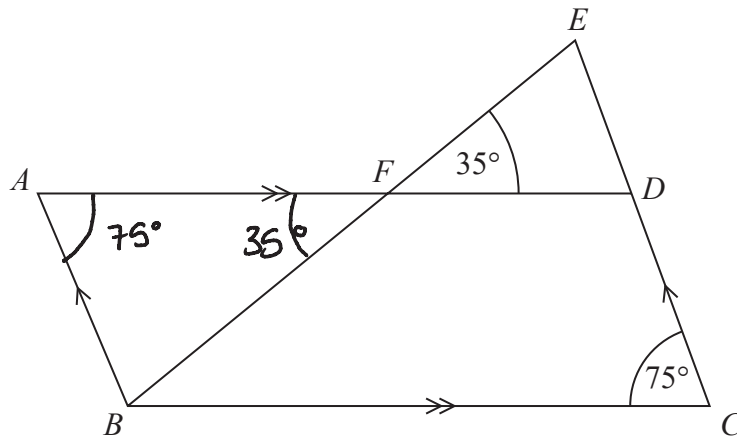


1.



$ABCD$  is a parallelogram.

$EDC$  is a straight line.

$F$  is the point on  $AD$  so that  $BFE$  is a straight line.

Angle  $EFD = 35^\circ$

Angle  $DCB = 75^\circ$

Show that angle  $ABF = 70^\circ$

Give a reason for each stage of your working.

Angle  $BAD = 75^\circ$  because opposite angles in a parallelogram are equal

Angle  $AFD = 35^\circ$  because vertically opposite angles are equal

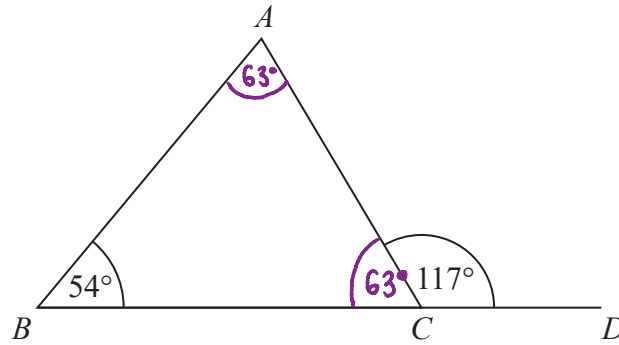
$$75 + 35 = 110$$

$$180 - 110 = 70$$

Therefore angle  $ABF = 70^\circ$

(Total for Question is 4 marks)

2.



$BCD$  is a straight line.

$ABC$  is a triangle.

Show that triangle  $ABC$  is an isosceles triangle.

Give a reason for each stage of your working.

Isosceles triangle is a triangle with 2 equal angles and 2 equal side lengths

$$\begin{aligned}\angle ACB &= 180 - 117 \\ &= 63^\circ\end{aligned}$$

because angles on a straight line add to  $180^\circ$

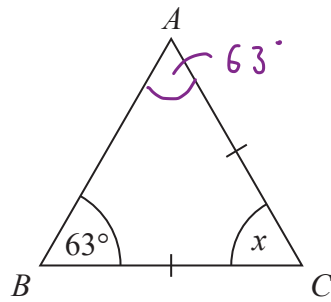
$$\begin{aligned}\angle BAC &= 180 - 63 - 54 \\ &= 63^\circ\end{aligned}$$

because all angles in a triangle add up to  $180^\circ$

Triangle  $ABC$  is an isosceles triangle because two of the angles are equal in size

(Total for Question is 4 marks)

3. Mary needs to work out the size of **angle x** in this diagram.



b = base angles

angles in  $\Delta$  sum to  $180^\circ$

$x = 180 - 63 - 63 = 54^\circ$  or  $x = 54^\circ$  (1)

She writes

$x = 63^\circ$  because **base angles of an isosceles triangle** are equal.

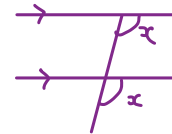
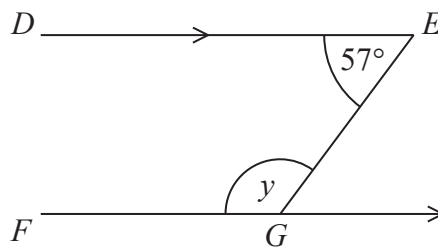
Mary is wrong.  $x$  lies between the two equal sides (AC and BC), so is not a base angle.

(a) Explain why.

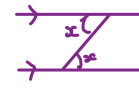
$x$  is not a base angle. (1)

(1)

William needs to work out the size of **angle y** in this diagram.



F = corresponding angles



Z = alternate angles

William writes

Working	Reason
angle $EGH = 57^\circ$	because <b>corresponding angles</b> are equal
$y = 180^\circ - 57^\circ$ $y = 123^\circ$	because angles on a <b>straight line</b> add up to <b><math>180^\circ</math></b>

The angles in the diagram are alternate, not corresponding.

One of William's reasons is **wrong**.

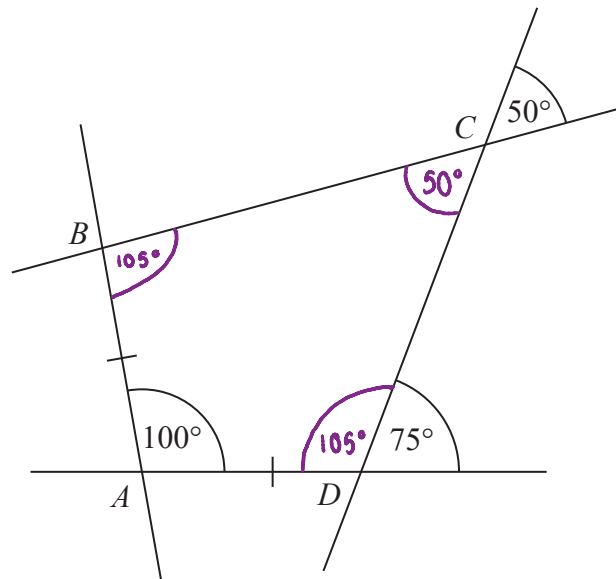
(b) Write down the **correct** reason.

alternate angles are equal.

(1)

(Total for Question is 2 marks)

4. The diagram shows quadrilateral  $ABCD$  with each of its sides extended.



$$AB = AD$$

Show that  $ABCD$  is a kite.

Give a reason for each stage of your working.

$$\angle BCD = 50^\circ \checkmark$$

Because vertically opposite angles are equal

$$\begin{aligned} \angle ADC &= 180 - 75 \\ &= 105^\circ \checkmark \end{aligned}$$

Because angles on a straight line add to  $180^\circ$

$$\angle ABC + 100 + 105 + 50 = 360$$

$$\angle ABC = 105^\circ \checkmark$$

Because angles in a quadrilateral add to  $360^\circ$

$\therefore ABCD$  is a kite because it has two equal side lengths and two equal angles  $\checkmark$

$$1 \text{ kg} = 1000 \text{ g}$$

$$3 \text{ kg} = 3000 \text{ g}$$

1 block weighs 650 g

$$4 \times 650 = 2600 \text{ g} \quad \checkmark$$

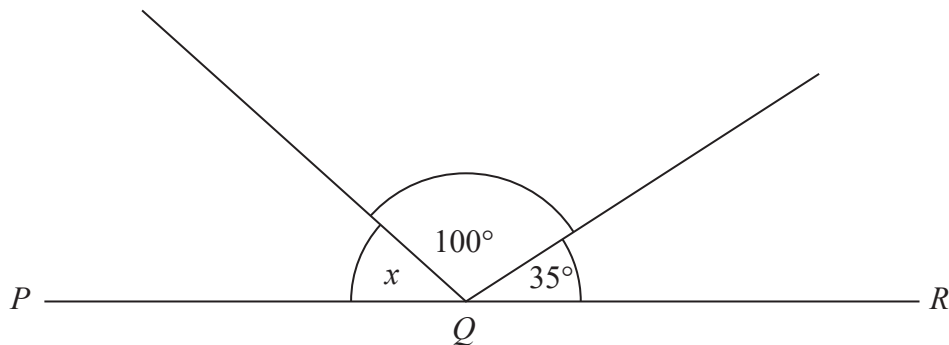
$$3000 - 2600 = 400 \text{ g} \quad \checkmark$$

$\times$	600	50
4	2400	200

$$2400 + 200 = 2600 \text{ g}$$

400  $\checkmark$

5.  $PQR$  is a straight line.



Work out the size of angle  $x$ .

Angles on a straight line add to  $180^\circ$

$$x + 100 + 35 = 180$$

$$x + 135 = 180$$

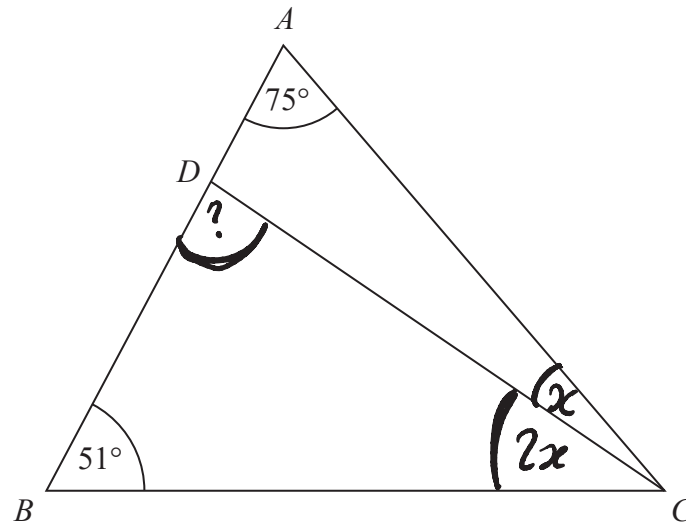
$$(-135) \quad (-135)$$

$$x = 45^\circ \quad \checkmark$$

45  $\checkmark$   $^\circ$

(Total for Question is 2 marks)

6. The diagram shows triangle  $ABC$ .

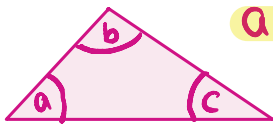


$ADB$  is a straight line.

the size of angle  $DCB$  : the size of angle  $ACD = 2 : 1$  ✓

Work out the size of angle  $BDC$ .

All interior angles of a triangle add to  $180^\circ$



$$a + b + c = 180$$

$$75 + 51 + 2x + x = 180 \quad \leftarrow \text{For Triangle ABC}$$

$$3x = 180 - 75 - 51$$

$$3x = 54 \quad \textcircled{1}$$

$$x = \frac{54}{3}$$

$$x = 18 \quad \textcircled{1}$$

For Triangle BCD

$$51 + 2x + ? = 180$$

$$\text{Since } x = 18 \quad \textcircled{1}$$

$$51 + 2(18) + ? = 180$$

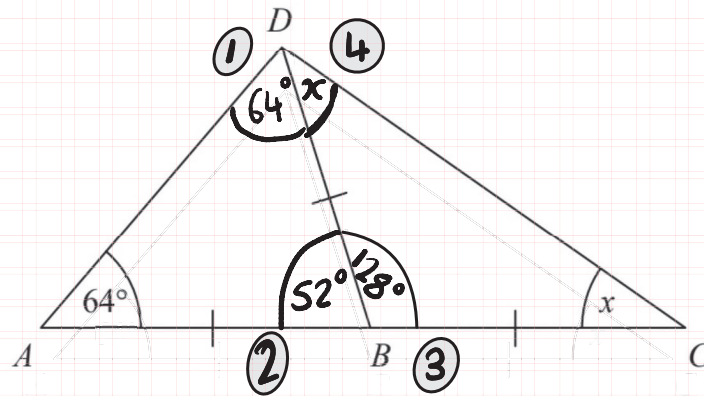
$$? = 180 - 51 - 2(18)$$

$$= 180 - 51 - 36$$

$$= 93$$

$\textcircled{1}$  93

7.



$ABC$  is a straight line.

$AB = BC = BD$ .

Angle  $DAB = 64^\circ$

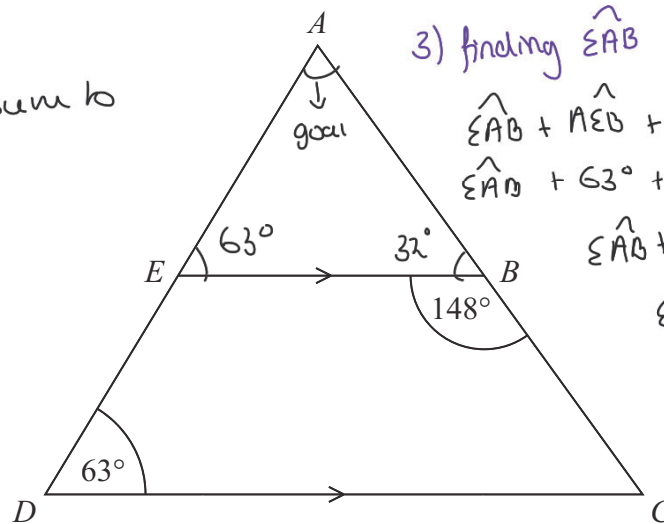
Work out the size of the angle marked  $x$ .

Give a reason for each stage of your working.

- ① base angles of isosceles triangle are equal (1)
- ②  $180 - 64 - 64 = 52^\circ$  Since sum of angles in triangle =  $180^\circ$  (1)
- ③  $180 - 52 = 128^\circ$  Since sum of angles on straight line =  $180^\circ$  (1)
- ④  $x + x + 128 = 180$  Since base angles in isosceles triangle are equal and sum of angles in triangle =  $180^\circ$  (1)  
 $2x + 128 = 180$   
 $2x = 52$   
 $x = 26^\circ$

8.  $ADC$  is a triangle.

Angles in a triangle sum to  $180^\circ$ . ✓<sub>5</sub>



3) finding  $\hat{\angle} EAB$

$$\hat{\angle} EAB + \hat{\angle} AEB + \hat{\angle} ABE = 180^\circ$$

$$\hat{\angle} EAB + 63^\circ + 32^\circ = 180^\circ \quad \checkmark_2$$

$$\hat{\angle} EAB + 95^\circ = 180^\circ$$

$$\begin{aligned} \hat{\angle} EAB &= 180^\circ - 95^\circ \\ &= 85^\circ \end{aligned}$$

$AED$  and  $ABC$  are straight lines.

$EB$  is parallel to  $DC$ .

Angle  $EBC = 148^\circ$

Angle  $ADC = 63^\circ$

Work out the size of angle  $EAB$ .

You must give a reason for each stage of your working.

1) finding angle  $\hat{\angle} AEB$ .

$\hat{\angle} AEB$  and  $\hat{\angle} ADC$  are corresponding angles ( $AE$  is on the line  $AED$  and  $EB$  and  $DC$  are parallel).

$$\hookrightarrow \hat{\angle} AEB = \hat{\angle} ADC \rightarrow \hat{\angle} AEB = 63^\circ \quad \checkmark_1$$

2) finding angle  $\hat{\angle} ABE$ .

Line  $ABC$  is a straight line, and angles on a line sum to  $180^\circ$  ✓<sub>4</sub>

$$\hat{\angle} ABE + \hat{\angle} EBC = 180^\circ$$

$$148^\circ \downarrow \hat{\angle} ABE + 148^\circ = 180^\circ$$

$$\hat{\angle} ABE = 180^\circ - 148^\circ$$

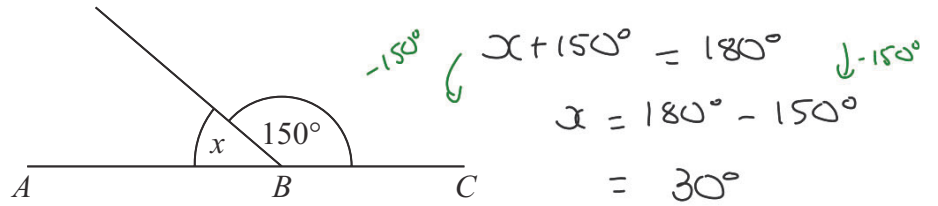
$$\hat{\angle} ABE = 32^\circ \quad \checkmark_2$$

$$\therefore \hat{\angle} EAB = 85^\circ \quad \checkmark_3$$

(Total for Question is 5 marks)



9.



**ABC** is a straight line.

(a) (i) Work out the size of the angle marked  $x$ .

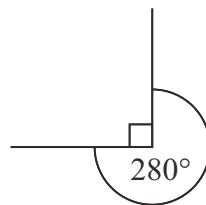
30 ✓ °  
(1)

(ii) Give a reason for your answer.

angles on a straight line sum to 180 ✓

(1)

The diagram below is wrong.



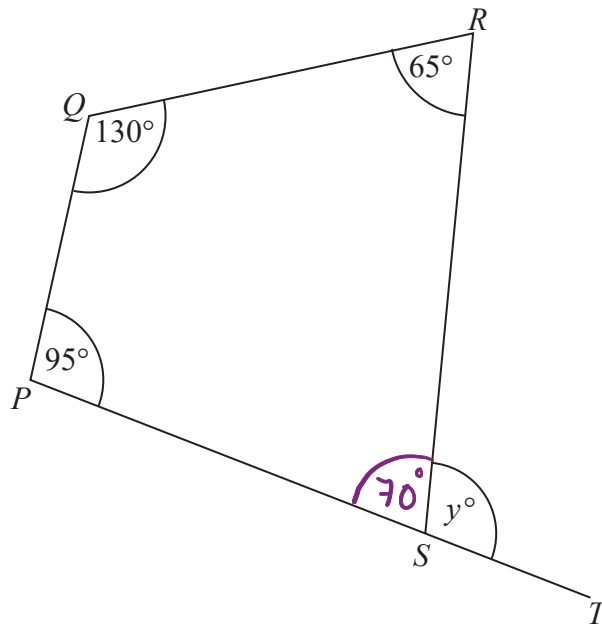
(b) Explain why.

Angles around point sum to 360°. Diagram shows a total sum of  $90^\circ + 280^\circ = 370^\circ$

$370^\circ \neq 360^\circ$  therefore is wrong. ✓  
(1)

(Total for Question is 3 marks)

10.  $PQRS$  is a quadrilateral.  
 $PST$  is a straight line.



Find the value of  $y$ .

Angles in a quadrilateral add up to  $360^\circ$

$$95 + 130 + 65 + x = 360^\circ$$

$$\therefore x = 360 - 65 - 130 - 95 = 70^\circ \quad \textcircled{1}$$

Angles on a straight line add up to  $180^\circ$

$$x + y = 180^\circ \quad \textcircled{1}$$

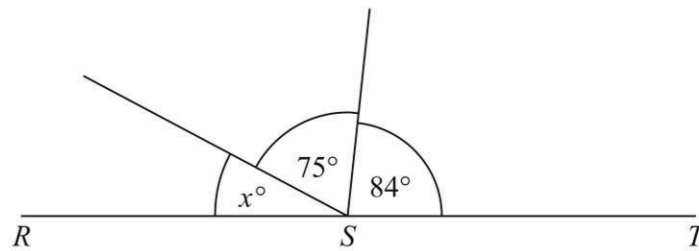
$$70 + y = 180^\circ$$

$$y = 180^\circ - 70^\circ = \underline{\underline{110^\circ}}$$

$$y = \textcircled{1} \quad \underline{\underline{110^\circ}}$$

(Total for Question is 3 marks)

11.



$RST$  is a straight line.

(i) Work out the value of  $x$ .

Angles on a straight line add to  $180^\circ$

$$\begin{array}{r}
 x + 75 + 84 = 180 \\
 \quad -75 \quad -75 \\
 \textcircled{1} \quad x + 84 = 105 \\
 \quad -84 \quad -84 \\
 \quad \quad x = 21
 \end{array}
 \quad \begin{array}{l}
 \textcircled{1} \\
 \textcircled{2}
 \end{array}$$

(ii) Give a reason for your answer.

Angles on a straight line add to  $180^\circ$   $\textcircled{1}$

(1)