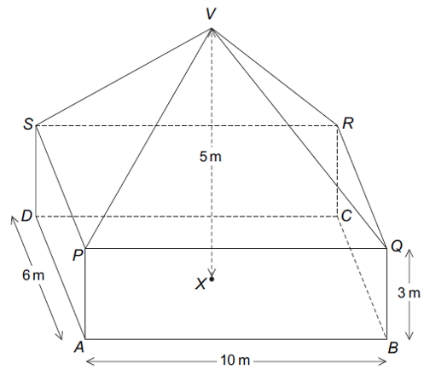
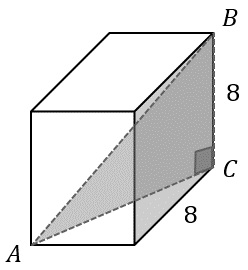
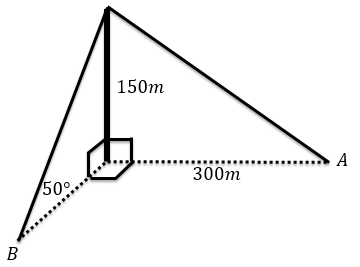
**Trigonometry II – 3D Pythagoras and Trigonometry**

**Test Your Understanding**  
[AQA Jan 2013 Paper 2] The diagram shows a cuboid and a pyramid . is directly above the centre of .

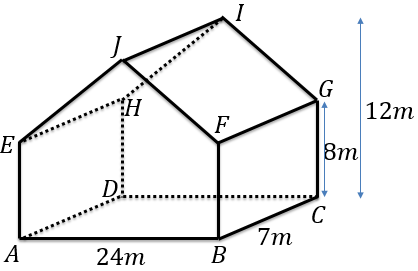
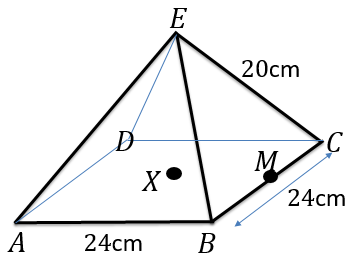
a) Work out the angle between the line and the plane . (Reminder: ‘Drop’ onto the plane)

b) Work out the angle between the planes and .

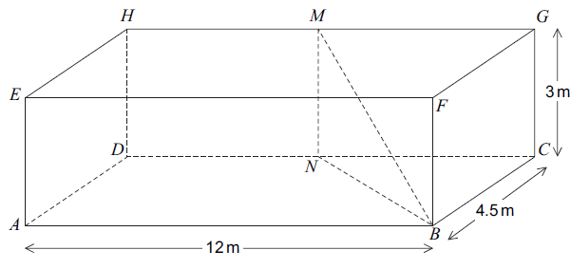
**Exercise 2**

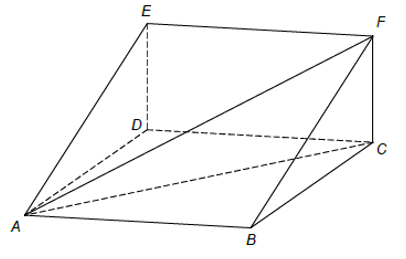
1. A cube has sides 8cm. Find:  
   a) The length .  
   b) The angle between and the horizontal plane.  
   ****
2. A radio tower 150m tall has two support cables running 300m due East and some distance due South, anchored at and . The angle of inclination to the horizontal of the latter cable is as indicated.  
     
   a) Find the angle between the cable attached to and the horizontal plane.

b) Find the distance between and .

1. Frost Manor is as pictured, with horizontally level.  
     
   a) Find the angle between the line and the plane .  
   b) Find the angle between the planes and .
2. A school buys a set of new ‘extra comfort’ chairs with its seats pyramid in shape. is at the centre of the base of the pyramid, and is the midpoint of .  
     
   a) By considering the triangle , find the length . **16cm**

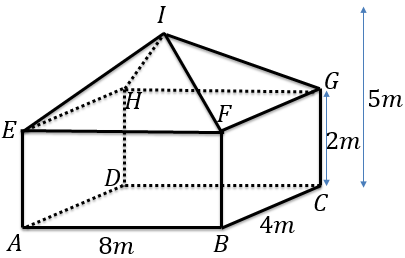
b) Hence determine the angle between the triangle and the plane .

1. [June 2013 Paper 2] is a cuboid. is the midpoint of . is the midpoint of .  
   
2. Show that 7.5m
3. Work out the angle between the line and the plane .
4. Work out the **obtuse** angle between the planes and .
5. [Set 3 Paper 2] The diagram shows part of a skate ramp, modelled as a triangular prism.

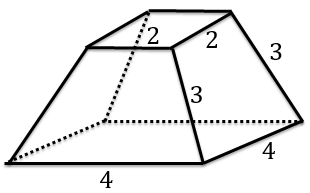
represents horizontal ground. The vertical rise of the ramp, , is 7 feet. The distance feet.  
  
You are given that

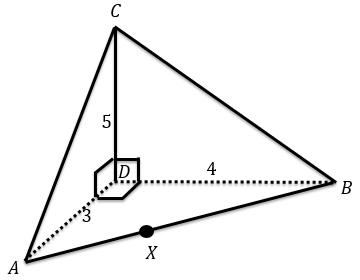
a) The gradient of is twice the gradient of . Write down the distance .

b) Greg skates down the ramp along . How much further would he travel if he had skated along .

1.   
   a) Determine the angle between the line and the plane .

b) Determine the angle between the planes and .

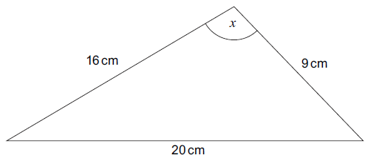
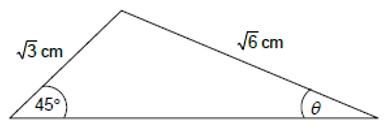
1. A ‘truncated pyramid’ is formed by slicing off the top of a square-based pyramid, as shown. The top and bottom are two squares of sides 2 and 4 respectively and the slope height 3.   
     
   Find the angle between the sloped faces with the bottom face.

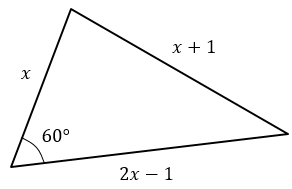
* a) is a point on such that is the line of greatest slope on the triangle . Determine the length of .

b) Hence determine .

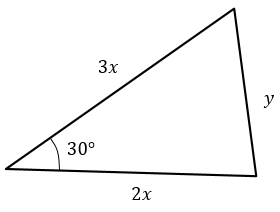
c) Hence find the angle between the planes and .

**Exercise 3**

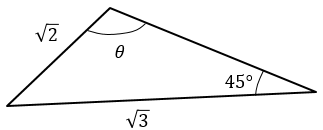
1. [June 2012 Paper 2 Q13]   
   Work out angle .  
     
   
2. Here is a triangle. Work out .  
   
3. Use the cosine rule to determine .

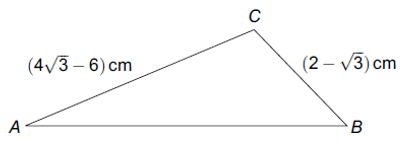


1. Given that the area of the triangle is 24cm2. Find the values of and .



1. The angle is obtuse. Determine .



1. [June 2012 Paper 1] Triangle ABC has an obtuse angle at C. Given that , use triangle to show that angle .  
   
2. [June 2013 Paper 2 Q23] In triangle , bisects angle .

Use the sine rule in triangles and to prove that .  
