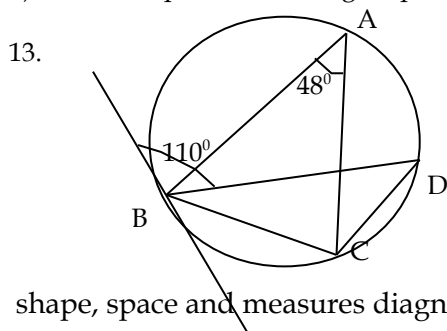


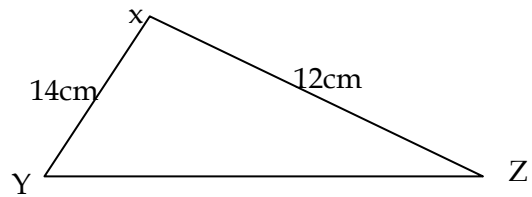
### Space, shape and measures diagnostic test

1. Name 4 polygons which tessellate.
2. How big are the external angles of a regular octagon?
3. A) A triangle ABC with A at (1,4); B at (1, 6) and C at (3, 5) is reflected in the line  $y = x$  to form  $A'B'C'$ . Find the co-ordinates of  $C'$ .  
 b) ABC is enlarged scale factor 2, centre (1,0) to form  $A''B''C''$ . Find the co-ordinates of  $A''$ .  
 c) If the base of ABC (AB) is 3.5cm work out the height.  
 d) Find the area of ABC
4. a) A car journey takes 2 hours 37 mins to cover 150 miles. What is the average speed to 3 sig fig?  
 b) If it had travelled at 56 miles per hour how long would the journey have taken to the nearest minute?
5. Two allied boats have a firing range of 200 metres. They are 180 metres apart.  
 Draw a scale diagram using 1:2000 to show the danger area around them.
6. A sparrow perched itself on the end of a minute hand of a church clock. The minute hand was 33cm long, and the sparrow sat there for 10 mins. How far did it travel to the nearest mm?
7. Which of these could describe area:  $\pi abc$ ,  $\pi^2 h$ ,  $abc$ ,  $a^2 b$ ,  $ab$
8. Two similar cartons are used for selling milk. The smaller has a base length of 8cm, and the larger has a base length of 20 cm.  
 a) what is the ratio of the lengths  
 b) If the smaller one has a height of 12 cm, what is the height of the larger one?  
 c) What will the ratio of their volumes be ( in its simplest form)?
9. Plot A at ( 3,7) and B at (3, 10) .  
 a) Construct the set of points that are all equidistant from A and B.  
 b) Name this line with an equation.  
 c) Give a mathematical description of it.
10. A woman standing at the top of the Eiffel tower looks down at Paris below through a pair of binoculars. If the binoculars point down with an angle of depression 40 degrees and the Eiffel tower is 300m high how far ( to the nearest metre) from the base of the tower can the woman see? (Ignore her height)
11. Draw the graph of  $x^2 + y^2 = 8$ . On the same axis draw the graph of  $y = x + 4$ .  
 a) Find the point where the 2 graphs intersect.  
 What does this tell you about the line?  
 b) Find the equation of a tangent parallel to this one. At what point does it touch the graph?



- a) Find angle BDC
  - b) Angle DBC
- Give reasons for your answers.

14. A triangle has area  $50\text{cm}^2$ . Find the size of angle X:



15. A sphere and a cone both have the same volume and the radius of the sphere,  $r$ , is the same as the base radius of the cone.  
Show that the height of the cone is  $4r$ .

16. Solve for  $0 < x < 360^\circ$  :

- a)  $\sin x = 0.3$
- b)  $2\sin x = 0.3$
- c)  $\sin 2x = 0.3$
- d)  $\sin(x+20) = 0.3$
- e)  $2 + \sin x = 1.3$

**17. A ship leaves a port P, and sails 100km on a bearing of  $100^\circ$  to an island, L. It then travels to a harbour H, 120km due south of P.**

- a) On what bearing is the island from the Port?**
- b) Find the distance of the Island from the harbour.**

Hint: draw a sketch