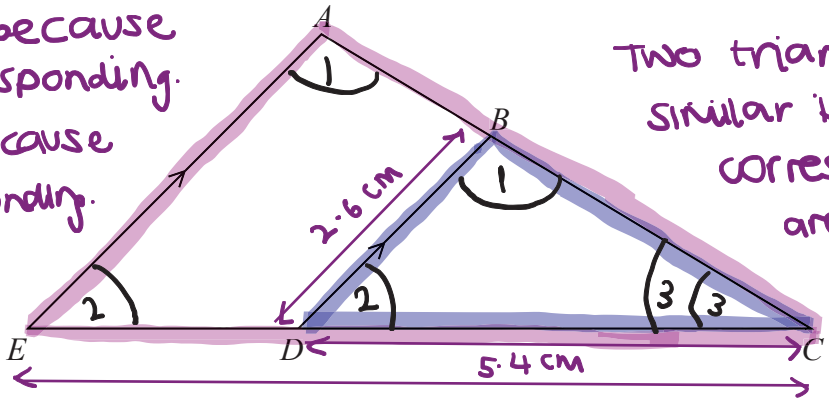
1.

∠EAC = ∠DBC because they are corresponding.

∠ABC = ∠BDC because they are corresponding.

∠ACE = ∠BCD.



Two triangles are similar if their corresponding sides are in the same ratio.

ABC and *EDC* are straight lines.
EA is parallel to *DB*.

Triangle ACD and triangle BCD are similar because their angles are the same size.

EC = 8.1 cm.
DC = 5.4 cm.
DB = 2.6 cm.

(a) Work out the length of *AE*.

$\frac{8.1}{5.4} = 1.5$ (1)

2.6 cm ⟶ AE. (×1.5) AE: 2.6 × 1.5 = 3.9 cm

(1)

3.9 cm

(2)

AC = 6.15 cm.

(b) Work out the length of *AB*.

(1)

AC = 6.15 cm.

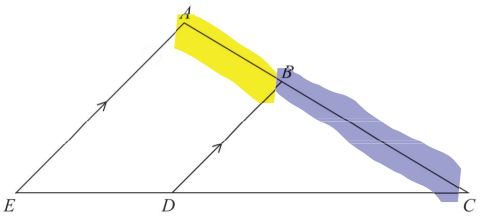
BC : $\frac{6.15}{1.5}$ = 4.1 cm.

BC ⟶ AC. (×1.5)

AB = AC − BC
= 6.15 − 4.1 = 2.05 (1)

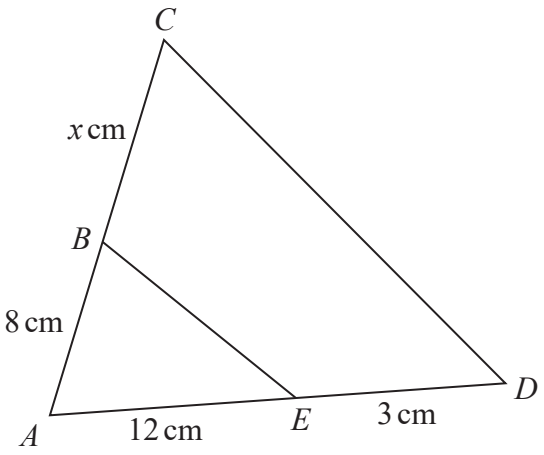
2.05 cm

(2)



(Total for Question is 4 marks)

2. The two triangles in the diagram are similar.



① Angle AEB = ADC
② Angle AEB = CAD ✓

There are two possible values of x.

Work out each of these values.
State any assumptions you make in your working.

Let k be scale factor

$AE \times k = AD$

$12 \times k = 15$

$k = \frac{15}{12}$

$k = \frac{5}{4}$ ✓

$AB \times k = AC$

$8 \times \frac{5}{4} = 8 + x$

$\frac{40}{4} = 8 + x$

$10 = 8 + x$

$2 = x$ ✓

$AE \times k = AC$

$AB \times k = AD$

$8 \times k = 15$

$k = \frac{15}{8}$

$12 \times \frac{15}{8} = 8 + x$ ✓

$\frac{12 \times 15}{8} = 8 + x$

$\frac{180}{8} = 8 + x$

$\frac{90}{4} = 8 + x$

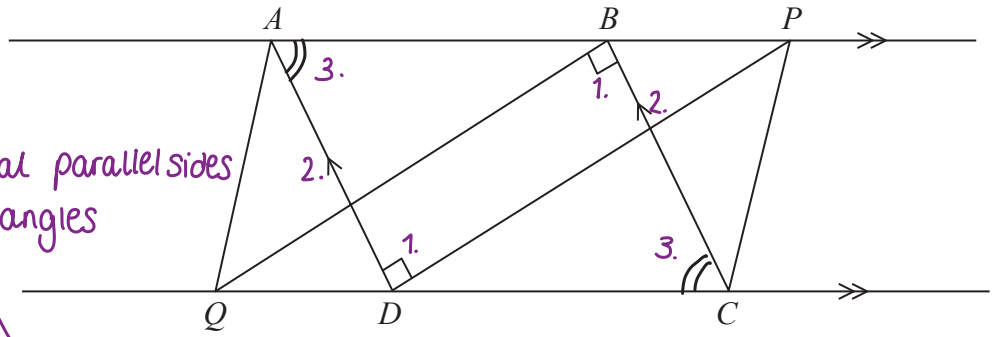
$\frac{45}{2} = 8 + x$

$22.5 = 8 + x$

$12.5 = x$ ✓

(Total for Question is 5 marks)

3.



2 pairs of equal parallel sides and equal angles

ABCD is a parallelogram.
ABP and *QDC* are straight lines.
Angle *ADP* = angle *CBQ* = 90°

Exactly the same (3 sides and 3 angles)
• SSS, ASA, SAS (not AAA)

(a) Prove that triangle *ADP* is congruent to triangle *CBQ*.

1. angle ADP = angle CBQ ⇒ both are 90° (1) 1 statement and reasoning
2. AB = BC as opposite sides of a parallelogram are equal
3. angle PAD = angle QCB as opposite angles in a parallelogram are equal

(1) all 3 statements + reasoning

The two triangles are therefore congruent, by ASA (they have 2 angles and a side length in common)

(1) Conclusion with ASA

(3)

(b) Explain why *AQ* is parallel to *PC*.

Considering APCQ : (from part a)

- AP = QC Since triangle ADP is congruent to triangle CBQ (1)
- AP and QC are parallel and equal
- Therefore APCQ is a parallelogram
- opposite sides of a parallelogram are parallel

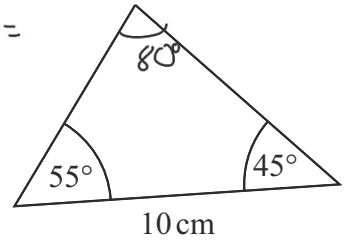
So therefore AQ is parallel to PC (1)

(2)

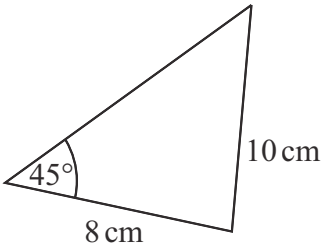
(Total for Question is 5 marks)

4. The diagram shows four triangles.

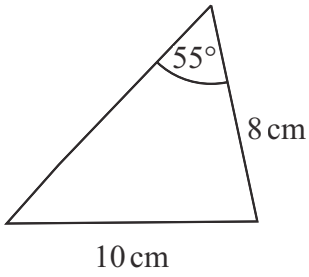
180 - 55 - 45 =



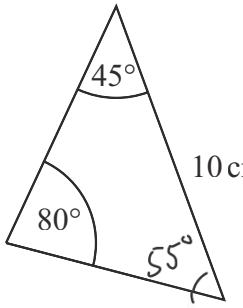
Triangle **A**



Triangle **B**



Triangle **C**



180 - 80 - 45 = 55

Triangle **D**

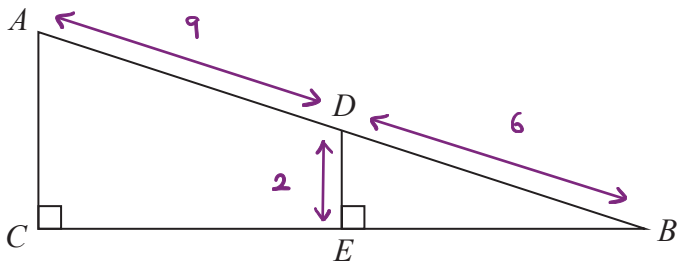
Two of these triangles are congruent. → Same

Write down the letters of these two triangles.

A and D ✓

(Total for Question is 1 mark)

5. The diagram shows two right-angled triangles *ACB* and *DEB*.

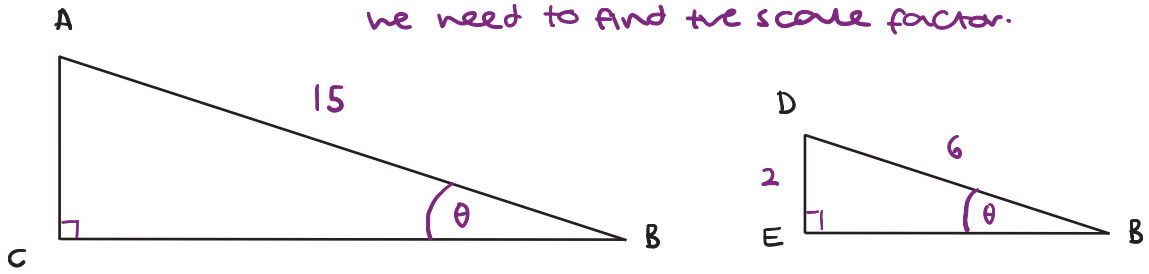


AD = 9 cm
DE = 2 cm
DB = 6 cm

Calculate the length of *CB*.
Give your answer correct to 2 decimal places.

The two triangles are similar.

we need to find the scale factor.



$6 \times SF = 15.$

$SF = \frac{15}{6} = 2.5$ (1)

$a^2 + b^2 = c^2.$

$2^2 + BE^2 = 6^2.$ (1)

$BE = \sqrt{6^2 - 2^2} = \sqrt{32}$ (1)

14.14 ..... cm

If $BE = \sqrt{32}$ cm and the scale factor = 2.5, (1)

$CB = \sqrt{32} \times 2.5 = 14.14$ cm (2dp.)

(Total for Question is 4 marks)