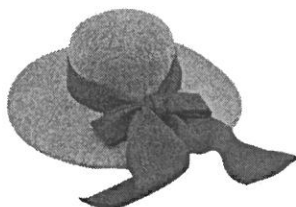# Multi Mark 2

1.

You will be assessed on the quality of your written communication in this question.

Cerys makes hats for a living.

Each hat she makes needs $0.45\,m^2$ of fabric, costing £3.40 per m^2, and 50 cm of ribbon.
Cerys pays herself £12.60 per hour.
She can make 3 hats in two hours.
There are no other costs or outgoings.
Cerys sells each hat for £10.25, which exactly balances the costs and outgoings.

Calculate how much the ribbon costs per metre.
You must show all your working.

Sales of hats – Cerys' wage – fabric = price of ribbon

hats $3 \times 10.25 = £30.75$

Cerys' wage $2 \times 12.60 = £25.20$

fabric $3 \times 0.45 = 1.35\,m^2$ needed
$1.35 \times 3.40 = £4.59$ for total fabric

price of ribbon used $= 30.75 - 25.20 - 4.59 = £0.96$

total ribbon used $= 3 \times 50cm = 150cm = 1.5m$

price of ribbon per metre $= \dfrac{£0.96}{1.5m} = £0.64$ per metre

[9]

2.

(a) Write down the *n*th term of the following sequences.

(i) 6, 13, 20, 27, ...

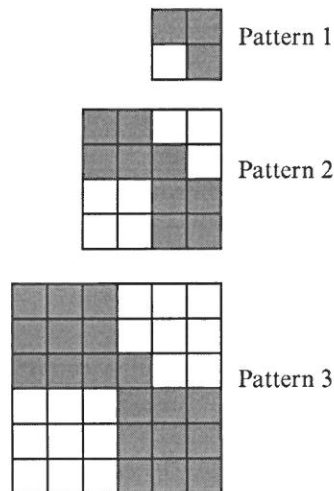$$7n - 1$$

[2]

(ii) 26, 20, 14, 8, ...

$$-6n + 32$$

[2]

(b)   *You will be assessed on the quality of your written communication in this part of the question.*

The diagrams show tile patterns.
Each pattern has some shaded tiles and some white tiles.

Pattern 1

Pattern 2

Pattern 3

Find the expression for the total number of tiles in Pattern n, the expression for the number of shaded tiles in Pattern n and the expression for the number of white tiles in Pattern n.

white   1   7   17

6   10

4   ⟶ 2nd difference is 4   ∴ $2n^2$

$2n^2$ =   2   8   18

to get from this to 1 7 17 , $\boxed{-1}$ so $2n^2 - 1$

shaded   3   9   19

6   10

4   ⟶ $2n^2$ so $2n^2 + 1$

2   8   18
3   9   19 $\boxed{+1}$

[7]