

What is Isahgenius ©.

Isahgenius is a series of spreadsheets created to assist Road Traffic Accident Investigators. It was written by an Accident Investigator for Accident Investigators.

Isahgenius is designed to assist with calculations, conversions and problems likely to be encountered in accident reconstruction. Containing over 80 formulas and combinations of formulas Isahgenius is set out in such a way that the user can quickly perform a whole range of calculations the results of which can be readily printed or copied into a Windows based word processor document. Isahgenius can perform complicated calculations in seconds.

Unlike other programs, Isahgenius allows users to view and consider a whole range of answers.

It contains composite as well as base equations.

Isahgenius consists of a workbook containing 12 worksheets named Speed, Distance, Time etc. Each worksheet consists of a series of tables, the user just enters the known values into the input cells and the calculations are performed instantly. One of the values is ranged so that the user is presented with several answers according to the ranged value.

By pasting the table onto another sheet, any chosen value can be ranged using the power of the host program to perform the calculations and provide functionality.

There are a number of features that differentiate Isahgenius from all other A.I calculation packages.

Firstly, from the data supplied, it will calculate all possible answers. Thus, you may wish to calculate the distance taken to accelerate from one speed to another when the rate of acceleration is known. Isahgenius will do this but it will also tell you the time taken to complete this manoeuvre. By default, the calculation is repeated 8 times, according to the variable, so 16 answers are given for just one input.

Another feature is that it contains a combination of formulas so that more complicated problems are easier to solve. For instance it will quickly calculate the safe speed in order to stop in a given distance (combining reaction distance with braking distance). Of course it will also tell you the total time taken to complete this manoeuvre.

The third feature is problem solving formulas which consider the relative movement of two vehicles. For instance it will tell you, for given parameters, the distance it would take one vehicle to overtake another, assuming either a constant speed, or constant acceleration for

the overtaking vehicle. These sort of problems can be very time consuming to solve with a calculator but Isahgenius will solve them instantly, and in this case will give you seven answers, according to the ranged value. However, remember that Isahgenius will calculate all possible answers from the data supplied. So, in the constant acceleration problem above, Isahgenius will also tell you the terminal speed and the time taken for the overtaking manoeuvre, for each of the seven scenarios!

Notes for guidance on Isahgenius ©.

Isahgenius © is a program to assist with accident investigation related problems.

In its standard form it consists of 12 sheets each containing several formulas.

To use just select the sheet which specifies the value that you wish to obtain.

e.g. Distance, time or velocity etc.

On most sheets the available formulas are displayed in yellow boxes at the top of the page. Click on the required formula and the cursor will move to the appropriate input box. Input boxes contain blue numbers surrounded by a black frame. Most sheets are protected to prevent accidental alteration and you can only input values in the input boxes. Enter the appropriate variables and the answer to the calculation is given between the two solid black lines. Input speeds are always in mph, (*see also section entitled Isahgenius © toolbar*) the next row shows the equivalent m/s. On some sheets I have added the calculated result of an extra unknown. e.g. On Distance sheet, Formula 4, which calculates distance, also shows the final velocity. This additional result is between broken lines. This result does not directly relate to that sheet but it saves time in making an additional calculation.

In the rest of the figures across the page I have ranged one value. I have chosen the value that is most likely to be estimated. I have tried to keep to a common and logical range but I accept that, on occasions, they may be either too narrow or too wide. To use the program efficiently, in the input box for the variable, enter a value higher or lower than your actual estimate. That way you will automatically get a range of answers each side the likely value.

Where a formula number is shown it relates to the formula number as shown in the Metropolitan Police Formula Book. In other cases the origin of the formula is shown where this can be ascertained.

Some formulas contain a help button, this refers the reader directly to the appropriate section on the information page (do not attempt to rename this page help, the macros will

not operate as help is a reserved word). The help is just brief guidance to some of the more complex equations. There is a return button at the end of each help section.

I have included a page called Paste. The idea of this is that it is a pre-formatted page where you can paste formula before you alter them. You may for instance want to alter the ranged values or copy one calculation several times so that you can input known values. An example would be calculating μ from skid tests. You may have completed three skid tests where you know your speed and thus you paste the equation three times side by side and then enter the appropriate speeds and distances.

Another use of the paste page would be to paste several formulas from different sheets so that they can be printed on just one sheet. The yellow formula boxes will not copy unless you unprotect the sheet. (Remember to protect again afterwards).

To use the Averages sheet, just enter a list of numbers in the boxes and the resultant averages are shown on the left of the screen. For percentile or quartile it is necessary to enter the appropriate figure in the input box below.

The Conversion sheet gives a conversion for just about any unit you are ever likely to use in accident investigation. Again, only input a value in the appropriate input box.

Graphs

The graph sheet contains pre-formatted graphs. The sheet is not protected and therefore it is recommended that before doing anything you copy the entire sheet and work with the copy rather than the original. Enter the variables in the input boxes and then, if necessary drag the appropriate row of mauve figures onto the chart.

Important. *Unless you are familiar with charting in Excel, do not delete all the data from a chart otherwise you will lose its formatting.*

The pedestrian throw chart is self explanatory. I would recommend that you use no more than three lines or the graph becomes a bit crowded.

The speed and relative distance charts are intended to compare the overall stopping distances of two vehicles, one travelling at the speed limit and the other at a higher speed. Remember, only input figures into the input boxes and the values for the chart will change automatically. You will need to manually enter the speed on the lower bar, and drag the cosmetic markings to their correct position. You can of course format in any manner you choose. An example of this is given to the right of this chart.

The second speed and relative distance chart compares three speeds, the speed limit and two higher speeds. This would be useful if you cannot calculate an actual speed just a minimum and maximum.

The third chart is defaulted at five speeds and is useful for a visual illustration of how stopping distance increase with speed.

The remaining charts illustrate how the data needs to be laid out should you wish to produce a graph for one of these formulas.

The last graph is used for calculating a safe speed for a bend. The speed shown is a speed at which any motorist should be able to negotiate the bend. The graph is used by some local authorities to determine the speed to be placed on a sign on some particularly tight and deceptive bends.

Macros

The spreadsheet contains a number of macros. To prevent their accidental alteration they are on hidden sheets.

There is an auto open macro. This hides the formula bar, status bar and, in most cases, row and column headers. They are not required when using Isahgenius © and their removal gives more visible screen space. All toolbars are hidden except one called Isahgenius. This contains all that you are likely to need when using this program. The auto close macro reinstates the standard Excel display. You can of course disable or modify the macros and this may be desirable if you are using a slower machine. (If this is the case I suggest that the graph sheet is moved to a separate spreadsheet).

Possible Problems

It is possible that you may experience problems especially with the Auto_Open macro. If this does not run correctly an error message will be displayed on the screen. If this is the case it will be necessary to edit the macro.

If an error message is displayed choose 'GOTO'.

This will take you to the line in the macro causing the problem.

Or

Choose Tools, Macros, select Auto_Open, and then choose the edit button.

To prevent Excel from reading a line of code that is causing a problem put a apostrophe (') before the line. This will then be ignored when the macro next runs.

The first section of this macro names the sheets. If you have deleted a sheet then you must delete its name from this line.

The next section disables the formula and status bar. If you want these to be permanently displayed substitute the word True for the word False.

The next section hides all the standard toolbars. If you want any of these to be permanently displayed substitute the word True for false.

If you have created additional named toolbars add them to the list with true or False as appropriate.

Similar problems may occur with the Auto_Close macro. Edit as necessary.

Yellow formula boxes

Every effort has been taken to ensure that the formulas display correctly on a whole range of monitors. However on some monitors at certain zoom levels it is possible that some of the formulas in the yellow boxes are slightly distorted. If this is the case modify as follows:-

Unprotect the sheet.

Select the formula box, if it is a box in the heading section then you will need to press the Control key as you select the box.

Then drag the yellow box to the desired size, normally this will be slightly larger.

(On some occasions it may be necessary to Ungroup the text in the box. This is done by selecting the Drawing icon and then the Ungroup icon. Click the Ungroup icon as many times as necessary to get to the appropriate level).

Resize the box (and, if necessary regroup).

If a heading box was ungrouped this will break its link with the macro. With the box selected reassign it by selecting Tools - Assign Macro.

Do not forget to protect the sheet after modifications.

Isahgenius © Toolbar

The Isahgenius toolbar contains five custom buttons.

The first enables you to Print Preview just the selected cells. This differs from the standard Print Preview which preview the entire sheet. You will find its use much quicker than any other method of printing.

The next allows you to input metres / second direct into a mph input cell. To use, select the input cell then press the toolbar button. Input the speed in metres / second and press Ok. This is a useful shortcut but beware, it will work with any input cell so make sure that only a mph cell is selected.

The next two are similar in that they enable inputs of μ into an acceleration rate cell and visa versa. Just make sure you use the correct button.

The fifth custom button is a toggle for column and row headings. By default these headings are switched off, clicking the button will display them only on the selected sheet.

Pasting into other applications

To paste an extract from Isahgenius into a word processor document use Edit - Paste Special - Microsoft Excel 5.0 Worksheet Object. Its horizontal position can be controlled by placing an indentation on the left side, in Word use Format - Paragraph. Alternatively the worksheet object can be placed in a frame and then moved anywhere on the page.

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