Name : _____

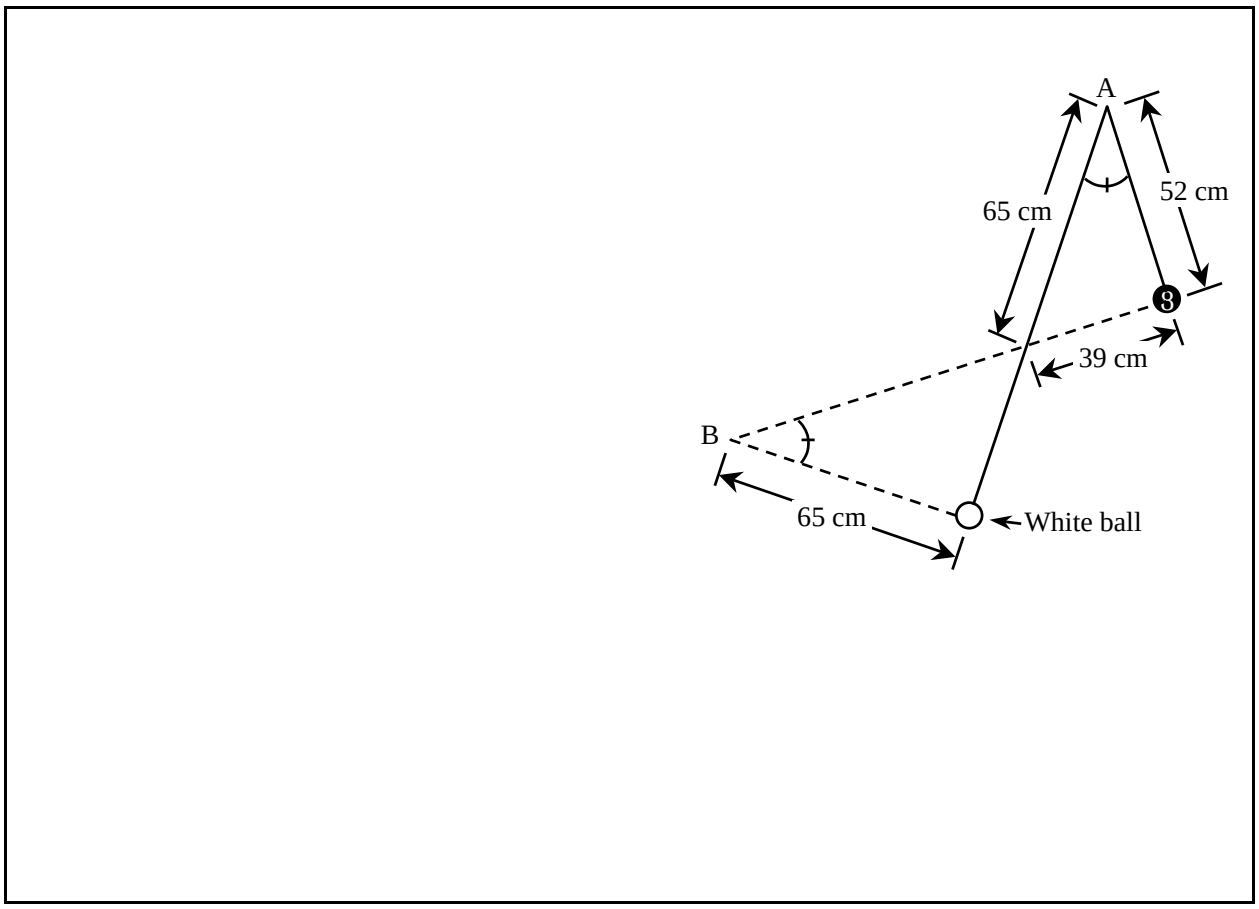
Math 4CST – Practice on Similar Triangles

1 A person playing pool wants to hit the white ball so that it rolls and eventually hits the 8 ball. The white ball must not touch the red ball.

As shown in the diagram below, the white ball can travel along two possible paths: one path is represented by dotted lines and the other path is represented by solid lines.

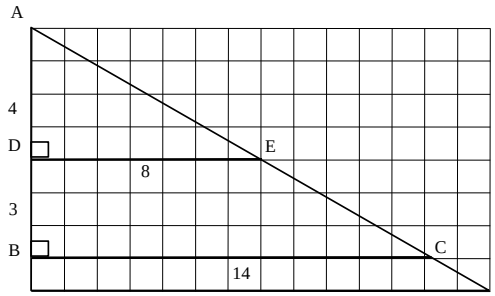
Various measurements are given in the following figure. In addition, angle A and angle B are congruent.

What is the difference between the length of the path represented by dotted lines and the length of the path represented by solid lines?

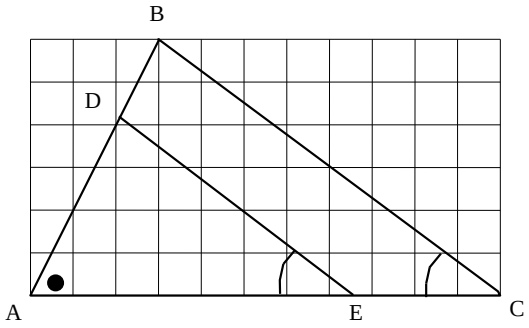


2 Identify the similar triangles in the following situations. Justify your answers.

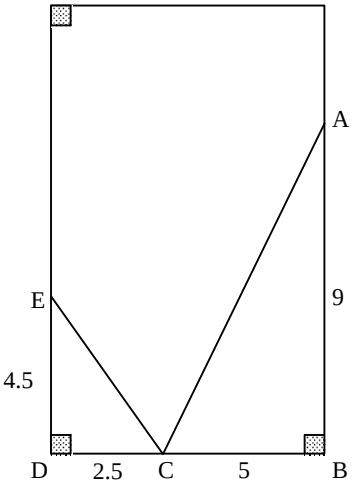
a)



b) Angle A is common and angles C and E are congruent.



4 Charles is playing billiards with his friends. According to him, the path taken by the yellow ball forms two similar triangles ABC and EDC.



What reason can be used to justify his statement?

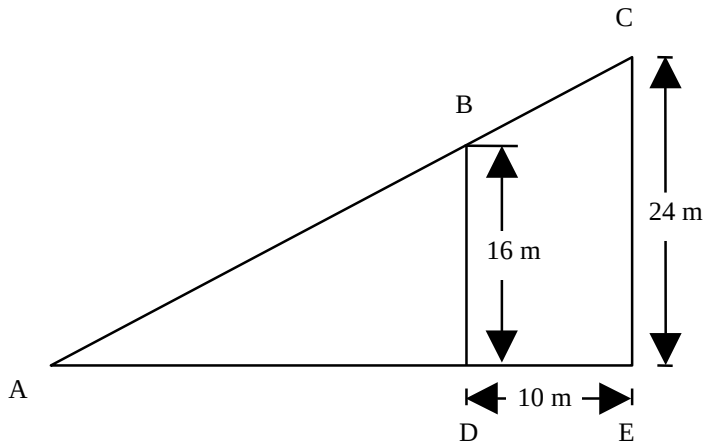
A) Two triangles are similar if each contains a right angle.

B) Two triangles are similar if they have two corresponding angles proportional.

C) Two triangles are similar if their corresponding sides are congruent.

D) Two triangles are similar if they have one corresponding congruent angle bounded by two corresponding proportional sides.

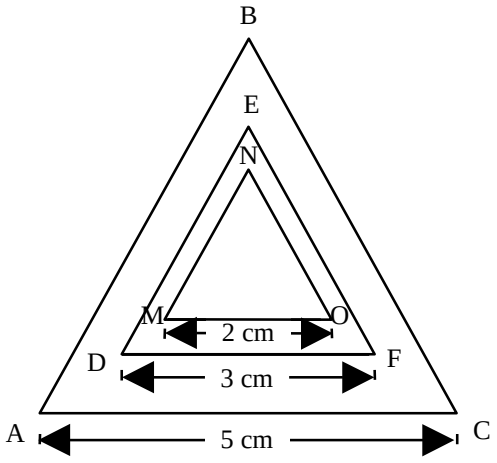
5 Triangles ABD and ACE in the figure below are similar.



Calculate the measure of segment AD.

Segment AD measures _____ m.

6 The logo of an organization is represented below. It is made up of three equilateral triangles : ABC, DEF and MNO. The length of the sides of the three triangles are 5 cm, 3 cm and 2 cm respectively.



What is the ratio between the perimeters of triangles MNO and ABC?

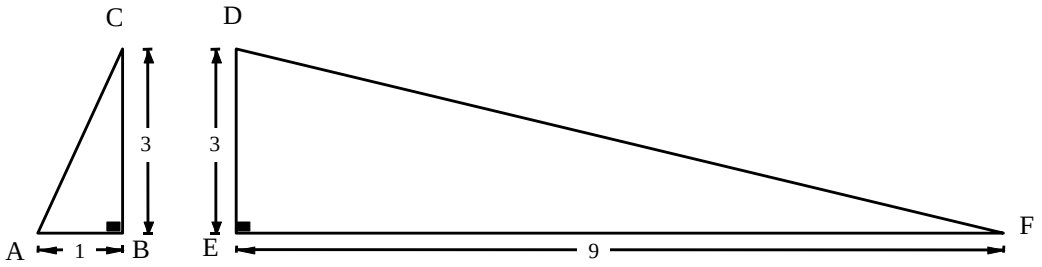
A) 0.6

B) 0.4

C) 0.36

D) 0.16

7 Right triangles ABC and DEF are similar.



Which of the following statements is true?

A) $\frac{m\,\overline{AC}}{m\,\overline{DF}} = \frac{m\,\overline{DE}}{m\,\overline{AB}}$

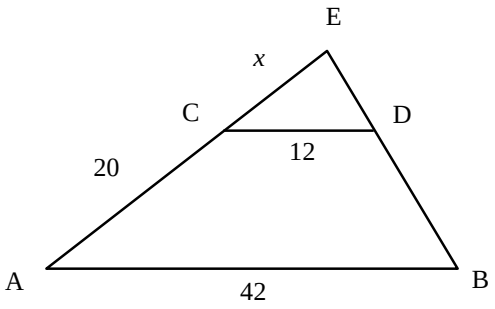
C) $\frac{m\,\overline{AC}}{m\,\overline{DF}} = \frac{m\,\overline{AB}}{m\,\overline{DE}}$

B) $\frac{m\,\overline{AC}}{m\,\overline{DF}} = \frac{m\,\overline{CB}}{m\,\overline{DE}}$

D) $\frac{m\,\overline{AC}}{m\,\overline{DF}} = \frac{m\,\overline{AB}}{m\,\overline{FE}}$

8 In the figure to the right, $\overline{AB} \,//\, \overline{CD}$.

The measurements are given in metres.



What is the length of segment CE to the nearest metre?

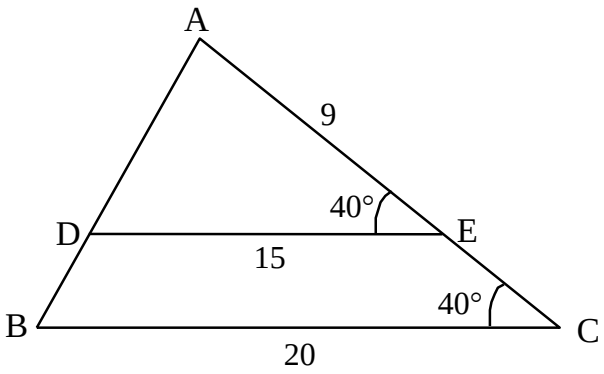
A) 4

C) 8

B) 6

D) 12

9 In the following diagram, triangles ABC and ADE are similar. The measurements are given in metres.



What is the measure of segment EC, rounded to the nearest hundredth of a metre?

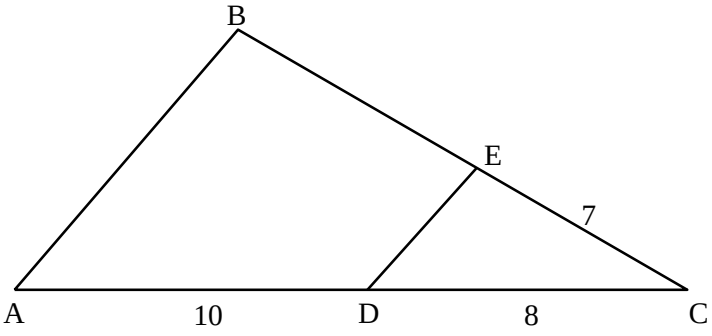
A) 2.25

B) 3.00

C) 6.75

D) 12.00

11 In triangle ABC below, segment DE is parallel to segment AB. The measurements are given in metres.



Rounded to the nearest hundredth of a metre, what is the length of segment BC?

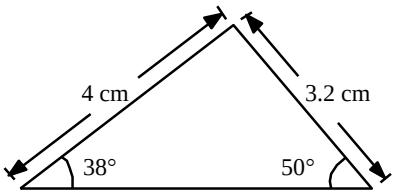
A) 8.75 m

B) 11.43 m

C) 15.75 m

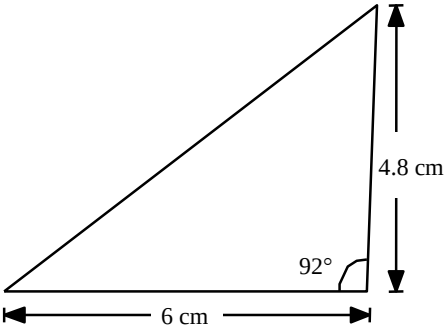
D) 16.00 m

12 One of the triangles below is similar to the one shown at the right.

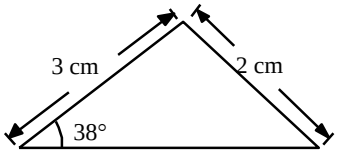


Which triangle is it?

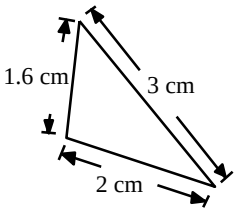
A)



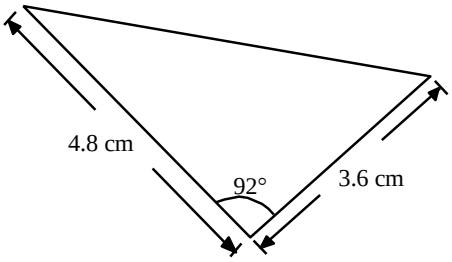
C)



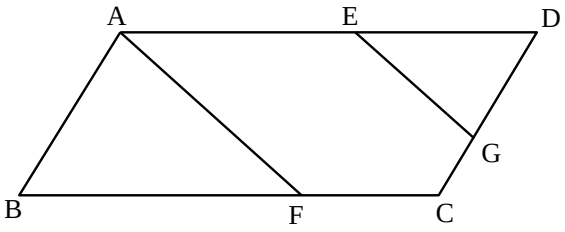
B)



D)



13 In the parallelogram shown at the right,



$\angle AFB \cong \angle DEG$ and $\angle B \cong \angle D$

m $\overline{BF}$ = 100

m $\overline{ED}$ = 80

m $\overline{AB}$ = 46.5 cm

m $\overline{EG}$ = 43.5 cm

What is the measure of segment AF?

A) 58.1 m

B) 54.4 m

C) 37.2 m

D) 34.8 m

14 In the parallelogram ABCD on the right,

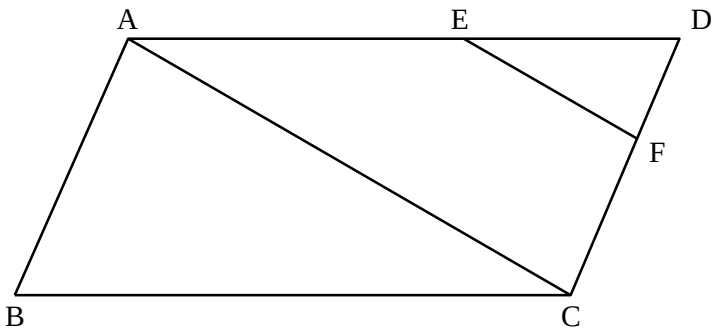
$\angle ACB \cong \angle FED$

m $\overline{AB}$ = 22 cm

m $\overline{BC}$ = 47 cm

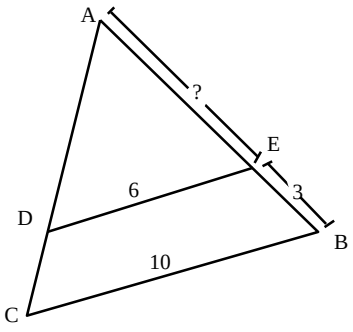
m $\overline{AC}$ = 45 cm

m $\overline{EF}$ = 18 cm



What is the measure of segment DF?

15 In the figure to the right, segments DE and CB are parallel and they measure 6 units and 10 units respectively. Segment EB measures 3 units.



What is the measure of segment AE?

A) 2 units

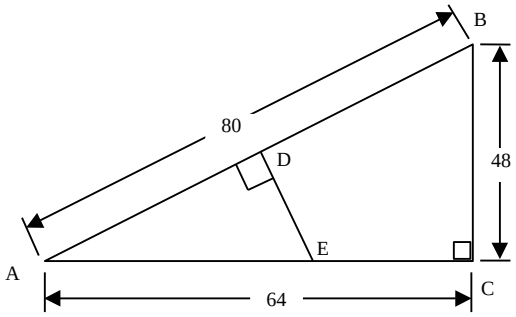
B) 4.5 units

C) 5 units

D) 7.5 units

16 In the diagram below, triangle ABC has a right angle at C and measurements as indicated.

D is the midpoint of $\overline{AB}$.

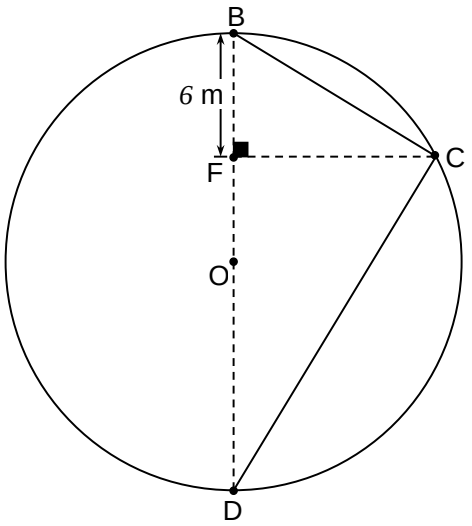


What is the measure of segment EC? (4 marks)

17 The diagram below represents a circular pool with diameter of *24* metres and centre O. There is a fountain in the pool, at point F, which is *6* metres from B, along diameter BD. Segment CF is perpendicular to segment BD and angle BCD measures 90 degrees.

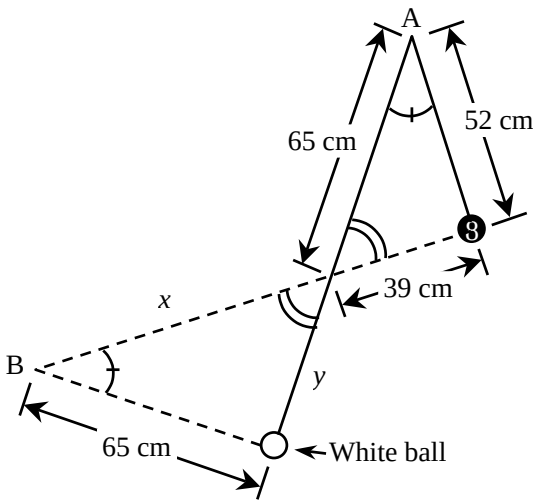
As Mary swims, she follows two straight paths that take her first from B to C and then from C to D.

What is the total distance that Mary swims? (round your answer to 2 decimal places) (3 marks)



Answers

1 The triangles are similar because two angles of one triangle are congruent to the two corresponding angles of the other triangle. The lengths of the corresponding sides are therefore proportional.



Unknown length of the segment drawn as a dotted line

Let x be the measure of the segment drawn as a dotted line

$$\frac{x}{65} = \frac{65}{52}$$

x = 81.25 cm

Length of the path represented by dotted lines

65 + 81.25 + 39

185.25 cm

Unknown length of the segment drawn as a solid line

Let y be the measure of the segment drawn as a solid line

$$\frac{y}{39} = \frac{65}{52}$$

y = 48.75

Length of the path represented by solid lines

48.75 + 65 + 52

165.75 cm

Difference between the lengths of these two paths

185.25 cm – 165.75 cm = 19.5 cm

Answer: The difference between the length of the path represented by dotted lines and the length of the path represented by solid lines is 19.5 cm.

2 a) Triangles ADE and ABC are similar. Two triangles are similar if they have at least one angle congruent between 2 corresponding proportional sides.

b) Triangles ADE and ABC are similar. Two triangles are similar if they have at least two angles congruent.

4 D

5 Segment AD measures 20 m.

6 B

7 C

8 C

9 B

11 C

12 A

13 B

14 m $\overline{\mathrm{DF}}$ = 8.8 cm

15 B

16 14 units

17 32.78 m