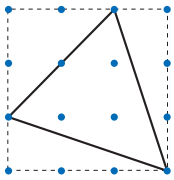
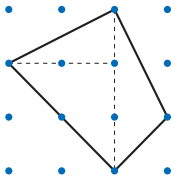
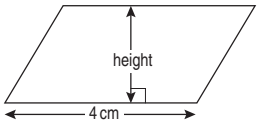
As outcomes, Year 8 pupils should, for example:

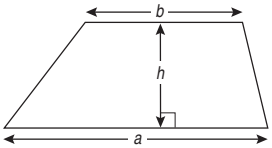
- On a 1 cm grid, draw a triangle with an area of 7.5cm^2 and an obtuse angle.
- Use methods such as dissection or 'boxing' of shapes to calculate areas. For example:
  Draw these shapes on a 1cm spotty grid and use the dashed lines to help find their areas.

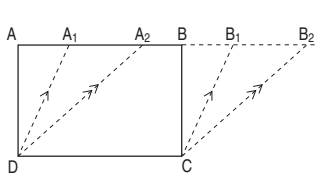
- Make quadrilaterals on a 3 by 3 pinboard.
  Find the area of each quadrilateral.
- The area of the parallelogram is 10 cm^2.
  Calculate the height of the parallelogram.

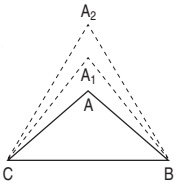


- The area of the trapezium is 10 cm^2.
  What might be the values of h, a and b (a > b)?



- Use a pinboard and spotty paper to investigate simple transformations of the vertices of triangles and parallelograms, and how they affect the area of the shapes. For example:





  Find the area of each parallelogram or triangle and explain what is happening.

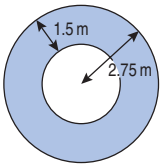
Link to problem solving (pages 18–19).

As outcomes, Year 9 pupils should, for example:

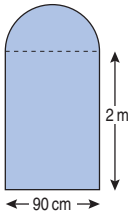
Know and use the formula for the area of a circle:
$A = \pi d^2/4$ or $A = \pi r^2$

For example:

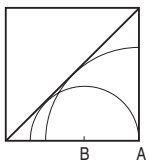
- A circle has a radius of 15 cm.
  What is its area?
- Calculate the area of the shaded shape.



- A church door is in the shape of a rectangle with a semicircular arch. The rectangular part is 2 m high and the door is 90cm wide.
  What is the area of the door?



- Napoli Pizzas make two sizes of pizza.
  a. A small pizza has a diameter of 25 cm.
  What is the surface area of the top of the pizza?
  b. A large pizza has twice the surface area of the small one. What is the diameter of the large pizza?
  c. A small boy reckons he could just about manage to eat a 120° wedge (sector) of the large pizza. What is the area covered by topping on this piece?
- The inside lane of a running track is 400 m long, 100m on each straight and 100m on each semicircular end.
  What area in the middle is free for field sports?
- A donkey grazes in a 60 m by 60m square field with a diagonal footpath. The donkey is tethered to a post. It can just reach the path, but not cross it.
  Consider two tethering positions:
  A. corner A, making the largest possible quarter circle (quadrant) for the donkey to graze;
  B. point B, somewhere on the field boundary, making the largest possible semicircle.



  Which tethering position gives the bigger grazing area? Use scale drawing and measurement to help calculate the answer.
  What if the field is rectangular?

Know that the area of a sector of a circle is directly proportional to the size of the angle θ between the two bounding radii, or area of sector = $2\pi r^2 \times \theta/360$, where θ is in degrees and r is the length of the radius.

Link to problem solving (pages 18–19).