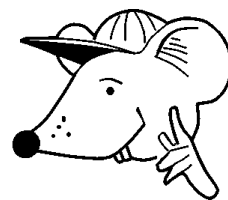


MATHEMATICS



N.S. Yr. 6 P.111

Make turns; estimate, draw and measure angles.

Equipment

Paper, pencil, ruler, set squares, protractor

MathSphere

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Concepts

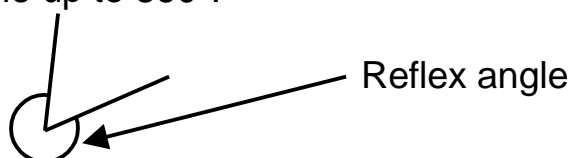
Children should be able to use, read and write the following vocabulary:

Turn, rotate, whole turn, half turn, quarter turn, angle, right angle, acute, obtuse, reflex, straight line, degree, ruler, set square, angle measurer, protractor.

The most important thing that children should understand about angles is that they are a **measure of turn**.

They should by now understand about acute and obtuse angles. They now need to know that the 'reflex' angle is the angle that makes an acute angle or obtuse angle up to 360° .

Eg.



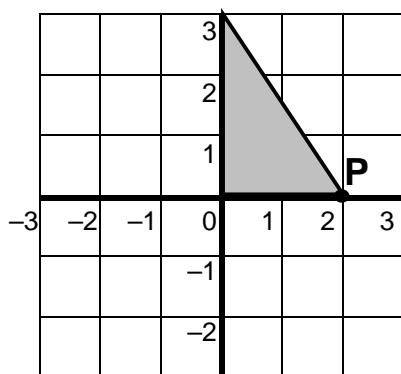
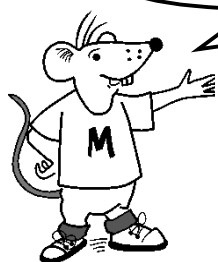
They should be able to draw in the position of a shape after a 90° or 180° rotation about one of its vertices. In the case of a turn of 90° , clockwise or anti-clockwise should be specified.

Children should now be able to estimate angles to a fair degree of accuracy and measure them to the nearest degree.

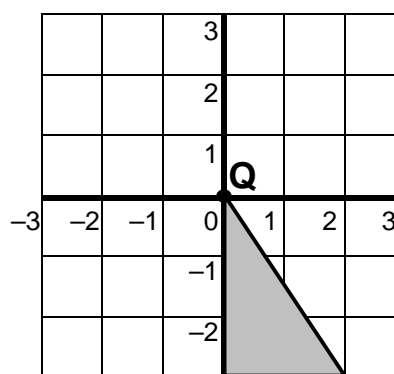
They should have carried out some experiments to show that the total of the angles in a triangle is 180° and be able to use this fact to calculate one missing angle, given the other two.

By using their knowledge of reflex angles, they should be able to calculate the missing angle at a point.

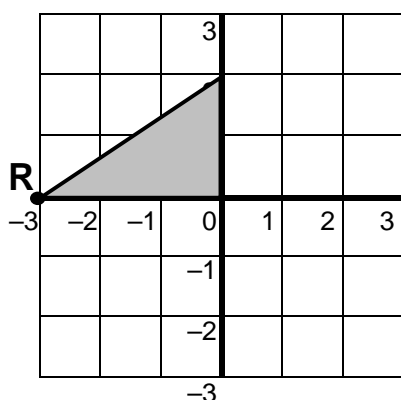
I would like you to rotate each of the shapes below by the amount shown. Be careful with 90° rotations to watch whether you should rotate clockwise or anti-clockwise!



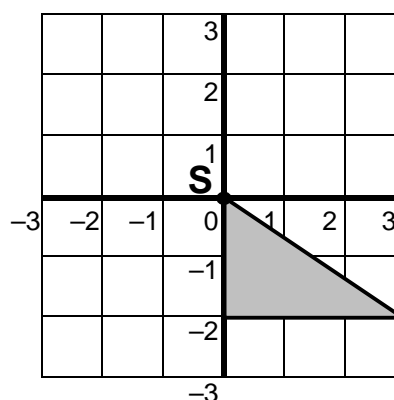
Rotate the triangle about **P** by 90° anti-clockwise



Rotate the triangle about **Q** by 180°

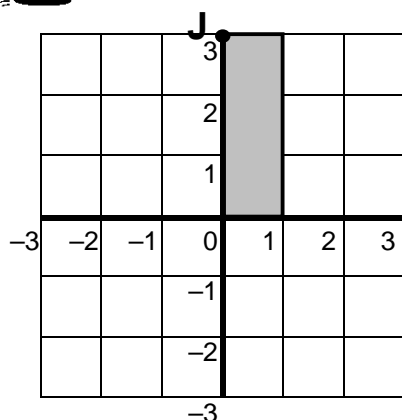
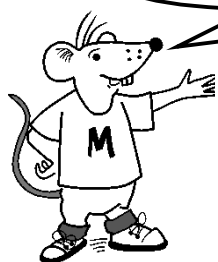


Rotate the triangle about **R** by 90° clockwise

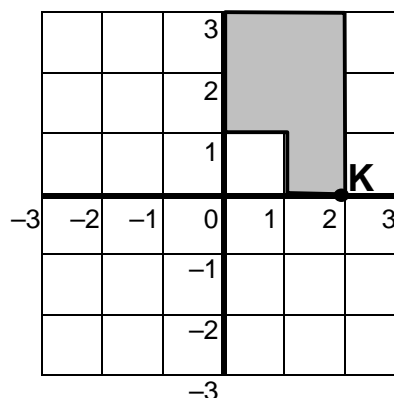


Rotate the triangle about **S** by 90° anti-clockwise

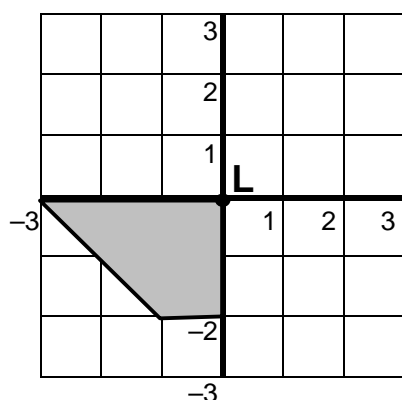
I would like you to rotate each of the shapes below by the amount shown. Be careful with 90° rotations to watch whether you should rotate clockwise or anti-clockwise!



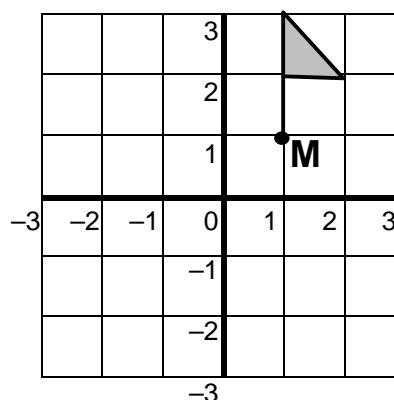
Rotate the rectangle about **J** by 90° clockwise



Rotate the hexagon about **K** by 90° anti-clockwise

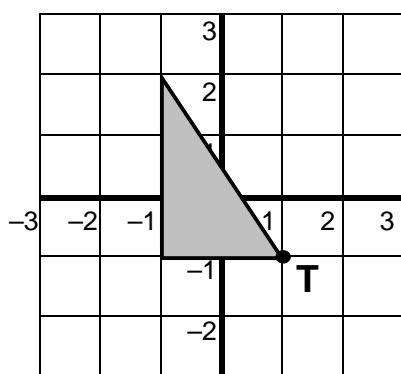
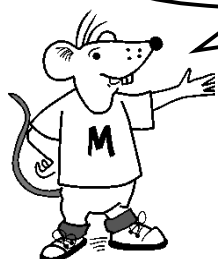


Rotate the trapezium about **L** by 90° clockwise

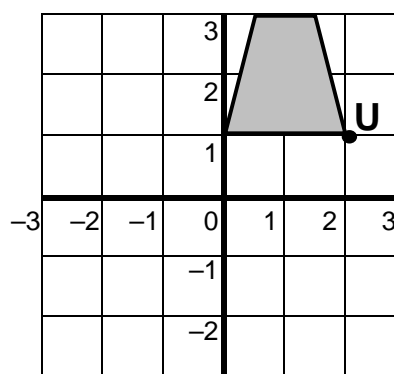


Rotate the flag about **M** by 180°

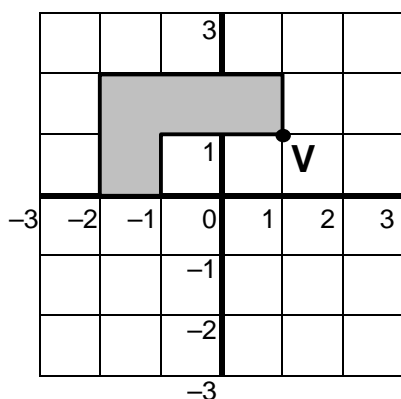
I would like you to rotate each of the shapes below by the amount shown. Be careful with 90° rotations to watch whether you should rotate clockwise or anti-clockwise!



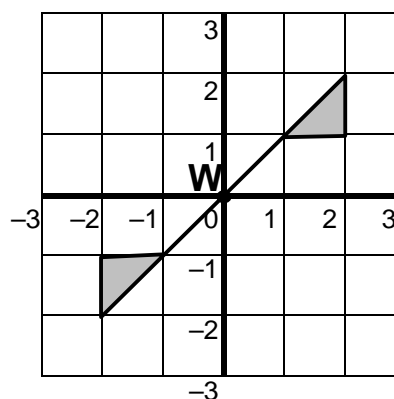
Rotate the triangle about **T** by 90° anti-clockwise



Rotate the trapezium about **U** by 90° anti-clockwise



Rotate the hexagon about **V** by 90° anti-clockwise

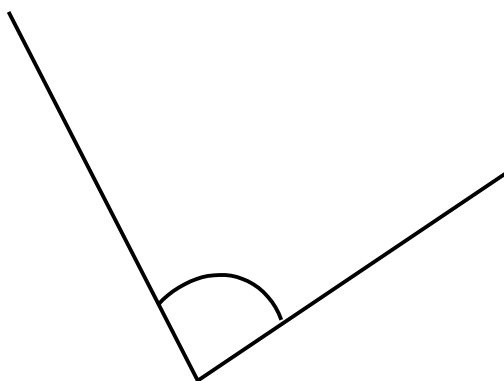


Rotate the double flag about **W** by 90° clockwise

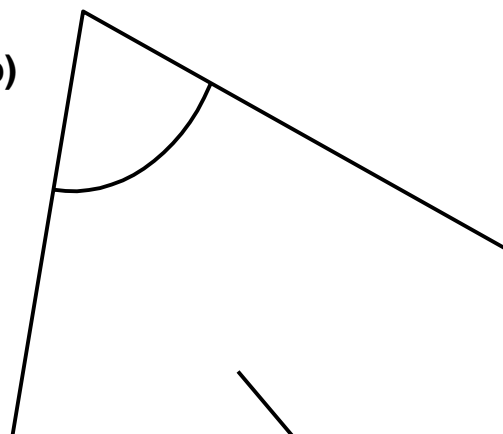
Measure these angles to the nearest degree. Write the number of degrees next to the angle.



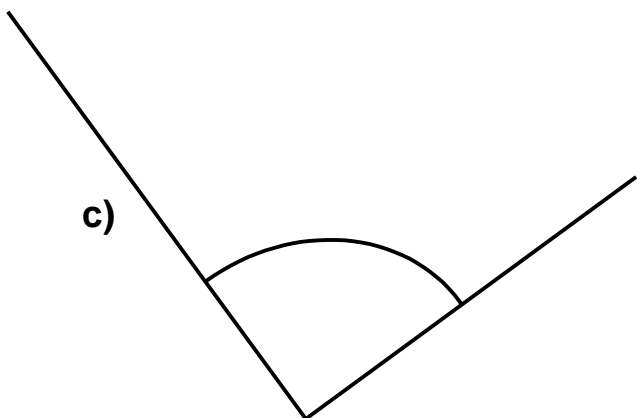
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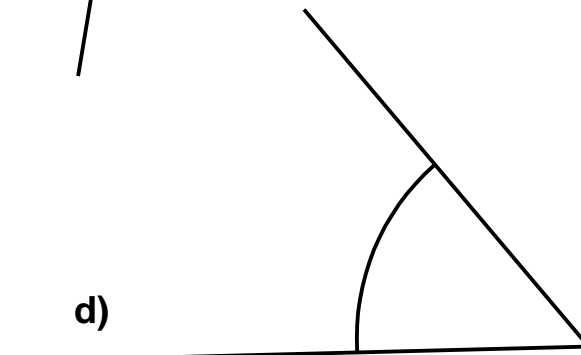
b)



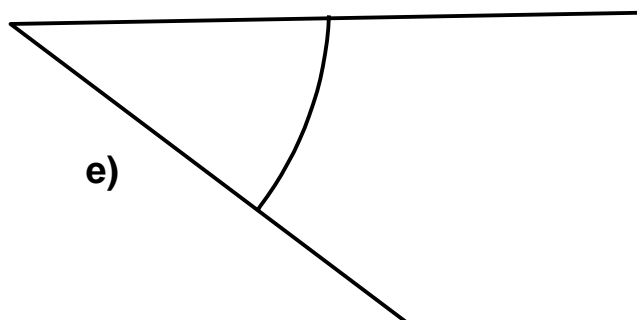
c)



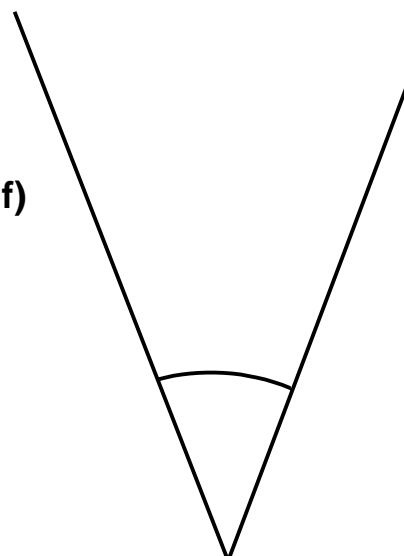
d)



e)



f)



Measure these angles to the nearest degree. Write the number of degrees next to the angle.



a)

b)

c)

d)

e)

f)

Draw angles of the following sizes: Use a larger sheet of paper or your exercise book.

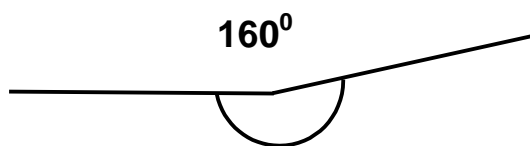
46° , 98° , 27° , 103° , 126° , 62° , 111° , 77°

Write the size of each angle on its shape.

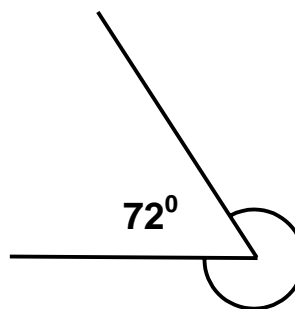
Calculate the missing angles. These are not drawn to scale, so do **not** measure the angles.

Write the missing angles on the diagrams.

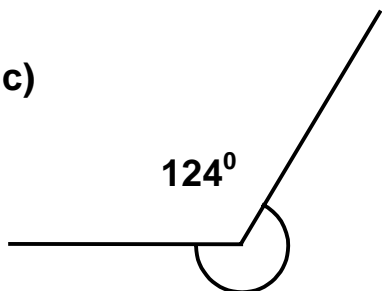
a)



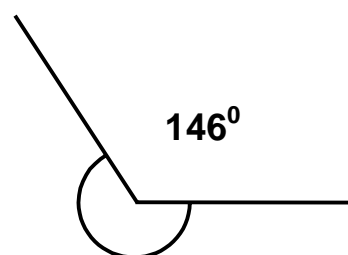
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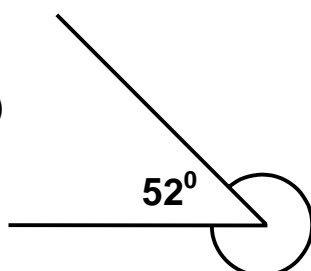
c)



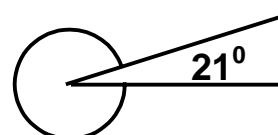
d)



e)



f)



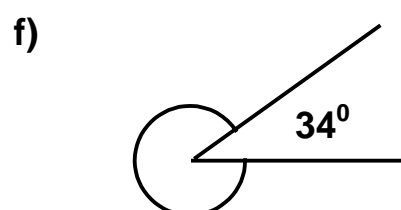
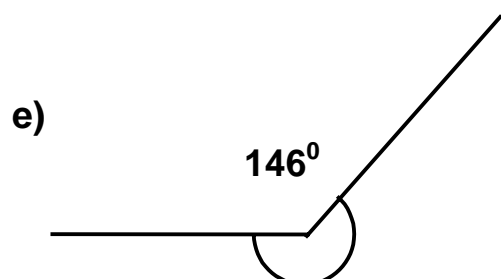
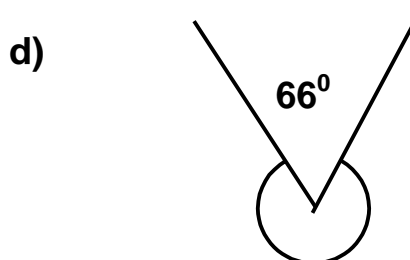
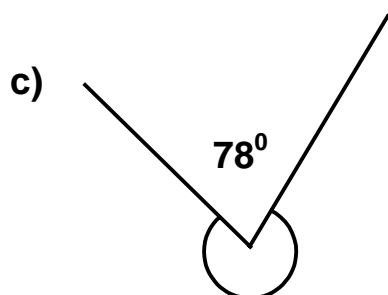
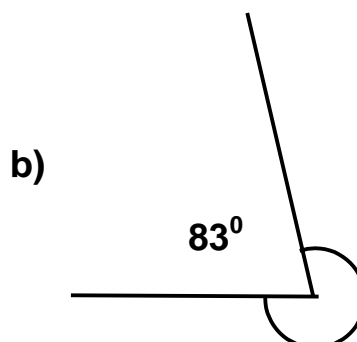
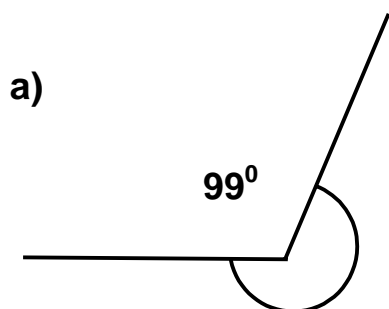
Draw angles of the following sizes: Use a larger sheet of paper or your exercise book.

123° , 56° , 141° , 129° , 52° , 153° , 98° , 31°

Write the size of each angle on its shape.

Calculate the missing angles. These are not drawn to scale, so do **not** measure the angles.

Write the missing angles on the diagrams.



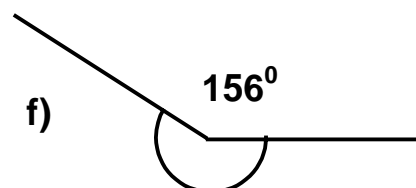
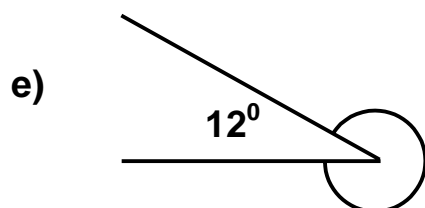
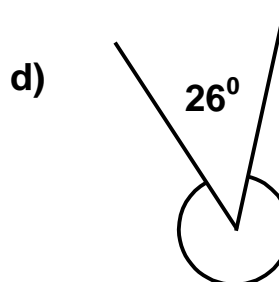
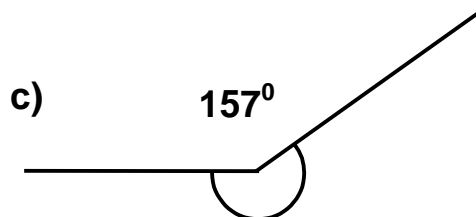
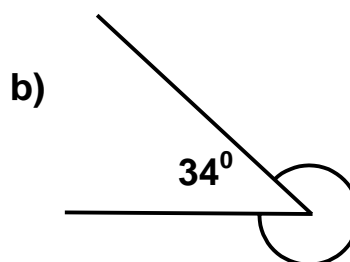
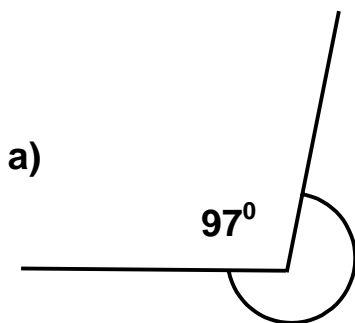
Draw angles of the following sizes: Use a larger sheet of paper or your exercise book.

132° , 101° , 154° , 121° , 136° , 12° , 171° , 138°

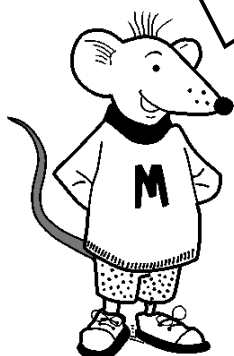
Write the size of each angle on its shape.

Calculate the missing angles. Do **not** measure the angles.

Write the missing angles on the diagrams.



Triangles? What do you know about the angles?



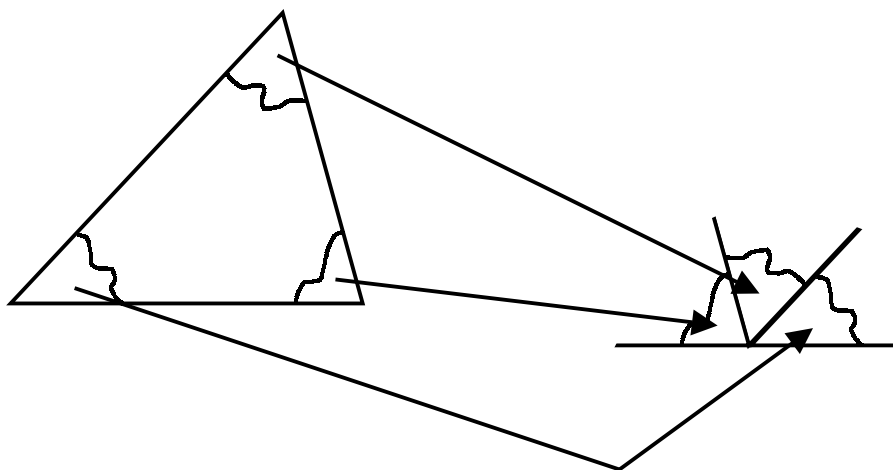
They look pretty cool to me! But with these shades, everything looks cool!!



Draw a triangle any shape you like. Cut it out accurately.

Tear off the corners (do not cut them off with scissors or you will forget which angle is which).

Place the corners next to each other, like this.



What do you notice?

Do the three angles make a straight line?

What does this tell you about the angles in a triangle?

You should have found out in the last exercise (page 11) that the angles of a triangle add up to 180° .

We can of course show this by measuring the angles.

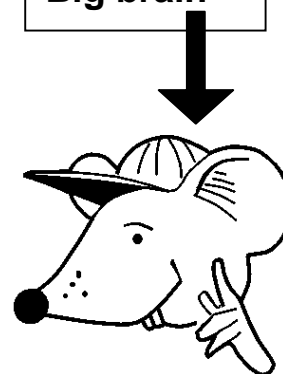
Draw another triangle any shape you like.

Measure the angles and see if they add up to 180° . Be as accurate as you can.

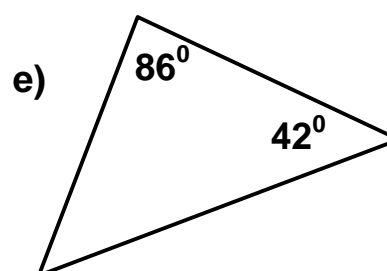
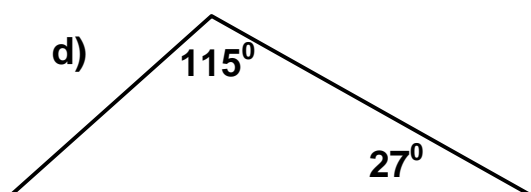
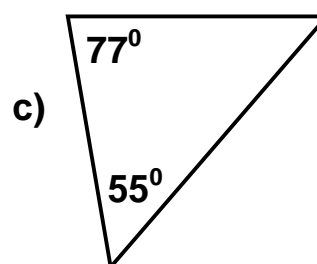
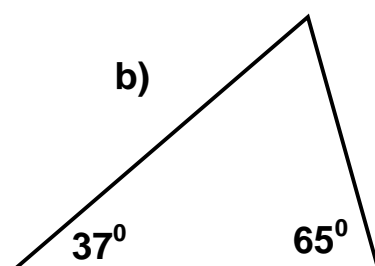
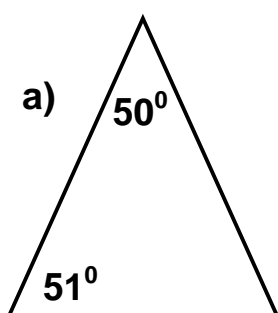
You may find you are one or two degrees out, but this is due to errors in using the protractor.

For best accuracy use a very sharp pencil, a good ruler and protractor with no chips in it.

Big brain

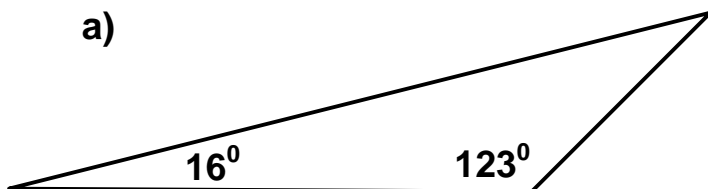


Now use what you know to calculate the missing angles in the triangles. Do **not** measure them as they are not drawn to scale.

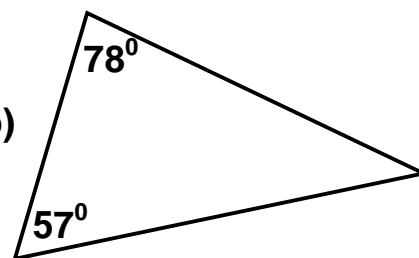


Find the missing angles in these triangles. Do **not** measure them as they are not drawn to scale.

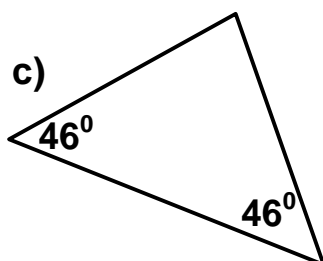
a)



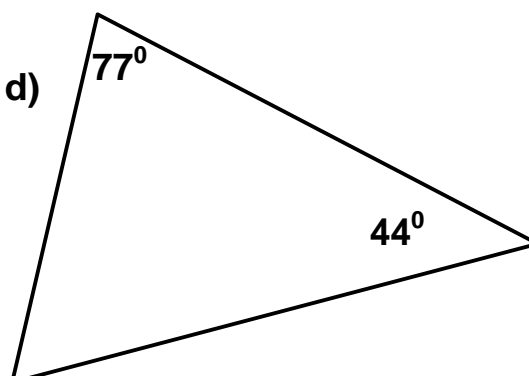
b)



c)



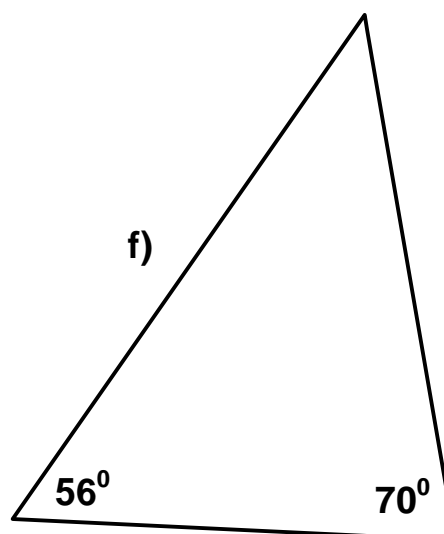
d)



e)

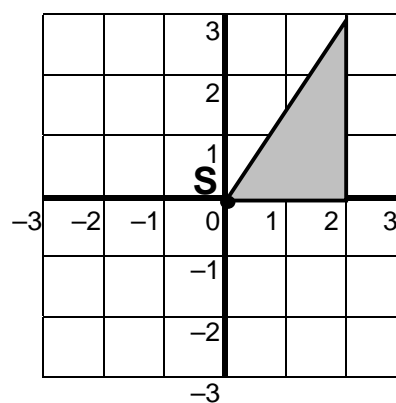
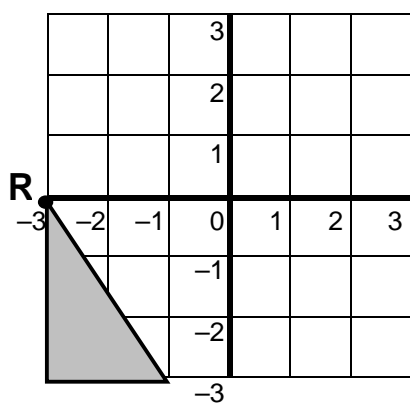
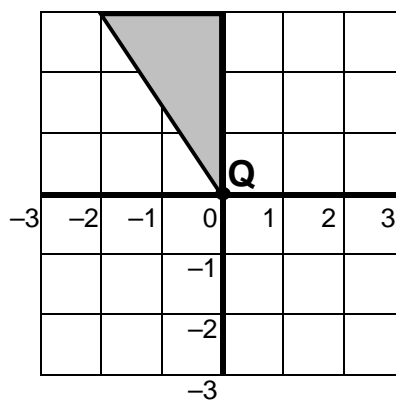
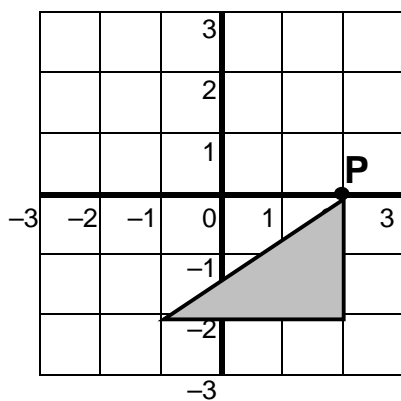


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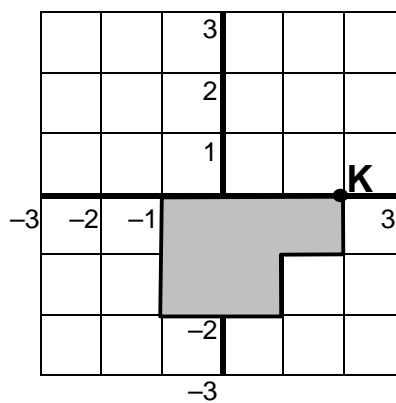
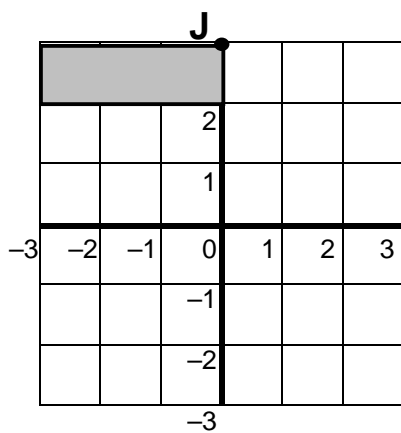


Answers

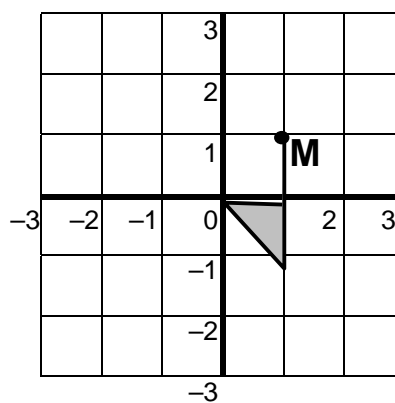
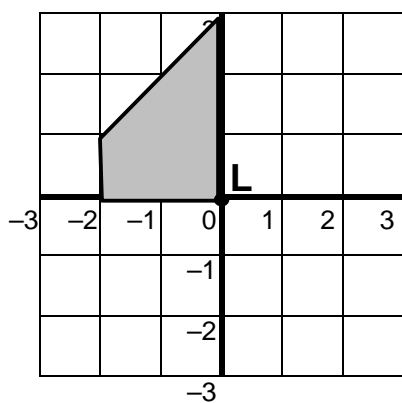
Page 3



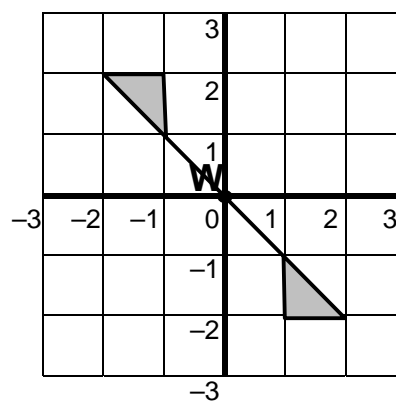
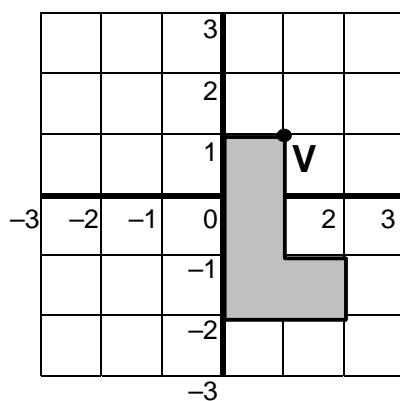
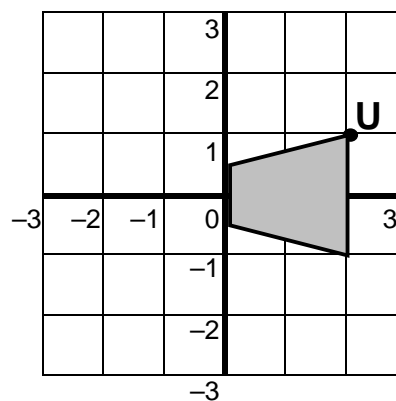
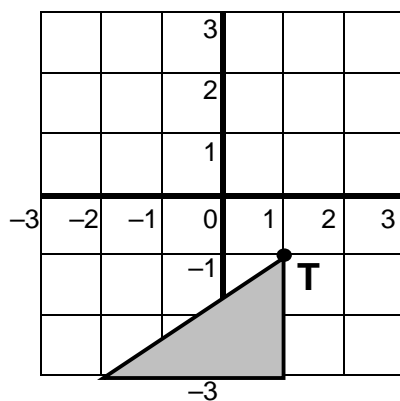
Page 4



Answers



Page 5



Answers

Page 6 a) 83° b) 70° c) 90° d) 51° e) 38° f) 42°	Page 10 a) 263° b) 326° c) 203° d) 334° e) 348° f) 204°
Page 7 a) 141° b) 46° c) 104° d) 105° e) 123° f) 125°	Page 11 The three angles make a straight line. The angles in a triangle therefore total 180°
Page 8 a) 200° b) 288° c) 236° d) 214° e) 308° f) 339°	Page 12 a) 79° b) 78° c) 48° d) 38° e) 52°
Page 9 a) 261° b) 277° c) 282° d) 294° e) 214° f) 326°	Page 13 a) 41° b) 45° c) 88° d) 59° e) 77° f) 54°