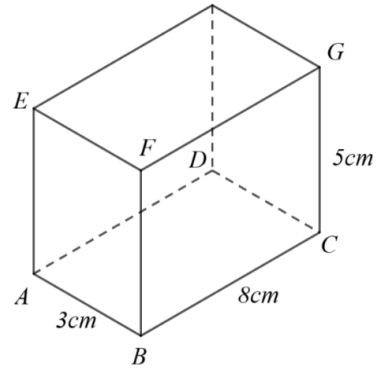
**3D Pythagoras/Trigonometry**
**www.m4ths.com – Steve B!**

(1) A cuboid is shown below.



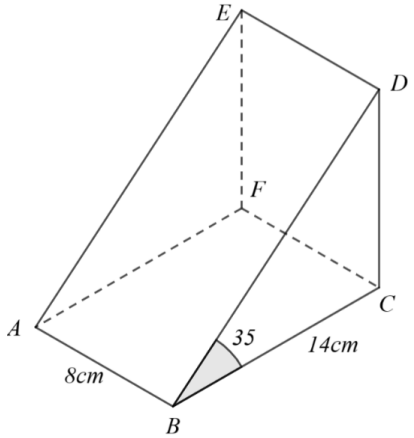

(a) Use Pythagoras to find the length $AC$

(b) Draw the triangle $GAC$

(c) Use Pythagoras to find the length $GA$

(d) Use trigonometry (SOH/CAH/TOA) to show that $< GAC$ is approximately $30^o$

(2) The diagram below shows a right triangular prism.




(a) Use trigonometry (SOHCAHTOA) to show that $CD$ is approximately $9.8cm$

(b) Use Pythagoras to show that $AC = 2\sqrt{65}$

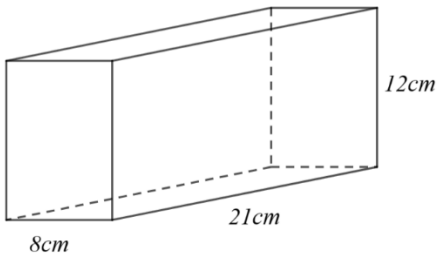
(c) Draw the triangle $DAC$

(d) Use your answers to parts (a) and (b) to find $AD$.

(e) Find the size of $< DAC$

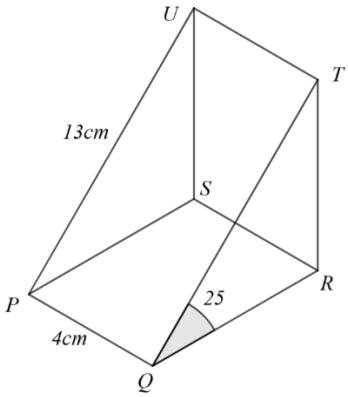
(f) Write down the other angle that is the same size as $< DAC$.

(3) The diagram below shows a cuboid.




Use Pythagoras to show that the longest diagonal in the box is $25.5cm$ to 1 decimal place.

(4) The diagram below shows a right triangular prism.




(a) Which length is the same as $UP$?

(b) Draw the triangle $TQR$.

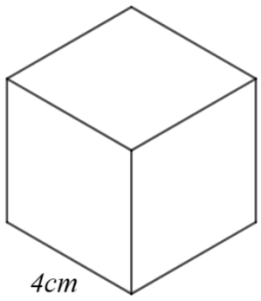
(c) Find the lengths $TR$ and $QR$ using trigonometry.

(d) Use Pythagoras to find $RP$

(e) Find the length $PT$.

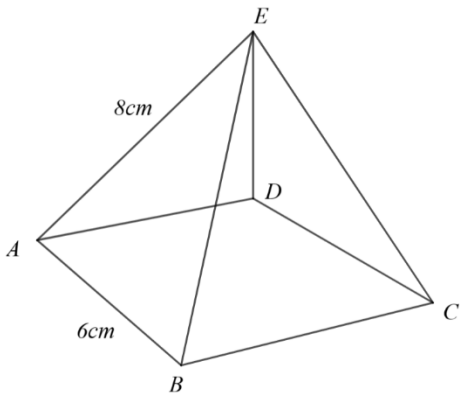
(f) Find $< TPR$.

(5) The diagram below shows a cube with side lengths $4cm$




Find the length of the longest pencil that will fit in the cube.

(6) The diagram below shows a square based pyramid



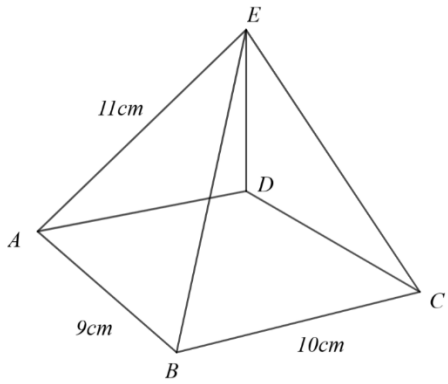

(a) The midpoint of $AC = M$. Show that $AM = 3\sqrt{2}$

(b) $M$ is directly below $E$. Draw triangle $AME$.

(c) Use Pythagoras to find the length $ME$.

(d) Find the size of $< EAM$

(7) The diagram below shows a rectangular based pyramid.




Find the size of $< EAC$

(8) A cuboid has dimensions $6cm, 12cm$ and $7cm$. Find any angle that one of the diagonals make with the base of the cuboid.

(9) A cube of side length $x$ has diagonals of length $7\sqrt{3}$.

(a) Show that the side lengths of the cube are 7.

(b) Find the surface area of the cube.