Trigonometry SOHCAHTOA
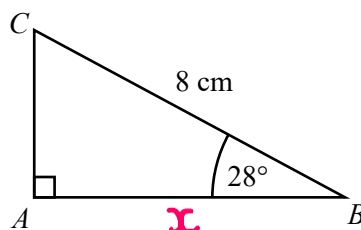
1 *ABC* is a right-angled triangle.

Calculate the length of *AB*.
Give your answer correct to 3 significant figures.

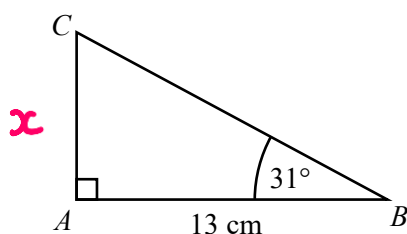$$\cos(28) = \frac{x}{8}$$

$$8 \times \cos(28) = x$$

$$x = 7.063580743$$

7.06 .... cm

(Total for Question 1 is 2 marks)

2 *ABC* is a right-angled triangle.

Calculate the length of *AC*.
Give your answer correct to 3 significant figures.

$$\tan(31) = \frac{x}{13}$$

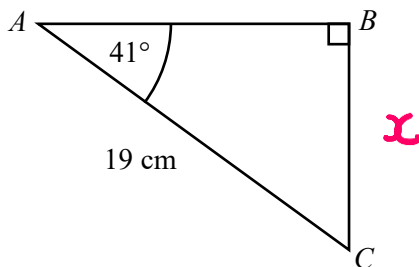$$13 \times \tan(31) = x$$

$$x = 7.811188047$$

7.81 .... cm

(Total for Question 2 is 2 marks)

1

3   *ABC* is a right-angled triangle.

A — $41°$ — B (right angle)

19 cm

x

C

Calculate the length of *BC*.
Give your answer correct to 3 significant figures.
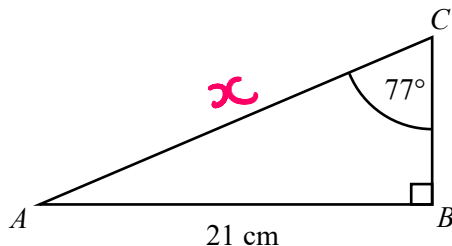
$$\sin(41) = \frac{x}{19}$$

$$19 \times \sin(41) = x$$

$$x = 12.46512155$$

12.5 cm

(Total for Question 3 is 2 marks)

4   *ABC* is a right-angled triangle.

C

x $77°$

A 21 cm B

Calculate the length of *AC*.
Give your answer correct to 3 significant figures.

$$\sin(77) = \frac{21}{x}$$
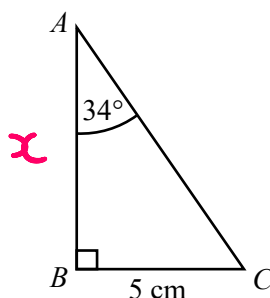
$$x = \frac{21}{\sin(77)}$$

$$x = 21.55238626$$

21.6 cm

(Total for Question 4 is 2 marks)

1st

2

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5 *ABC* is a right-angled triangle.

Calculate the length of *AB*.
Give your answer correct to 3 significant figures.

$$\tan(34) = \frac{5}{x}$$
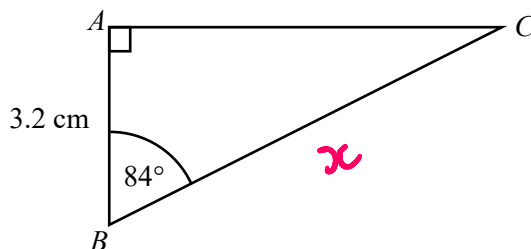
$$x = \frac{5}{\tan(34)}$$

$$x = 7.412804843$$

7.41 .... cm

(Total for Question 5 is 2 marks)

6 *ABC* is a right-angled triangle.

Calculate the length of *BC*.
Give your answer correct to 3 significant figures.

$$\cos(84) = \frac{x}{3.2}$$
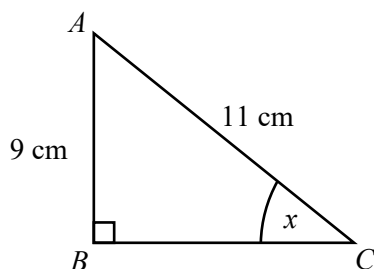
$$x = \frac{3.2}{\cos(84)}$$

$$x = 30.6136711 5$$

30.6 .... cm

(Total for Question 6 is 2 marks)

3

7 *ABC* is a right-angled triangle.

A

11 cm

9 cm

x

B   *C*

Work out the size of the angle marked *x*.
Give your answer correct to 1 decimal place.
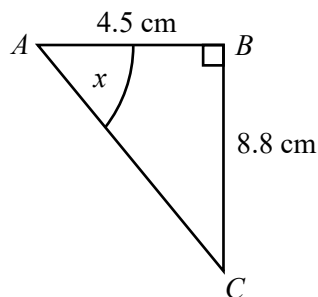
$$\sin(x) = \frac{9}{11}$$

$$x = \sin^{-1}\left(\frac{9}{11}\right)$$

$$x = 54.90319877$$

54.9 °

(Total for Question 7 is 2 marks)

8 *ABC* is a right-angled triangle.

4.5 cm

A   *B*

x

8.8 cm

C

Work out the size of the angle marked *x*.
Give your answer correct to 1 decimal place.

$$\tan(x) = \frac{8.8}{4.5}$$
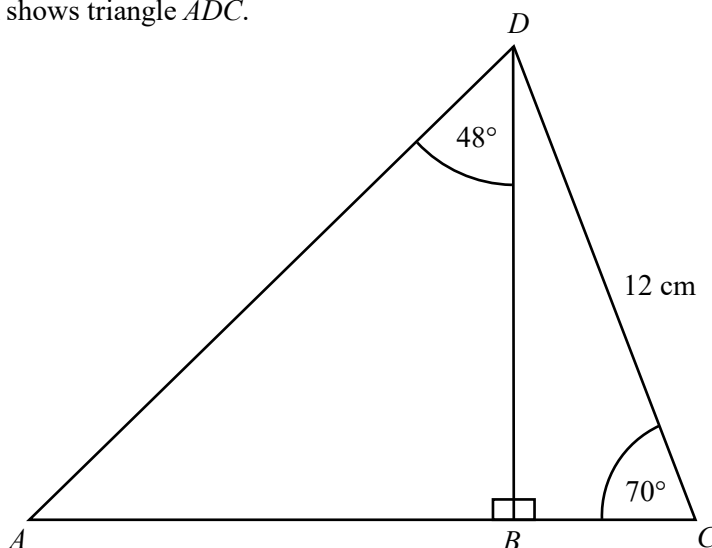
$$x = \tan^{-1}\left(\frac{8.8}{4.5}\right)$$

$$x = 62.91644914$$

62.9 °

(Total for Question 8 is 2 marks)

1st

4

9 The diagram shows triangle *ADC*.

ABC is a straight line.

Work out the length of *AC*.
Give your answer correct to 3 significant figures.

$$\cos(70) = \frac{BC}{12}$$

$$BC = 12 \times \cos(70)$$
$$BC = 4.10424172$$

$$\sin(70) = \frac{BD}{12}$$

$$BD = 12 \times \sin(70)$$
$$BD = 11.27631145$$

$$\tan(48) = \frac{AB}{11.27\ldots}$$

$$AB = 11.27\ldots \times \tan(48)$$
$$AB = 12.52361262$$

$$AC = AB + BC$$
$$= 12.52\ldots + 4.1\ldots$$
$$= 16.62785\ldots$$
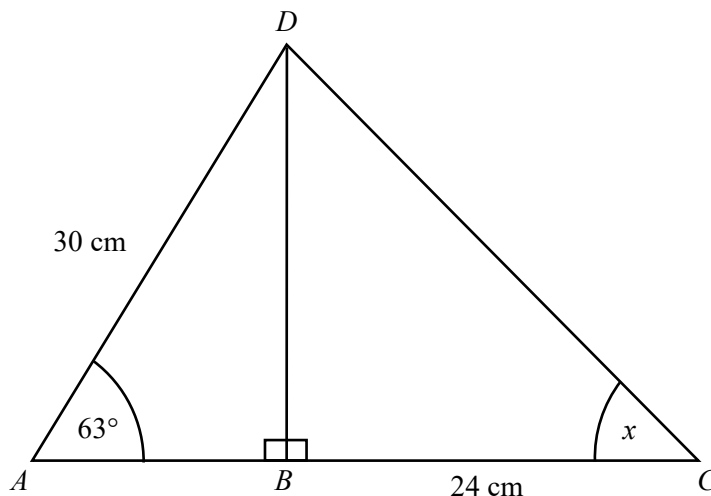
16.6 .... cm

(Total for Question 9 is 6 marks)

10 The diagram shows triangle *ADC*.

ABC is a straight line.

Work out the size of the angle marked *x*.
Give your answer correct to 1 decimal place.

$$\sin(63) = \frac{BD}{30}$$

$$BD = 30 \times \sin(63)$$

$$BD = 26.73019573$$

$$\tan(x) = \frac{26.7...}{24}$$

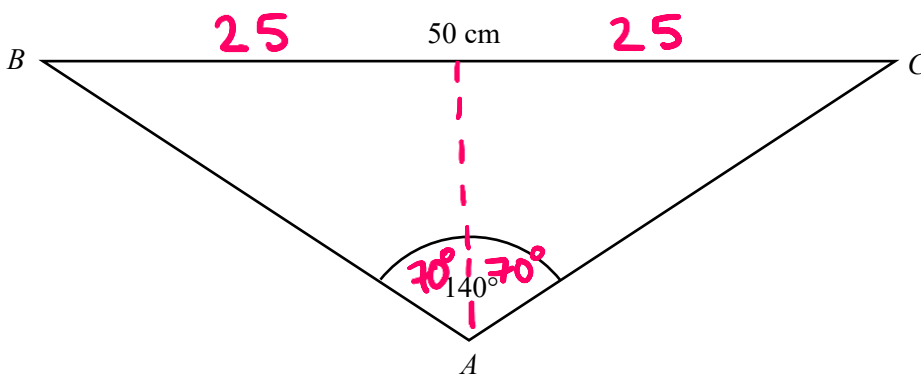$$x = \tan^{-1}\left(\frac{267...}{24}\right)$$

$$x = 48.0805702$$

48.1 °

(Total for Question 10 is 4 marks)

11 The diagram shows triangle *ABC*.

25   50 cm   **25**

B ———————————————————————— *C*

70° 70°
140°

A

AB = AC

Work out the perimeter of triangle *ABC*.
Give your answer correct to 1 decimal place.

$$\sin(70) = \frac{25}{AB}$$

$$AB = \frac{25}{\sin(70)}$$

$$AB = 26.60444431$$
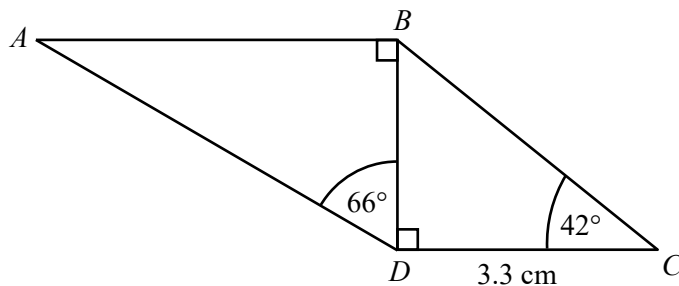$$AC = 26.60444431$$

$$P = 26.6... + 26.6... + 50$$
$$= 103.2088886$$

103.2 cm

(Total for Question 11 is 4 marks)

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12 The diagram shows trapezium *ABCD*.

Work out the length of *AD*.
Give your answer correct to 3 significant figures.

$$\tan(42) = \frac{BD}{3.3}$$

$$BD = 3.3 \times \tan(42)$$
$$BD = 2.971333346$$

$$\cos(66) = \frac{2.97\ldots}{AD}$$
$$AD = \frac{2.97\ldots}{\cos(66)}$$
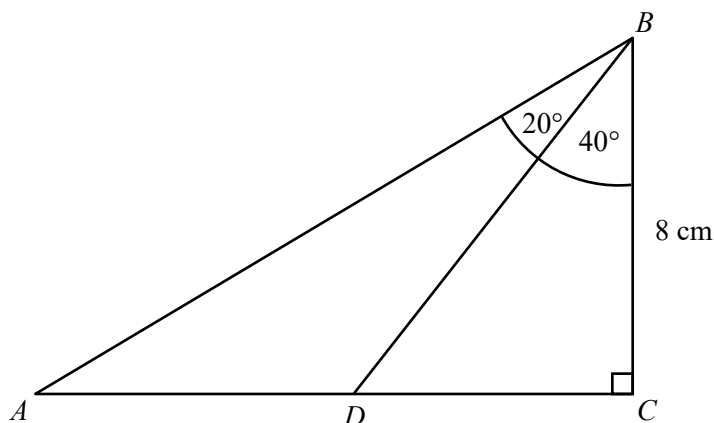$$AD = 7.305300363$$

7.31 .... cm

(Total for Question 12 is 4 marks)

8

13 The diagram shows triangle *ABC*.

ADC is a straight line.

Work out the length of *AD*.
Give your answer correct to 3 significant figures.

$$\tan(40) = \frac{DC}{8}$$

$$DC = 8 \times \tan(40)$$
$$DC = 6.712797049$$

$$\tan(60) = \frac{AC}{8}$$

$$AC = 8 \times \tan(60)$$
$$AC = 13.85640646$$
$$AD = 13.85... - 6.71...$$
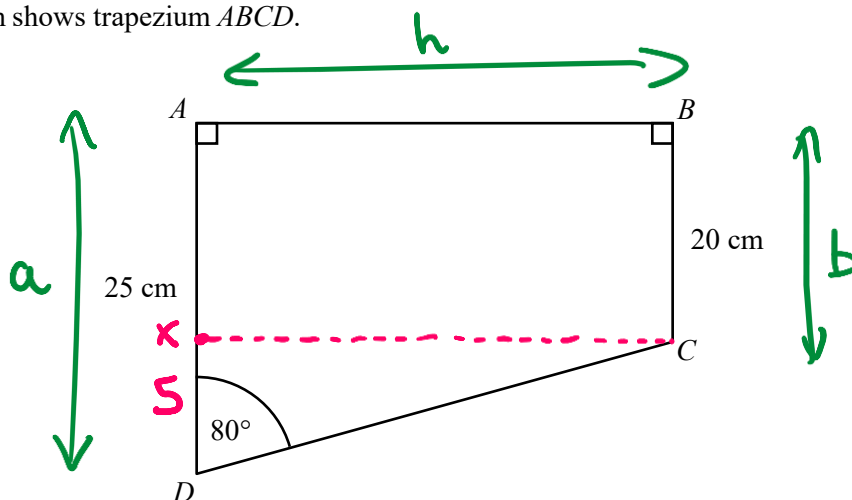$$AD = 7.143609411$$

7.14 .... cm

(Total for Question 13 is 4 marks)

9

14 The diagram shows trapezium *ABCD*.

Work out the area of trapezium *ABCD*.
Give your answer correct to 3 significant figures.

$$\tan(80) = \frac{XC}{5}$$

$$XC = 5 \times \tan(80)$$

$$XC = 28.3564091$$

$$\text{Area} = \frac{1}{2}(a+b)h$$

$$= \frac{1}{2}(25 + 20) \times 28.356\ldots$$

$$= 638.0192047$$

638 .... cm²

(Total for Question 14 is 4 marks)

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15 The diagram shows rectangle *ABCE*.

30 cm

A B

10 10

24 x 6

E D C
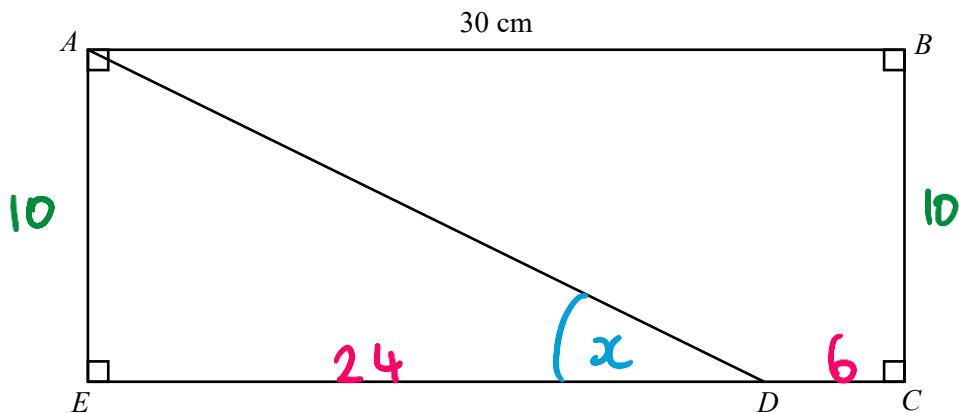
The perimeter of rectangle *ABCE* is 80 cm
$ED : DC = 4 : 1$

Work out the size of angle *ADE*.
Give your answer correct to 1 decimal place.

$30 \div 5 = 6$ $80 - 30 - 30 = 20$
$4 \times 6 = 24$ $20 \div 2 = 10$
$1 \times 6 = 6$

$\tan(x) = \dfrac{10}{24}$
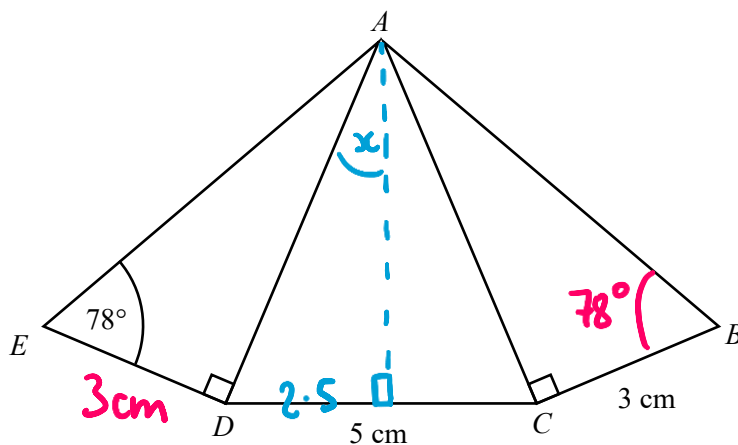
$x = \tan^{-1}\left(\dfrac{10}{24}\right)$

$x = 22.61986495$

22.6 °

(Total for Question 15 is 4 marks)

16 *ABCDE* is a pentagon formed from three triangles.

Triangles *ABC* and *ADE* are congruent.

Work out the size of angle *DAC*.
Give your answer correct to 1 decimal place.

$$\tan(78) = \frac{AD}{3}$$

$$AD = 3 \times \tan(78)$$

$$= 14.11389033$$

$$\sin(x) = \frac{2.5}{14.11\ldots}$$

$$x = \sin^{-1}\left(\frac{2.5}{14.11\ldots}\right)$$
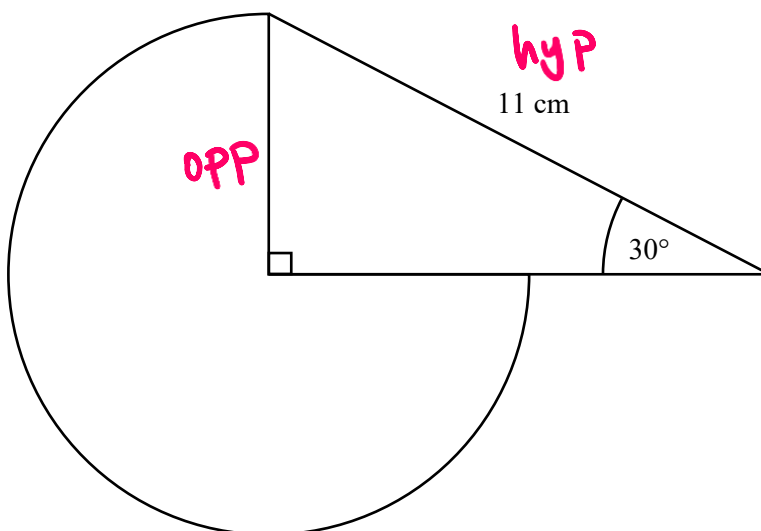
$$x = 10.20266209$$

Angle DAC = 2x

$$= 2 \times 10.20\ldots$$

$$= 20.4053\ldots$$

20.4 °

(Total for Question 16 is 4 marks)

17 A logo is made from a sector and a triangle.

hyp

11 cm

opp

30°

Work out the area of the sector.
Give your answer correct to 3 significant figures.

$$\sin(30) = \frac{Opp}{11}$$

$$Opp = 11 \times \sin(30)$$

$$= 5.5$$

$$Area = \frac{3}{4} \times \pi \times 5.5^2$$

$$= 71.27488333$$

71.3 .... cm²

(Total for Question 17 is 4 marks)

13