1 Here is a list of ingredients needed to make 12 scones.

Ingredients for 12 scones

220 g self-raising flour
40 g butter
150 m*l* milk
2 tablespoons sugar

Viv is making scones for 15 people.
She is making 2 scones for each person.] 30 scones needed

Work out the amount of each ingredient she needs.

12 × 2·5 = 30

Self-raising flour .....550..... g

Butter ....100.... g

Milk ....375.... m*l*

Tablespoons of sugar ....5....

(Total for Question 1 is 3 marks)

2 Here are the first five terms of an arithmetic sequence.

$$2 \qquad 7 \qquad 12 \qquad 17 \qquad 22$$

(a) Explain why the number 271 cannot be a term in this sequence.

Terms end in 2 or 7

(b) Write down an expression, in terms of n, for the nth term of the sequence.

$5n - 3$

(Total for Question 2 is 3 marks)

3 Find the coordinates of the midpoint of the line joining the points (1, 2) and (4, 0).
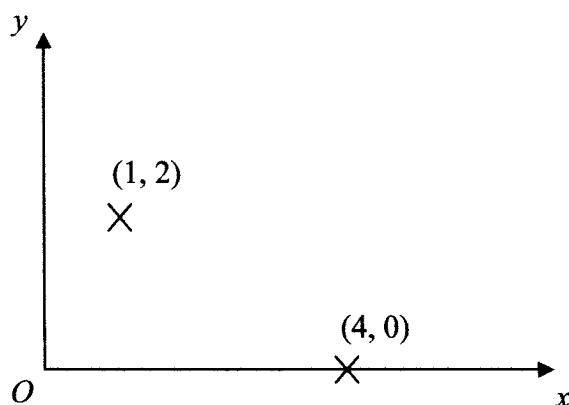

Diagram **NOT**
accurately drawn

(1, 2)
X

(4, 0)
X

O x

$$\frac{1+4}{2} \quad , \quad \frac{2+0}{2}$$

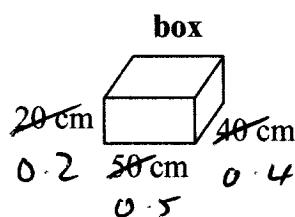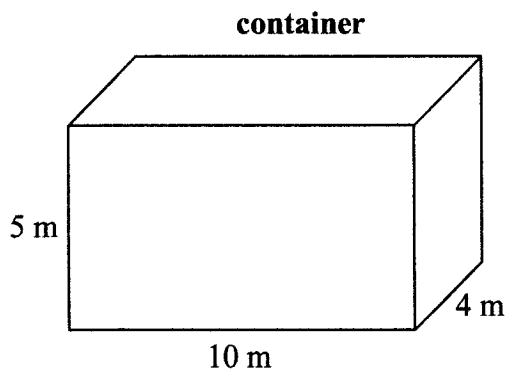$$\frac{5}{2} \quad , \quad \frac{2}{2}$$

(2.5 , 1)

(Total for Question 3 is 2 marks)

*4 Marc drives a truck.
The truck pulls a container.
The container is a cuboid 10 m by 4 m by 5 m.

Diagram **NOT**
accurately drawn

container

5 m

4 m

10 m

box

~~20 cm~~   ~~40 cm~~
0.2 ~~50 cm~~ 0.4
    0.5

Marc fills the container with boxes.
Each box is a cuboid 50 cm by 40 cm by 20 cm.

Show that Marc can put no more than 5000 boxes into the container.

$$5 \times 10 \times 4 = 200 \, M^3$$

$$0.2 \times 0.5 \times 0.4 = 0.04$$

$$200 \div 0.04 = 5000$$

(Total for Question 4 is 4 marks)

5 (a) Simplify $2e - 8f + 6e + 3f$

$8e - 5f$

(b) Factorise $4t + 10$

$2(2t + 5)$

$2(2t + 5)$

(c) Expand and simplify $3 + 2(p - 1)$

$3 + 2p - 2$

$2p + 1$

(d) Factorise $ax + bx + ay + by$

$x(a+b) + y(a+b)$

$a+b\begin{bmatrix} x + y \end{bmatrix}$

$(a+b)(x+y)$

(Total for Question 5 is 7 marks)

6 John earns £30 000 each year.
He knows that 20% of his monthly pay is deducted each month.

Work out how much money John has left each month after this deduction.

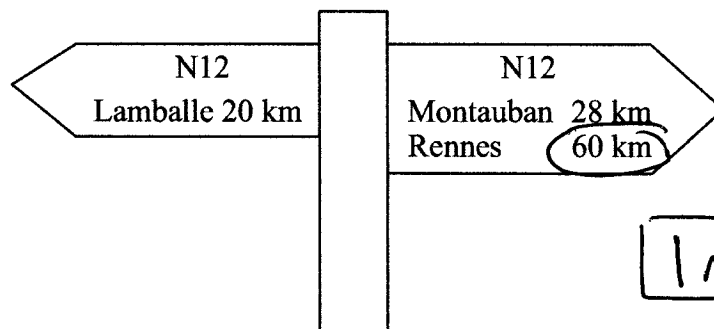$$10\% = 3000$$
$$20\% = 6000$$

$$30000 - 6000 = 24000$$

$$24000 \div 12$$

£ _2000_

(Total for Question 6 is 3 marks)

7 Caroline is driving her car in France.
She sees this road sign.

N12
Lamballe 20 km

N12
Montauban 28 km
Rennes 60 km

1 mile = 1.6 KM

Caroline is going to Rennes on the N12
She stops driving 10 miles from the road sign.

Work out how much further Caroline has to drive to get to Rennes.
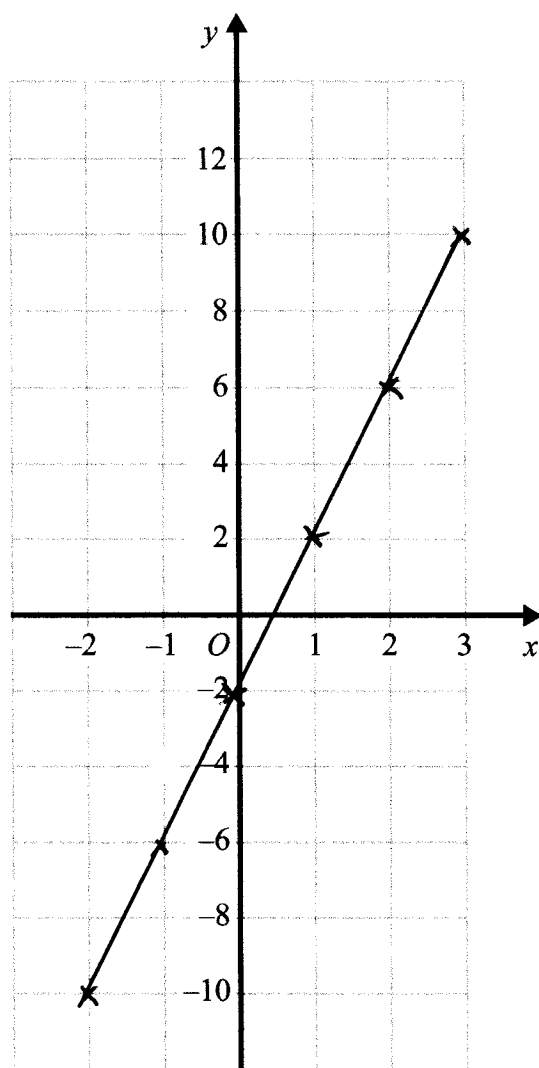
$$10 \text{ miles} = 16 \text{ KM}$$

$$60 - 16 = 44 \text{ KM}$$

_44 KM_

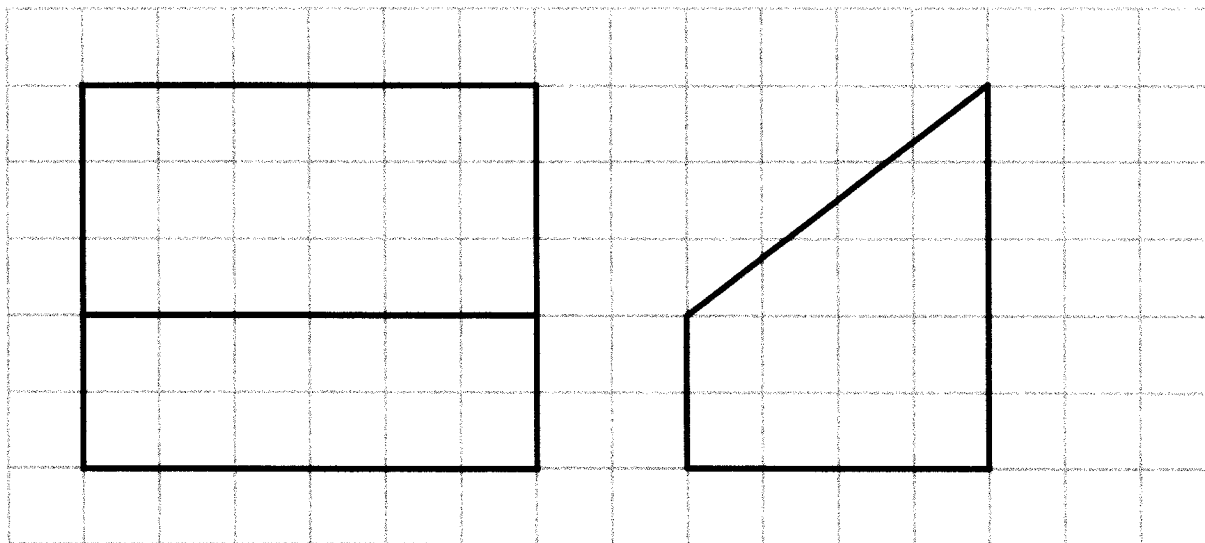**(Total for Question 7 is 3 marks)**

8 On the grid, draw the graph of $y = 4x - 2$ for values of x from $x = -2$ to $x = 3$

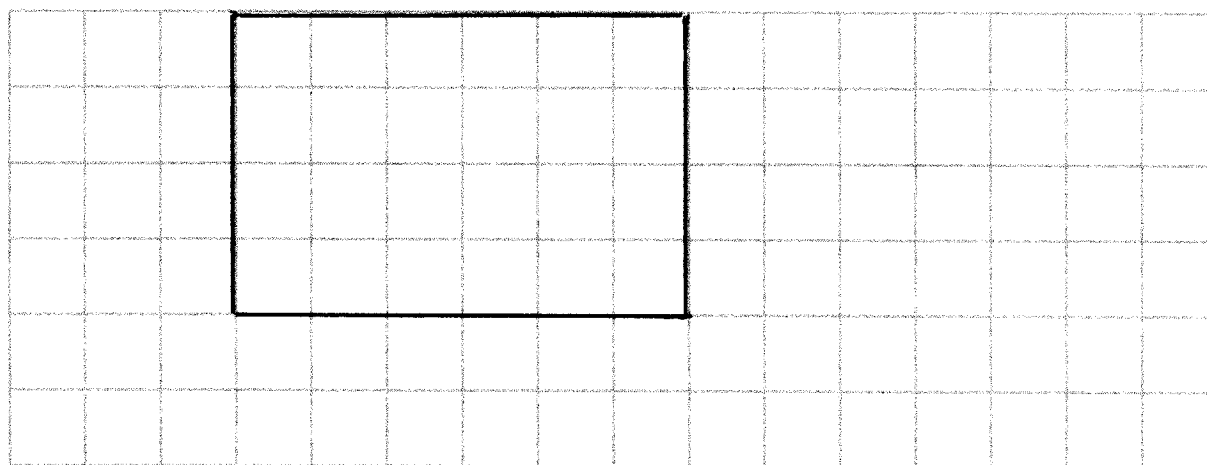**(Total for Question 8 is 3 marks)**

9 The diagram shows the front elevation and the side elevation of a prism.

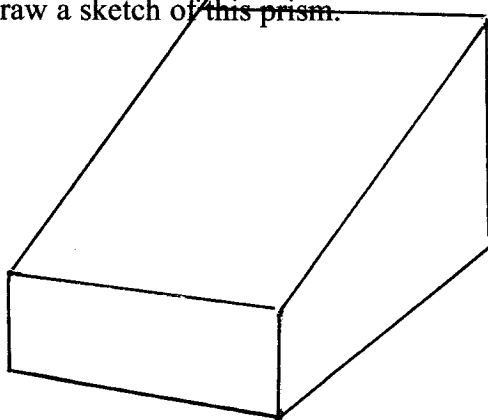Front elevation   Side elevation

(a) On the grid, draw a plan of this prism.

(b) In the space below, draw a sketch of this prism.

(Total for Question 9 is 4 marks)

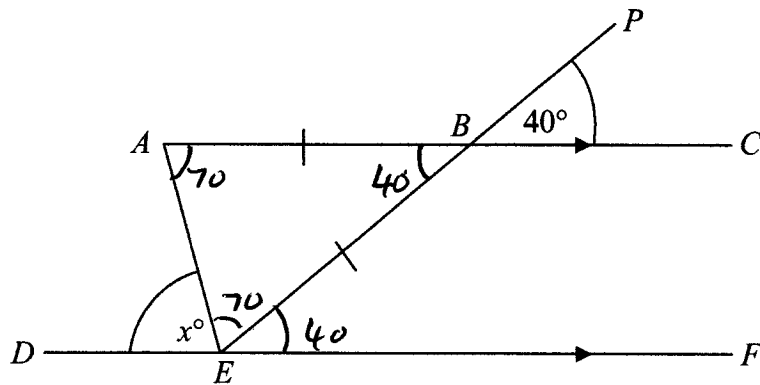Diagram **NOT**
accurately drawn

ABC is parallel to *DEF*.
EBP is a straight line.
AB = *EB*.
Angle *PBC* = 40°.
Angle *AED* = *x*°.

Work out the value of *x*.
Give a reason for each stage of your working.

$A\hat{B}E = 40°$ vertically opposite angles are equal

$B\hat{A}E = B\hat{E}A = 70°$ Base angles in an isosceles triangle are equal

$B\hat{E}F = 40°$ Alternate angles are equal

$x = 180 - (70 + 40)$ Angles on a straight line add up to 180°

$= 70$

(Total for Question 10 is 5 marks)

11 (a) Find the value of 5^0

.... **1**

(b) Find the value of $27^{\frac{1}{3}}$

$$\sqrt[3]{27}$$

.... **3**

(c) Find the value of 2^{-3}

$$2^3 = 8$$

.... $\dfrac{1}{8}$
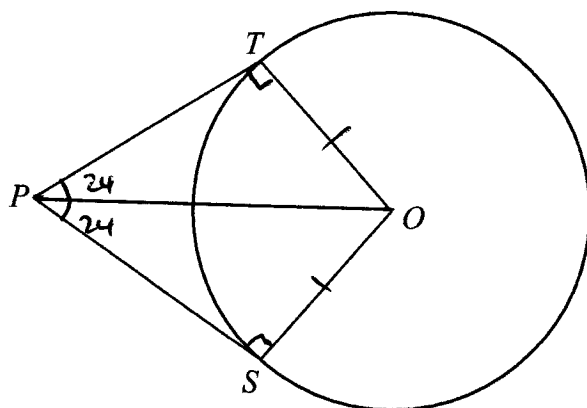
(Total for Question 11 is 3 marks)

12

Diagram **NOT** accurately drawn

S and T are points on the circumference of a circle, centre O.
PT and PS are tangents.
Angle $TPO = 24°$.

Work out the size of angle SOT.

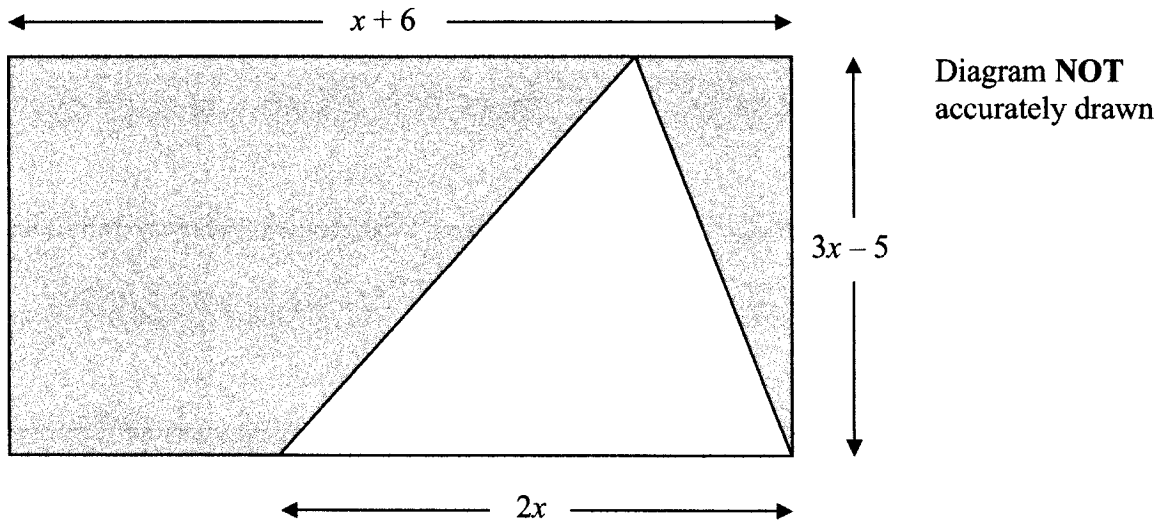$$180 - 48$$

.... **132** °

(Total for Question 12 is 3 marks)

*13 The diagram shows a triangle inside a rectangle.

$x + 6$

Diagram **NOT** accurately drawn

$3x - 5$

$2x$

All measurements are given in centimetres.

Show that the total area, in cm², of the shaded regions is $18x - 30$

Rectangle $\quad (3x - 5)(x + 6)$

$$3x^2 - 5x + 18x - 30$$

$$3x^2 + 13x - 30$$

Triangle $\quad \dfrac{2x(3x - 5)}{2} \quad = 3x^2 - 5x$

∴ Shaded area $\quad 3x^2 + 13x - 30 - (3x^2 - 5x)$

$$18x - 30 \qquad QED$$

(Total for Question 13 is 4 marks)

P 4 0 6 2 1 A 0 1 2 1 6

14 Express $0.2\dot{5}$ as a fraction in its simplest form.

$$\text{Let } x = 0.2\dot{5}$$
$$100x = 25.\dot{5}$$
$$10x = 2.\dot{5}$$
$$\overline{\rule{0pt}{1em}}$$
$$90x = 23$$
$$x = \frac{23}{90}$$

....

(Total for Question 14 is 3 marks)

15 A straight line, L, is perpendicular to the line with equation $y = 1 - 3x$.
The point with coordinates $(6, 3)$ is on the line L.

Find an equation of the line L.

$$M = -3$$

Grad of
perpendicular $\dfrac{-1}{M}$ $\dfrac{-1}{-3} = \dfrac{1}{3}$

$$y = mx + c$$
$$y = \tfrac{1}{3}x + c$$
$$3 = \tfrac{1}{3}(6) + c$$
$$3 = 2 + c$$
$$3 - 2 = c$$
$$1 = c$$

$$\underline{y = -\tfrac{1}{3}x + 1}$$

(Total for Question 15 is 3 marks)

16 (a) Rationalise the denominator of $\dfrac{15}{\sqrt{5}}$ $\times \dfrac{\sqrt{5}}{\sqrt{5}}$ $= \dfrac{15\sqrt{5}}{5}$

$3\sqrt{5}$

....

$(1 + \sqrt{3})^2$ can be written in the form $a + b\sqrt{3}$, where a and b are integers.

(b) Work out the value of a and the value of b.

$(1 + \sqrt{3})(1 + \sqrt{3})$

$1 + 1\sqrt{3} + 1\sqrt{3} + 3$

$4 + 2\sqrt{3}$

$a = \underline{\qquad 4 \qquad}$

$b = \underline{\qquad 2 \qquad}$

(Total for Question 16 is 4 marks)

17 Write $\dfrac{3}{b} + \dfrac{2}{a-b}$ as a single fraction in its simplest form.

$$\frac{3(a-b)}{(b)(a-b)} + \frac{2b}{(a-b)(b)}$$

$$\frac{3a-3b+2b}{b(a-b)}$$

$$\frac{3a-b}{b(a-b)}$$

$$\frac{3a-b}{b(a-b)}$$

....

(Total for Question 17 is 3 marks)

TOTAL FOR PAPER IS 60 MARKS