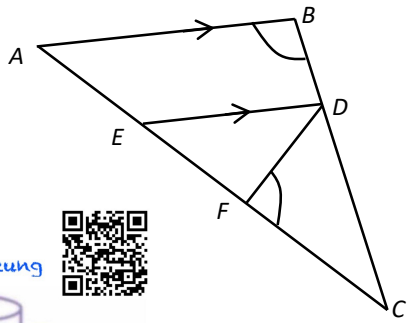
Similar Triangles
Multiple Choice Questions

[20-21]

1. [20-21 S. 2 Final Exam #23]

In the figure, AB // ED and $\angle ABC = \angle CFD$. Which of the followings must be correct?

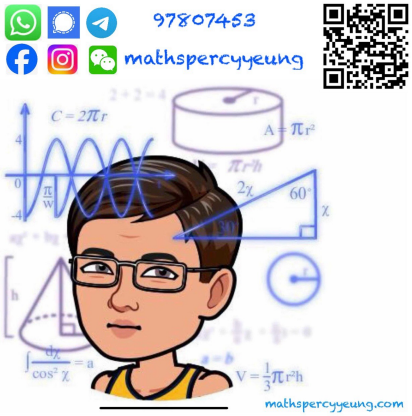


I. $\Delta CFD \sim \Delta CDE$

II. $\Delta CDE \sim \Delta DFE$

III. $AB \times CD = AC \times DF$

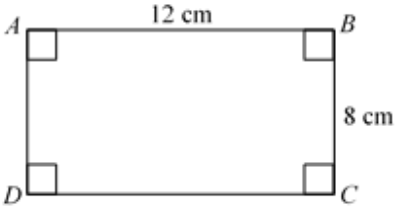
A. I only
B. II only
C. I and II only
D. I and III only



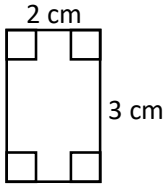
[21-22]

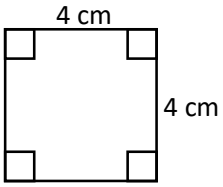
2. [21-22 S.2 Mid-year, #6]

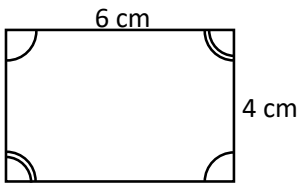
The figure below shows a rectangle $ABCD$ with AB = 12 cm and BC = 8 cm.



Which of the following figure(s) must be similar to rectangle $ABCD$?

I. 

II. 

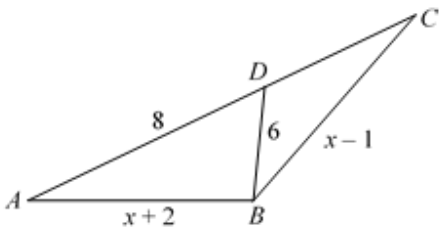
III. 

A. I only
B. II only
C. I and III only
D. II and III only

Similarity

3. [21-22 S.2 Mid-year, #9]

In the figure, D is a point on AC such that $AD = 8$ and $BD = 6$. If $AB = x + 2$, $BC = x - 1$ and $\Delta ABC \sim \Delta ADB$, find the value of x.



A. 9
B. 10
C. 11
D. 12

4. [21-22 S.2 Mid-year, #14]

The figure shows a triangle ADE. B and C are the mid-points of AD and AE respectively. Which of the following must be true?

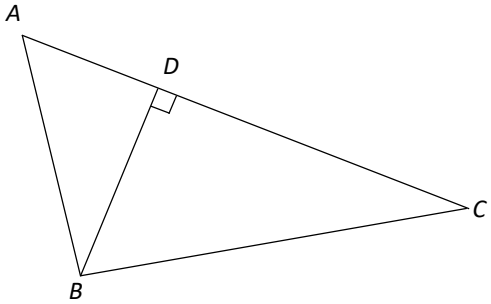
I. $DE : BC = 2 : 1$
II. $DE \,//\, BC$
III. $AB \times AE = AC \times AD$

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

5. [21-22 Final,#10]

In the figure, D is a point on AC such that $BD \perp AC$. If AB = 28 cm, BC = 45 cm and DC = 43.2 cm, find the length of AD correct to the nearest 0.1 cm.

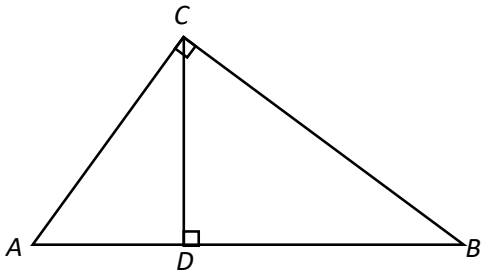
A. 9.8 cm.
B. 12.6 cm.
C. 19.8 cm.
D. 25.0 cm.



Similarity

6. [21-22 Final,#20]

In the figure, ΔABC is a right-angled triangle with $\angle ACB = 90°$. D is a point on AB such that $CD \perp AB$. Which of the following must be true?



I. $DC^2 = AD \times BD$

II. $AC \times CB = AB \times CD$

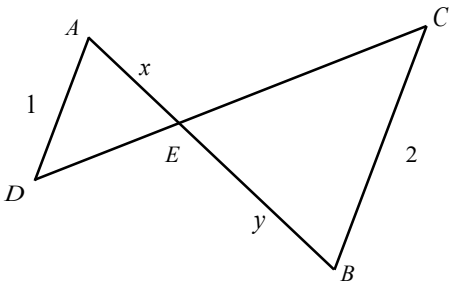
III. If $AD : DC = 1 : 2$, then $2AB = 5CD$.

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

[22-23]

7. [22-23 Mid-Year,#8]

In the figure, AB and CD intersect at the point E. It is given that $AD = 1$ and $CB = 2$. If $AD // CB$, $AE = x$ and $EB = y$, which of the following MUST be true?



I. $\Delta ADE \sim \Delta BCE$

II. $y = 2x$

III. $\angle CBA = \angle DAB$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

Similarity

8. [22-23 Mid-Year,#17]

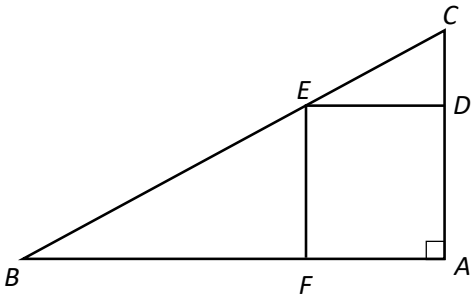
In the figure, ABC is a right-angled triangle with $\angle BAC = 90°$. D, E and F are points on AC, BC and AB respectively so that $ADEF$ is a rectangle. If CD = 3 cm and BF = 7 cm, then the area of $ADEF$ is

A. 10.5 cm^2.

B. 21 cm^2.

C. 32 cm^2.

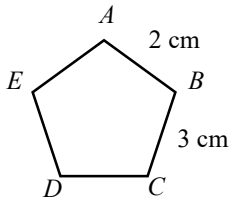
D. 42 cm^2.

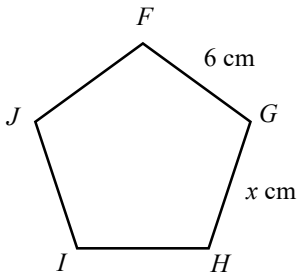


9. [22-23 Final,#4]

In the figure, $ABCDE$ is similar to $FGHIJ$. If AB = 2 cm, BC = 3 cm, FG = 6 cm and $GH = x$ cm, find the value of x.

A. 3
B. 9
C. 27
D. 81





10. [22-23 Final,#24]

ΔABC *is a* right-angled triangle with $\angle B = 90°$. If P, Q and R are mid-points of AB, BC and AC respectively, which of the following must be true?

I. $\angle PRQ = 90°$
II. $\Delta PQR \sim \Delta CAB$
III. $AC \,//\, PQ$

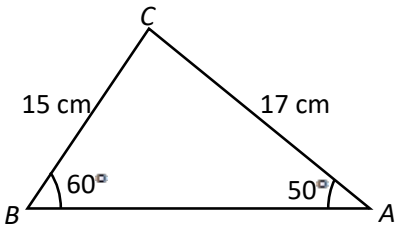
A. I and II only
B. I and III only
C. II and III only
D. I, II and III

Similarity

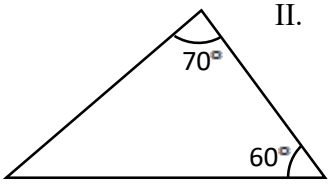
[23-24]

11. [23-24 Mid-Year,#4]

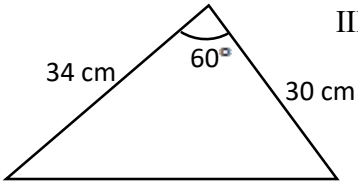
The figure shows a triangle ABC with $\angle A = 50°$, $\angle B = 60°$, $AC = 17$ cm and $BC = 15$ cm . Which of the following triangle(s) must be similar to ΔABC ?



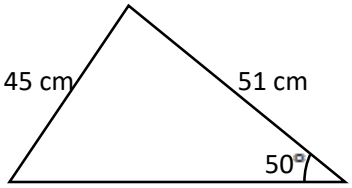
I.



II.



III.



A. I only

B. II only

C. I and III only

D. II and III only

12. [23-24 Mid-Year,#18]

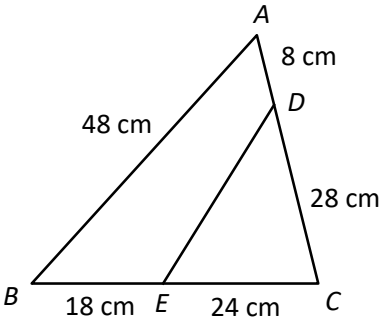
In the figure, ABC is a triangle. D and E are points on AC and BC respectively. Find the length of DE .

A. 30 cm

B. 32 cm

C. 36 cm

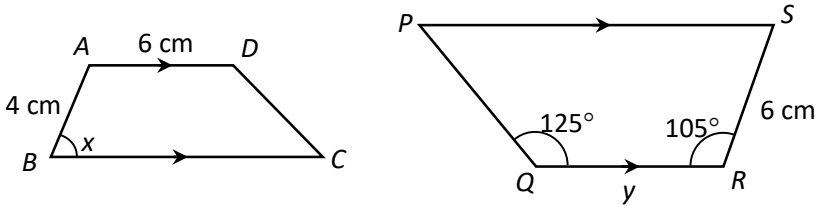
D. 40 cm



Similarity

13. [23-24 Mid-Year,#19]

In the figure, *ABCD* and *RSPQ* are similar figures. Find x and y.



A. $x = 55°,\ y = 8$ cm

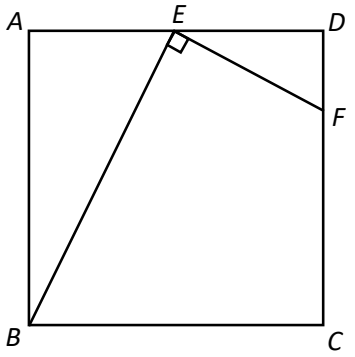
B. $x = 55°,\ y = 9$ cm

C. $x = 75°,\ y = 8$ cm

D. $x = 75°,\ y = 9$ cm

14. [23-24 Mid-Year,#20]

In the figure, *ABCD* is a square. *E* is the mid-point of *AD* and *F* is a point on *CD* such that $FE \perp BE$. Which of the following are true?



I. $\Delta ABE \sim \Delta DEF$

II. $\Delta ABE \sim \Delta EBF$

III. $AB = 4DF$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

15. [23-24 Final,#2]

It is given that $\Delta ABC \sim \Delta DEF$. If $\angle A = 2x + 15°$, $\angle B = 4x$, $\angle C = 3x + 30°$ and $\angle F = 3y$, find x and y.

A. $x = 15°,\ y = 20°$

B. $x = 15°,\ y = 25°$

C. $x = 20°,\ y = 20°$

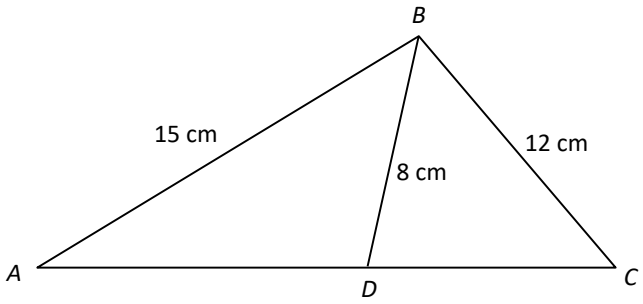
D. $x = 20°,\ y = 25°$

Similarity

16. [23-24 Final,#21]

The figure shows a triangle ABC. D is a point on AC such that $\angle ABD = \angle ACB$. If AB = 15 cm, BC = 12 cm and BD = 8 cm, find CD.

A. 12.5 cm
B. 11.5 cm
C. 10 cm
D. 8.8 cm



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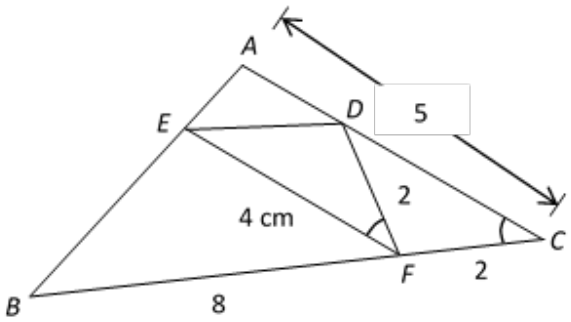
Similarity
Conventional Questions

[20-21]

1. [20-21 S. 2 Final Exam #20]

In **Figure 9**, D, E and F are points on AC, AB and BC respectively. $BF = 8$ cm, $DF = FC = 2$ cm, $EF = 4$ cm, $AC = 5$ cm and $\angle ACB = \angle DFE$.



(a) Prove that $\Delta ABC \sim \Delta DEF$. **(3 marks)**

(b) Prove that $AC \parallel EF$. **(2 marks)**

[21-22]

2. [21-22 S.2 Mid-year, #1]

Figure 1 shows two triangles ABC and DEF. $AB = 8$ cm, $DE = 6$ cm, $DF = 7.5$ cm, $\angle ABC = 70°$, $\angle ACB = 60°$ and $\angle DEF = x$. If $\Delta ABC \sim \Delta DEF$, find

(a) x,

(b) the length of AC. **(3 marks)**

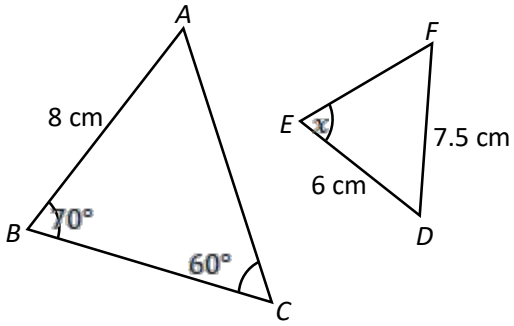
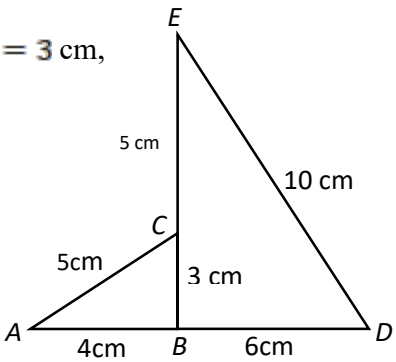


Figure 1

3. [21-22 S.2 Mid-year, #11]

In **Figure 2**, ABD and BCE are straight lines. $AB = 4$ cm, $BD = 6$ cm, $BC = 3$ cm, $CE = AC = 5$ cm and $DE = 10$ cm.



(a) Prove that $\Delta ABC \sim \Delta EBD$. **(2 marks)**

(b) Prove that $BE \perp AD$. **(2 marks)**

Figure 2

Similarity

4. [21-22 S.2 Mid-year, #13]

In **Figure 3**, ΔDAC is a right-angled triangle with $\angle DAC = 90°$. B is a point on DC such that $AB \perp DC$.

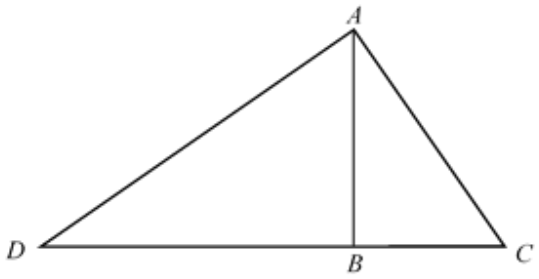


Figure 3

(a) Prove that $\Delta ADB \sim \Delta CAB$. **(2 marks)**

(b) Suppose $AB : DB = 3 : 4$ and $BC = (y + 1)$ cm. Find the area of ΔABC in terms of y. **(2 marks)**

5. [21-22 S.2 Final Exam, #9]

Figure 2 shows ΔADE with $AD = 6$ cm and $AE = 4$ cm. B is a point on AD such that $AB = 2$ cm. C is a point on AE such that $AC = 3$ cm.

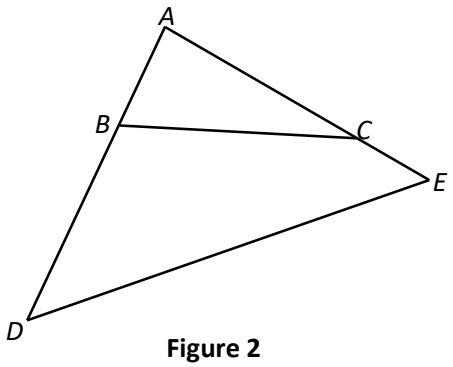


Figure 2

(a) Prove that $\Delta ABC \sim \Delta AED$. **(2 marks)**

(b) If $\angle DAE = 104°$ and $\angle ADE = 47°$, find $\angle ABC$. **(2 marks)**

6. [21-22 S.2 Final,#12]

Figure 4 shows a trapezium $ABCD$ with $\angle DAB = \angle ABC = 90°$. E is a point on AB such that $AE : EB = 4 : 1$.

It is given that $AD = 5$ cm, $BC = 8$ cm and $AB = 15$ cm.

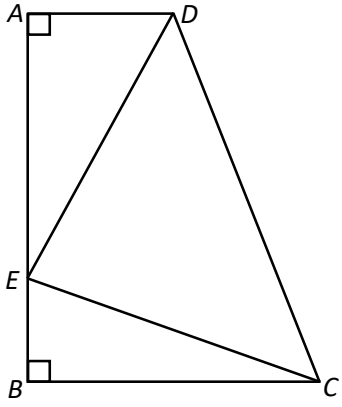


Figure 4

(a) Find DE and CE. Give your answers in surd form if necessary. **(3 marks)**

(b) Show that ΔCDE is a right-angled triangle. State which angle is the right angle. **(2 marks)**

Similarity

[22-23]

7. [22-23 S.2 Mid-Year,#6]

In **Figure 3**, *ABC*, *AFD* and *BFE* are straight lines. It is given that *AC // ED* and *FE // CD*.

(a) Prove that $\Delta ACD \sim \Delta DEF$. **(2 marks)**

(b) Suppose $\angle ACD = 50°$ and $\angle ADE = 65°$. Find $\angle AFE$. **(2 marks)**

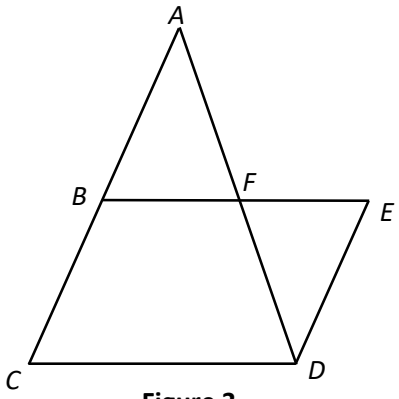


Figure 3

8. [22-23 S.2 Mid-Year,#13]

In **Figure 6**, *ABCD* is a quadrilateral. *E* is a point lying on *BC* such that $AE \perp BD$. *AE* and *BD* intersects at *F*. It is given that $\Delta ADF \sim \Delta EBF$.

(a) If $AF : EF = 3 : 2$, find $DF : BF$. **(2 marks)**

(b) Let $BF = x$ cm and $EF = y$ cm. Find the area of ΔADF : the area of ΔEBF. **(2 marks)**

(c) It is given that $\Delta ADB \cong \Delta CBD$ and the area of ΔEBF is 16 cm^2. Find the area of the quadrilateral *ABCD*. **(3 marks)**

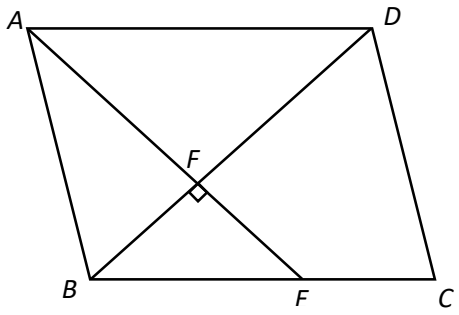


Figure 6

9. [22-23 S.2 Final,#16]

Similarity

Figure 5 shows ΔABC. M is a point on AC such that $\Delta AMB \sim \Delta BMC$.

(a) Prove that $\Delta AMB \sim \Delta ABC$. **(2 marks)**

(b) Suppose $AM : MC = 3 : 1$ and $BM = 2\sqrt{3}$, find the length of BC. **(3 marks)**

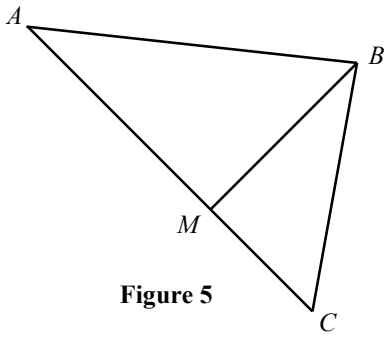


Figure 5

[23-24]

10. [23-24 S.2 Mid-Year,#6]

In **Figure 1**, AE and BD intersect at C. It is given that $\Delta ABC \sim \Delta EDC$, $AC = 3$, $BC = 4$ and $CE = 12$. Find CD. **(3 marks)**

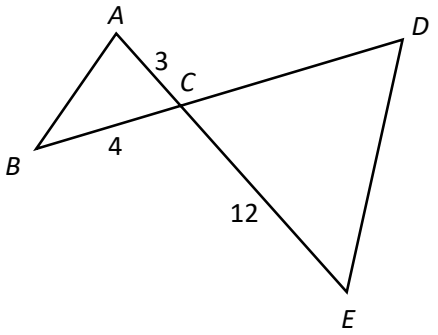


Figure 1

11. [23-24 S.2 Mid-Year,#9]

Figure 2 shows a right-angled triangle ABC with $\angle ABC = 90°$. D and E are points on AC and BC respectively such that $DE \perp BC$, $DE = 6$ cm, $BE = 24$ cm and $EC = 8$ cm. F is a point on AB such that $FB = 18$ cm.

(a) Prove that $\Delta BEF \sim \Delta ECD$. **(3 marks)**

(b) Prove that $CA \,//\, EF$. **(2 marks)**

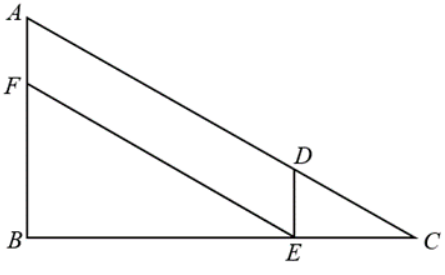


Figure 1

12. [23-24 S.2 Mid-Year,#13]

Similarity

In ΔABC , D is a point on AC such that $\Delta ABC \sim \Delta BDC$. Let $AD = q$, $DC = r$ and $BC = s$.

(a) Show that $q = \dfrac{s^2 - r^2}{r}$. **(2 marks)**

(b) Suppose that $q = s + r$.

(i) Find $s : r$.

(ii) If $BC = 5$ and $BD = 4$, find the perimeter of ΔABC . **(4 marks)**

13. [23-24 S.2 Final,#2]

Figure 1 shows ΔABC and ΔDEF where $\angle BAC = 25°$, $\angle ABC = 120°$, AB = 6 cm , $AC = 2x$ cm , $\angle EDF = 25°$, $\angle DFE = 35°$, $DE = 18$ cm and $DF = 7y$ cm .

(a) Prove that $\Delta ABC \sim \Delta DEF$. **(3 marks)**

(b) Find $x : y$. **(2 marks)**

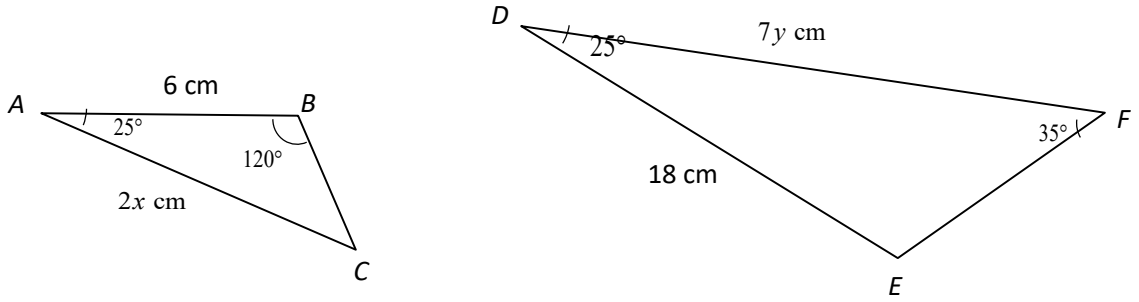


Figure 1

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