can load no more than 34.7 cm of sand in my trailer.

Clear and All Clear

The \boxed{C} key clears your last entry.

The \boxed{AC} key clears the current computation. Hit it a second time and it will do a full clear on the scroll.

Built in functions

Basic math functions are all available through the functions key. Long press it to change function.

Available functions are: sine, cosine, tangent, cotangent, arcsine, arccosine, arctangent, e-power (e^x), logarithm(10), natural logarithm (ln), 10^x , $\frac{1}{x}$.

Factorization

To factorize an number, use the $\boxed{.x.}$ key.

$\boxed{68}\boxed{.x.} \rightarrow 2 \times 2 \times 17$

or

$\boxed{5849}\boxed{.x.} \rightarrow \text{prime}$

Primes cannot be factorized of course. This function is limited. If the limit is reached you may see: *probably prime*.

Degrees and radians

The $\boxed{\text{deg/rad}}$ key switches to and from degrees (0-360°) and radians (0 to 2pi). This is not a conversion. It is a setting for MyCalcApp.

To and from decimal hours

To use time in calculations, either enter time in a specific way or convert to and from decimal time using the $\boxed{h:}$ key.

What time passed between 2:30:00 and 4:45:00?

Type: $\boxed{4}\boxed{h:}\boxed{30}\boxed{h:}\boxed{00} - \boxed{2}\boxed{h:}\boxed{45}\boxed{h:}\boxed{00} = 1.75\boxed{h:}\boxed{01:45:00}$

One hour and 45 minutes passed or $1\frac{3}{4}$ of an hour. The $\boxed{h:}$ key is used both while entering time data and also to convert to and from decimal hours afterwards.

John runs 42 kilometers in 2 hours and 6 minutes. What is his average speed?

$\boxed{42}\boxed{km}\boxed{:}\boxed{02}\boxed{h:}\boxed{06}\boxed{h:}\boxed{00} = 12.43 \text{ miles/hour (or 20 km/hour)}$.

Currency math

How much does an iPad cost in Euros if I buy it in USA for 499 dollar?

$\boxed{499}\boxed{\text{dollar}} = \$ 499.00 \boxed{\text{euro}} \text{€ } 384.35^3$

After my trip I have 22 euro, 16 dollar and 120 Yen. How much money do I have in dollars?

³ op 24 maart 2013

120 yen + 22 euro + 16 dollar = \$ 45.88⁴

Current Google exchange rates (no older than 1 hour, as long as there is an internet connection) are used to do the automatic conversions.

Setting the number format

The default number format setting in MyCalcApp is `max 2`. This means that numbers that have more than 1 decimal are rounded on the second decimal. Except if the result would become 0.00. In that case all decimals will be shown.

`40 : 2 =` 10

`5 : 2 =` 2.5

`5 : 3 =` 1.67

Do you want more or less decimals? Use the `format` key to select `1, 2, 3 or 4 decimals` fixed. Do you want as many decimals as possible, always, select the `variable` format.

Using formulas

The volume of a sphere is $\frac{4}{3} \times \pi \times r^3$. Even if you know this, it is still quite an effort to compute the result for $r = 5$ cm. With MyCalcApp it becomes really easy.

Long press the formula key to get the list of built in formulas. Select `volume of a sphere`. The top row of keys now appears and on the left one will get a label: `radius`. Now simply type `5 cm` and hit that top left key: `radius`. The scroll will show: radius = 5 cm. Almost there ... just hit the formula key and the result is computed for you.

$$\frac{4}{3} \times \pi \times (5 \text{ cm})^3 = 0.52 \text{ liter}$$

Some of the formulas that are available: conversion Fahrenheit to and from Celsius; end speed given acceleration and time; distance, given begin speed, acceleration and time; area of triangle; volume of a sphere; volume of a cylinder; volume of a cone. Need more? Do mail us your suggestions!

The Muiswerk key

Long press the Muiswerk key to get access to a quick start reference, the full manual, the Muiswerk website and a sound on/off option.

The Scroll

The results of your computations are printed on the scroll. In some cases MyCalcApp will print intermediate results automatically. Scroll back your scroll to see earlier results.

⁴ op 24 maart 2013

About the memory functions and parenthesis?

If you do your math with MyCalcApp every line of the scroll is a memory. Touching it will bring the result into your current calculation. No need for parenthesis either.

Your challenge: $(2.25+3.96) \times (5.36+3.88) + 89 + 2653:15$

Just type:

$$2.25 + 3.96 = 6.21$$

$$5.36 + 3.88 = 9.24$$

$$89 + 2653 : 15 = 265.87$$

$$6.21 \times 9.24 = 57.38$$

$$57.38 + 265.87 = \underline{323.25}$$

The coloring happens as you reuse your results. Thus you can always retrace your steps.

Background

Muiswerk Educatief is based in Uithoorn, The Netherlands, Europe. We create clever interactive web based learning experiences. Our cognitive tutor is a powerful platform for educational experts to create interactive materials for any subject. Muiswerk products are deployed in over 2800 locations worldwide today.

In 2011 we created our first app to support our language products: a straight forward powerful dictionary for the Dutch language. This app is downloaded 50.000 times per year.

For our second app we set out to support our math products. We came up with ... a calculator! Everyone knows what a calculator is and what you can do with it. We asked ourselves this question: how come calculators have hardly changed over the last 40 years. We brainstormed ourselves into the concept of a revolutionary calculator that brings all the innovations one could have wished for in the past 40 years. MyCalcApp brings a new dimension to math. A product not just for students. MyCalcApp is for all of us.

MyCalcApp is available in Dutch and English on iPod, iPhone, iPad and on Android devices.

For more information: Muiswerk Educatief: <http://www.muiswerk.nl/mycalcapp>.

Differences between iOS- and Android-versions

MyCalcApp was created using the Titanium framework. This has allowed us to simultaneously develop the iOS version (available in Apple App Store) and the Android version (available in Google Play Store). Titanium does respect the differences between iOS and Android in order to make the resulting app look and feel like it truly belongs on the platform.



Quick start

Superpower mode

n/d - numerator/denominator
enter a fraction; convert decimal to/from fraction

n! faculty

%! add/subtract absolute percentage

h: covert hours
hh:mm:ss ↔ h.xxxx

md switch from powermode to superpowermode

0 ... 9 digit keys

use/select built in function

use/select currency

x² square x

set display format

√x square root of x

AC clear line or (2x) clear screen

use/select unit of acceleration

use/select compute formula

π value of pi

P1 P2 P3 P4 enter parameters used by formulas

deg/rad assume degrees or radians

.x. factorize

+/- change sign

% add/subtract %; convert decimal or fraction to percentage

: divide by

x multiply by

- subtract

use/select unit of distance

+ add

use/select unit of area

= compute

use/select unit of volume

use/select unit of mass

c clear last entry

use/select unit time

use/select info

use/select unit of speed

. decimal point

y^x y to the power of x

use/select density factor

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Figure 2 iPad quick start

About us



Figure 3 Muiswerk Team

Design and development iOS-version and Android-version: *John Bouwens*

Basic design and prototype: *Theo Schijf*

Artwork all version: *Arie Schijf*

Ideas: staff of Muiswerk Educatief

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Gallery



Figure 4 MyCalcApp on iPhone in powermode



Figure 5 MyCalcApp on iPad in superpower mode

Muiswerk Educatief

by Bouwens/Schijf/Schijf

MyCalcApp

Adds a new dimension to calculators



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Index

10^x , 14
AC, 14
all clear, 14
Android, 18
arccosine, 14
arcsine, 14
arctangent, 14
artwork, 20
average speed, 12, 14
background, 17
C, 14
clear, 14
click, 7
contents, 2
conversion 0.25 ... 1/4 ... 25%, 10
copyrights, 22, 23
cosine, 14
cotangent, 14
currency key, 14
decimal hours, 14
degrees, 14
denominator, 10
density, 11
design, 20
development, 20
dollar, 14
euro, 14
examples, 12
factorization-key, 14
foreword, 4
formulas, 15
fractions, 10
function key, 14
gallery, 21
how it works, 7
idea, 20
introduction, 5
inverse of x , 14
iOS, 18
left handed, 8
ln, 14
logarithm, 14
long press, 7
md, 7
memory function, 16
modes
 keyboard, 7
muiswerk educatief, 17
muiswerk key, 15
mycalcapp, 1
n/d key, 10
natural logarithm, 14
number format key, 15
numerator, 10
operators, 8
papierrol, 14
parenthesis, 16
percentages, 9, 10
press, 7
prime, 14
probably prime, 14
quick start, 19
radians, 14
right handed, 8
scroll, 15
sine, 14
superpower mode, 19
tangent, 14
Titanium, 18
units of measure, 10, 11
Usain Bolt, 5
yen, 14