



5.19F SOHCAHTOA (Trigonometry): Foundation Tier Practice

EDEXCEL Edexcel 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Write down the trigonometric ratio that links opposite and hypotenuse. Use the word "sine" in your answer.

(Total for Question 1 is 1 mark)

- 2** Work out $\sin(\theta)$ for a right-angled triangle with opposite = 3 cm and hypotenuse = 5 cm.

(Total for Question 2 is 2 marks)

- 3** A right-angled triangle has adjacent = 4 m and hypotenuse = 5 m. Calculate $\cos(\theta)$. Give your answer to 2 decimal places.

(Total for Question 3 is 2 marks)

- 4** Work out $\tan(\theta)$ in a right-angled triangle where opposite = 7 cm and adjacent = 3 cm. Give your answer as a decimal to 2 decimal places.

(Total for Question 4 is 3 marks)

- 5 A ladder leans against a wall making an angle of 60 degrees with the ground. The foot of the ladder is 2.5 m from the wall. Work out the length of the ladder. Give your answer to 2 decimal places.

(Total for Question 5 is 3 marks)

- 6 A right-angled triangle has hypotenuse 13 cm and one shorter side 5 cm. The side of length 5 cm is opposite angle θ . Work out the angle θ . Give your answer to the nearest degree.

(Total for Question 6 is 4 marks)

- 7 A tree casts a shadow 8 m long. The angle of elevation of the sun is 36 degrees. Work out the height of the tree. Give your answer to 1 decimal place.

(Total for Question 7 is 4 marks)

- 8 In triangle ABC, angle A is 90 degrees. Side AB = 9 cm and angle B = 41 degrees. Work out the length of side AC to the nearest millimetre.

(Total for Question 8 is 4 marks)

- 9** A surveyor stands 12 m from the base of a tower. The angle of elevation to the top is 28 degrees. Work out the height of the tower. Give your answer to the nearest 0.1 metre. (Take the surveyor's eye level as ground level.)

(Total for Question 9 is 4 marks)

- 10** In a right-angled triangle the hypotenuse is 10 m and the angle at A (not the right angle) is 30 degrees. Work out the length of the side opposite angle A. Give your answer to 1 decimal place.

(Total for Question 10 is 3 marks)

- 11** A ramp rises to a height of 1.2 m over a horizontal distance of 4.0 m.
(a) Work out the angle of incline, correct to the nearest degree.
(b) Work out the length of the ramp (the sloping side) to 2 decimal places.

(a) (a) Work out the angle of incline, correct to the nearest degree. (2)

(b) (b) Work out the length of the ramp (the sloping side) to 2 decimal places. (3)

(Total for Question 11 is 5 marks)

12 A 12.0 m ladder reaches 9.0 m up a wall. The ladder touches the ground at point a short distance from the wall.

(a) Work out the angle between the ladder and the ground, to the nearest degree.

(b) Work out the horizontal distance from the foot of the ladder to the wall, to 2 decimal places.

(a) (a) Work out the angle between the ladder and the ground, to the nearest degree. **(2)**

(b) (b) Work out the horizontal distance from the foot of the ladder to the wall, to 2 decimal places. **(3)**

(Total for Question 12 is 5 marks)

Mark scheme · 5.19F SOHCAHTOA (Trigonometry): Foundation Tier Practice

Question 1

- **B1** sine = opposite/hypotenuse or $\sin(\theta) = \text{opposite/hypotenuse}$ cao
- **Answer: sine = opposite/hypotenuse ($\sin(\theta) = \text{opposite/hypotenuse}$)**

Question 2

- **M1** substitute into ratio $\sin = \text{opposite/hypotenuse}$, $\sin = 3/5$ oe
- **A1** 0.6 cao or $3/5$ cao
- **Answer: 0.6 (or $3/5$)**

Question 3

- **M1** use $\cos = \text{adjacent/hypotenuse}$, $\cos = 4/5$ oe
- **A1** 0.80 cao (to 2 dp as 0.80)
- **Answer: 0.80**

Question 4

- **M1** use $\tan = \text{opposite/adjacent}$, $\tan = 7/3$ oe
- **A1** 2.333... oe
- **A1** 2.33 to 2 dp cao
- **Answer: 2.33**

Question 5

- **M1** identify relation: $\cos(60) = \text{adjacent/hypotenuse} \Rightarrow \text{hypotenuse} = \text{adjacent}/\cos 60$
- **M1** substitute: ladder = $2.5 / \cos 60 = 2.5 / 0.5$
- **A1** 5.00 m cao
- **Answer: 5.00 m**

Question 6

- **M1** identify sine relation: $\sin(\theta) = \text{opposite/hypotenuse}$
- **M1** substitute: $\sin(\theta) = 5/13$
- **M1** use inverse sine: $\theta = \sin^{-1}(5/13)$ oe
- **A1** $\theta = 23$ degrees to nearest degree cao
- **Answer: 23 degrees**

Question 7

- **M1** identify $\tan(\theta) = \text{opposite/adjacent}$, so height = $8 * \tan 36$
- **M1** substitute and use calculator: height = $8 * \tan 36$
- **A1** height = $8 * 0.726542... = 5.81234...$ (correct value)
- **A1** 5.8 m to 1 dp cao
- **Answer: 5.8 m**

Question 8

- **M1** identify relation: AC is adjacent to angle B so $\cos 41 = AC/AB$
- **M1** rearrange: $AC = AB * \cos 41$
- **A1** $AC = 9 * \cos 41 = 9 * 0.754709... = 6.79238...$ cm
- **A1** 6.79 cm $\Rightarrow$ 67.9 mm $\Rightarrow$ 68 mm cao
- **Answer: 68 mm**

Question 9

- **M1** identify $\tan(\theta) = \text{opposite}/\text{adjacent}$, so height = $12 * \tan 28$
- **M1** substitute and use calculator: height = $12 * \tan 28$
- **A1** height = $12 * 0.531709... = 6.38051...$ (correct intermediate value)
- **A1** 6.4 m to 1 dp cao
- **Answer: 6.4 m**

Question 10

- **M1** identify $\sin(A) = \text{opposite}/\text{hypotenuse}$ so opposite = hypotenuse * $\sin 30$
- **M1** substitute: opposite = $10 * \sin 30 = 10 * 0.5$
- **A1** 5.0 m cao
- **Answer: 5.0 m**

Question 11

- (a) **M1** identify $\tan(\theta) = \text{opposite}/\text{adjacent}$ so $\tan(\theta) = 1.2/4.0$
- (a) **A1** $\theta = \tan^{-1}(0.3) = 16.699... \Rightarrow 17$ degrees to nearest degree cao
- (a) **Answer: 17 degrees**
- (b) **M1** use Pythagoras or use hypotenuse = adjacent / $\cos(\theta)$; here hypotenuse = $\sqrt{4.0^2 + 1.2^2}$
- (b) **M1** calculate: length = $\sqrt{16 + 1.44} = \sqrt{17.44}$
- (b) **A1** length = $4.1761... \Rightarrow 4.18$ m to 2 dp cao
- (b) **Answer: 4.18 m**

Question 12

- (a) **M1** identify $\sin(\theta) = \text{opposite}/\text{hypotenuse}$ so $\sin(\theta) = 9.0/12.0$
- (a) **A1** $\theta = \sin^{-1}(0.75) = 48.590... \Rightarrow 49$ degrees to nearest degree cao
- (a) **Answer: 49 degrees**
- (b) **M1** use $\cos(\theta) = \text{adjacent}/\text{hypotenuse}$ or use Pythagoras: adjacent = $\sqrt{12^2 - 9^2}$
- (b) **M1** calculate: adjacent = $\sqrt{144 - 81} = \sqrt{63}$
- (b) **A1** adjacent = $7.937253... \Rightarrow 7.94$ m to 2 dp cao
- (b) **Answer: 7.94 m**