

S.2 MATHEMATICS 2013

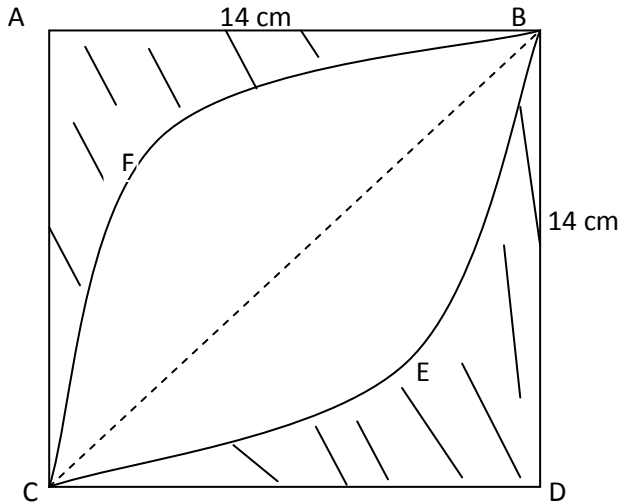
INSTRUCTIONS:

- Attempt all numbers in section A and B.
- Show all your working clearly and neatly.

**SECTION A**

1. Find the highest common factor (HCF) of 18, 42 and 45.
2. A polygon is divided into 5 triangles by drawing diagonals from one vertex.
  - (i) How many sides does it have?
  - (ii) What is the sum of the interior angles?
3. Simplify:  $\frac{3\frac{3}{4} \text{ of } 1\frac{1}{9} - 3\frac{1}{6}}{2\frac{1}{3} \text{ of } (6\frac{1}{2} - 4\frac{1}{3})}$ .
4. (a) Solve:  $3(2x - 2) - 3(x - 2) = 12$   
(b) Given that  $a = 1\frac{1}{2}$ ,  $b = \frac{3}{4}$  and  $c = 2\frac{1}{2}$ , evaluate:  $c + a \div b$ .
5. A girl divides a number by 8 and gets the correct answer of 23 remainder 7. What is the remainder if she divides the same number by 7?
6. Express 784 as a product of prime factors. Hence find the square root of 784.
7. Express 0.341666..... in the form  $\frac{p}{q}$  where  $q \neq 0$ .
8. Given that:  
 $P = \{\text{Prime numbers between 10 and 24}\}$   
 $I = \{\text{Integers between 10 and 24}\}$ 
  - (a) Illustrate the information on a Venn diagram.
  - (b) Show the relationship between the sets.

9. Study the figure below and answer the questions that follow:



ABEC and DCFB are quadrants of two intersecting circles.

- a) Find the area of the un-shaded part.
- b) Calculate the perimeter of the un-shaded part.

10. An examination is marked out of 130 marks. If Sonia obtained 60% in the examination, how many marks did she get out of 130?

### SECTION B

**11.** (a) Using a ruler and a pair of compasses **only**, construct **triangle ABC** in which **BC = 6cm**, **AC = 4cm** and **angle ABC = 22.5°**.

- (b) Measure **AB** and **angle ACB**.
- (c) Construct a **circle** that passes through A, B and C.
- (d) What is the **radius** of this circle?

12. A poultry farm has twenty times as many hens as turkeys and three-quarters as many ducks as turkeys.

- (a) If there are  $t$  turkeys, write down a simplified expression in  $t$  for the total number of birds on the farm.
- (b) Given that there are 75 ducks, calculate the total number of birds on the farm.

- (c) Express as a percentage the sum of turkeys and ducks to the number of hens on the farm.
13. A boatman sailed from Island P heading to island Q which is East of P and 12km away, then he continued on bearing  $135^{\circ}$  to island R 8km away.
- (a) Using a scale of 1cm to represent 2km, make a scale drawing of the route of a boatman.
- (b) Find the shortest distance between P and R.
- (c) Find the bearing of R from P.
- 14 The height of an aluminum cylindrical water tank is 3m and its radius is 1.4m.
- (a) Find the volume of the tank in  $\text{m}^3$ .
- (b) Determine the volume of the tank in litres.
- (c) Find the cost of the aluminum sheet needed to make the tank if it is closed at one end and aluminum cost sh. 1,200per  $\text{m}^2$ .

END