5.19 SOHCAHTOA (Trigonometry): 30-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

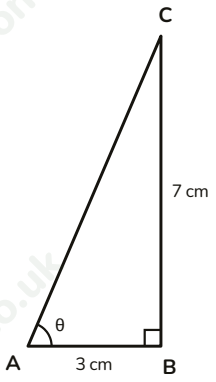
Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

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

Diagram NOT accurately drawn

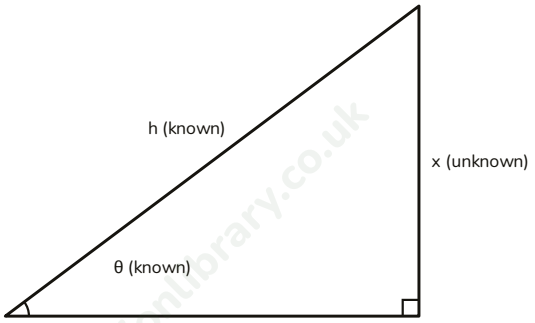


(Total for Question 1 is 3 marks)

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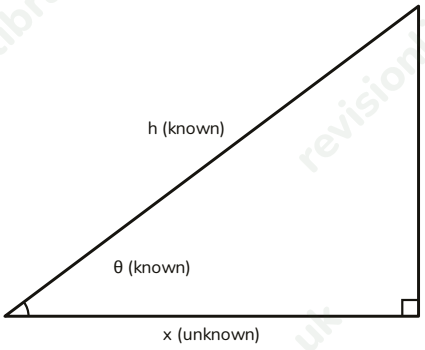
2 For each right-angled triangle described below, write down which trigonometric ratio (sine, cosine or tangent) should be used.

(a) The hypotenuse and angle θ are known. The side opposite θ is unknown. Which ratio should be used to find it? **(1)**



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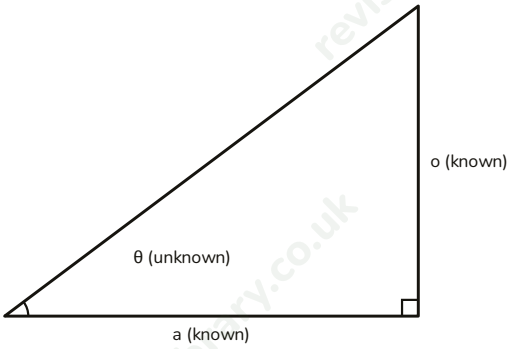
(b) The hypotenuse and angle θ are known. The side adjacent to θ is unknown. Which ratio should be used to find it? **(1)**



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(c) The side opposite θ and the side adjacent to θ are known. Angle θ is unknown. Which ratio should be used to find it? **(1)**



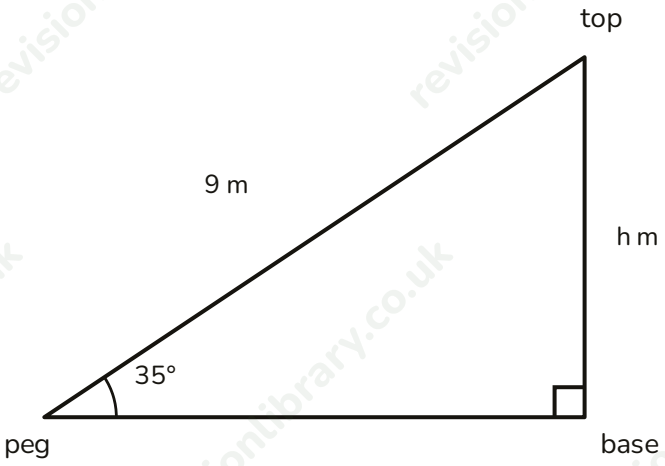
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(Total for Question 2 is 3 marks)

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3 A support cable is attached to the top of a flagpole and pegged into the ground. The cable makes an angle of 35 degrees with the ground and is 9 m long. Calculate the height, h, of the flagpole. Give your answer correct to 3 significant figures.

Diagram NOT accurately drawn

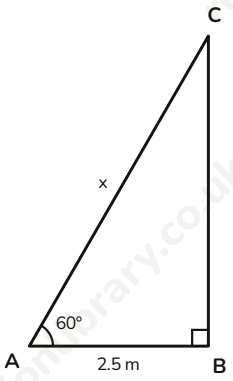


(Total for Question 3 is 2 marks)

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4 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.

Diagram NOT accurately drawn

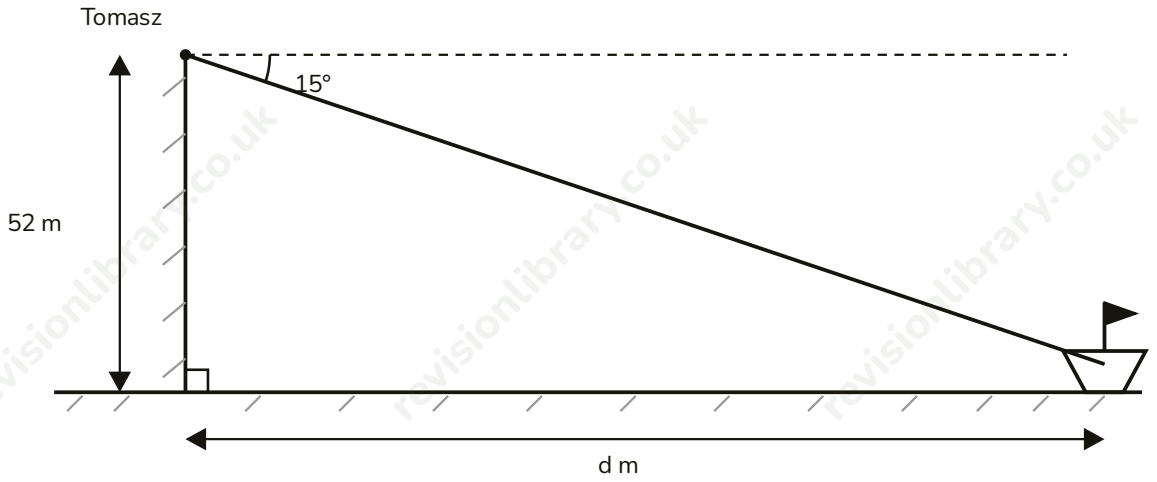


(Total for Question 4 is 3 marks)

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5 From the top of a vertical cliff 52 m high, Tomasz observes a boat out at sea. The angle of depression from Tomasz to the boat is 15 degrees.
Calculate the horizontal distance, d, from the base of the cliff to the boat. Give your answer correct to 3 significant figures.

Diagram NOT accurately drawn

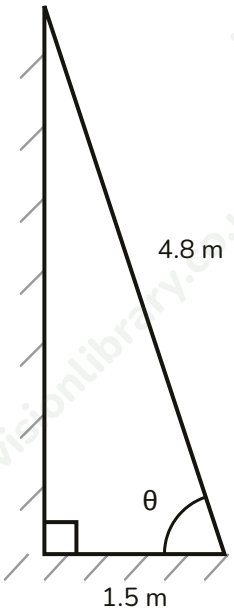


(Total for Question 5 is 3 marks)

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6 A ladder of length 4.8 m leans against a vertical wall. The foot of the ladder is 1.5 m from the base of the wall.

Diagram NOT accurately drawn



(a) Calculate the size of angle θ, the angle the ladder makes with the ground. Give your answer correct to 1 decimal place. **(3)**

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(b) Calculate how far up the wall the ladder reaches. Give your answer correct to 3 significant figures. **(2)**

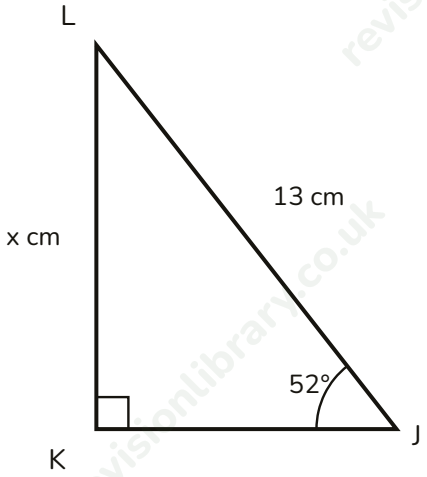
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(Total for Question 6 is 5 marks)

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7 In triangle JKL, angle K = 90 degrees, angle J = 52 degrees and the hypotenuse JL = 13 cm.
Show that x = 10.2 cm, correct to 1 decimal place.

Diagram NOT accurately drawn

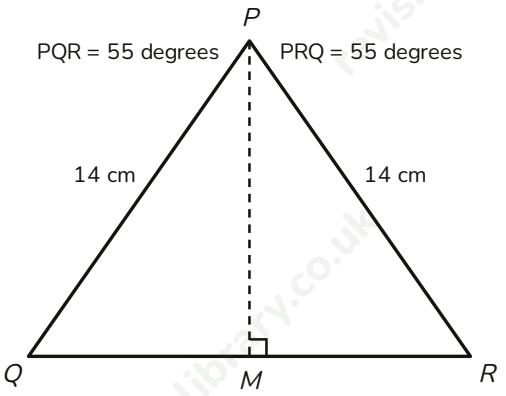


(Total for Question 7 is 3 marks)

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8 Triangle PQR is isosceles, with PQ = PR = 14 cm and base angles at Q and R both equal to 55 degrees. M is the midpoint of QR, so PM is a line of symmetry perpendicular to QR.

Diagram NOT accurately drawn



(a) Calculate the height PM of the triangle. Give your answer correct to 3 significant figures. **(2)**

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(b) Given that QR = 2 x 14 x cos(55 degrees), calculate the area of triangle PQR. Give your answer correct to 3 significant figures. **(3)**

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(Total for Question 8 is 5 marks)

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Mark scheme · 5.19 SOHCAHTOA (Trigonometry): 30-minute Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

use tan = opposite/adjacent, tan = 7/3 oe	**M1**
2.333... oe	**A1**
2.33 to 2 dp cao	**A1**

Answer: 2.33

Question 2

(a) Sine (SOH) cao	**B1**

(a) Answer: Sine

(b) Cosine (CAH) cao	**B1**

(b) Answer: Cosine

(c) Tangent (TOA) cao	**B1**

(c) Answer: Tangent

Question 3

h = 9 sin(35) oe	**M1**
awrt 5.16 (m)	**A1**

Answer: h = 5.16 m (3 s.f.)

Question 4

identify relation: cos(60) = adjacent/hypotenuse => hypotenuse = adjacent/cos60	**M1**
substitute: ladder = 2.5 / cos60 = 2.5 / 0.5	**M1**
5.00 m cao	**A1**

Answer: 5.00 m

Question 5

tan(15) = 52 / d oe (using alternate angle, angle of elevation from boat = 15)	**M1**
d = 52 / tan(15)	**M1**
awrt 194 m	**A1**

Answer: 194 m (3 s.f.)

Question 6

(a) cos(θ) = 1.5 / 4.8 oe	**M1**
(a) θ = $\cos^{-1}$(1.5 / 4.8)	**M1**
(a) awrt 71.8 degrees	**A1**

(a) Answer: 71.8 degrees (1 d.p.)

(b) $\sqrt{4.8^2 - 1.5^2}$ oe, or 4.8 x sin(their θ)	**M1**
(b) awrt 4.56 m	**A1**

(b) Answer: 4.56 m (3 s.f.)

Question 7

x = 13 x sin(52) oe	**M1**
x = 10.244... seen (at least 3 s.f. before rounding)	**M1**
10.2 cm cso, correctly rounded to 1 d.p. as required	**A1**

Answer: x = 10.2 cm (as required)

Question 8

(a) PM = 14 sin(55) oe	**M1**
(a) awrt 11.5 (cm)	**A1**

(a) Answer: PM = 11.5 cm (3 s.f.)

(b) QM = 14 cos(55) oe, or QR = 2 x 14 x cos(55)	**M1**
(b) area = 0.5 x QR x PM (ft their QR and PM)	**M1**
(b) awrt 92.1 (cm^2)	**A1**

(b) Answer: area = 92.1 cm^2 (3 s.f.)

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