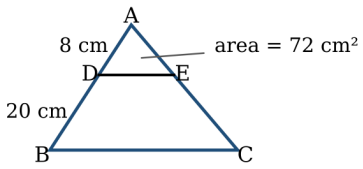
Day 348 **S Tier 10-a-day**

1 The 5-digit number 4309k is a multiple of 9.
k is a single digit.
Find all the possible values of k.

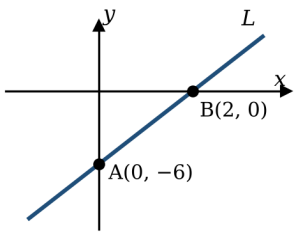
2 In the diagram, DE is parallel to BC. AD = 8 cm, DB = 20 cm and the area of triangle ADE is 72 cm^2.
Work out the area of the trapezium DBCE.
The diagram is not drawn accurately.

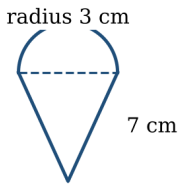


3 Show that $5^{k+2} - 5^k$ is a multiple of 24 for all integer values of k.

4 50 beetles in a field are caught, marked and put back.
Later, a second sample of 40 beetles is caught. 8 of these are marked.
(a) Work out an estimate for the number of beetles in a field.
(b) State one assumption you have made.

5 The diagram shows the straight line L, which passes through the points A and B.
The line M is perpendicular to L and passes through B.
Find the equation of M in the form y = mx + c.



Day 348	S Tier 10-a-day
6 A tank is filled by a tap in 6 minutes. A drain can empty the full tank in 12 minutes. The tap and the drain are both open, and the tank is empty to begin with. How long does it take for the tank to fill?	
7 A is the point (2, 7) and B is the point (4, −1). Find an equation of the perpendicular bisector of AB. Give your answer in the form ax + by = c, where a, b and c are integers.	
8 A rectangle has area $(17 + 7\sqrt{5})$ cm^2 and length $(2 + \sqrt{5})$ cm. Find the width of the rectangle. Give your answer in the form $a + b\sqrt{5}$	
9 A solid is made from a cone of height 7 cm and a hemisphere. Both have radius 3 cm. Work out the total volume of the solid. Give your answer in terms of π. 	
10 A bag contains some counters. 8 of them are green and the rest are white. Two counters are taken at random without replacement. The probability that both are green is $\frac{7}{30}$. Work out how many counters are white.	