eClassroom

GCSE Mathematics

Trigonometry

Worked Solutions

Pearson Edexcel GCSE & iGCSE Mathematics

Section A — Foundation — Worked Solutions

[Fluency] Question 1

$x = 8\tan 40°$

∴ **x ≈ 6.71 cm**

[Fluency] Question 2

$x = 15\cos 52°$

∴ **x ≈ 9.23 cm**

[Fluency] Question 3

$\theta = \arctan\left(\frac{7}{11}\right)$

∴ **θ ≈ 32.5°**

[Fluency] Question 4

$\theta = \arcsin\left(\frac{5}{11}\right)$

∴ **θ ≈ 27.0°**

[Fluency] Question 5

(a) sin30° = 1/2

(b) cos45° = √2/2

(c) tan60° = √3

∴ **(a) 1/2 (b) √2/2 (c) √3**

[Reasoning] Question 6

$h = 6\sin 70°$

∴ **h ≈ 5.64 m**

[Reasoning] Question 7

$d = \frac{80}{\tan 28°}$

∴ **d ≈ 150.5 m**

[Reasoning] Question 8

$\text{North} = 20\cos 40° \approx 15.3 \text{ km}$

$\text{East} = 20\sin 40° \approx 12.9 \text{ km}$

∴ **15.3 km north, 12.9 km east**

[Problem Solving] Question 9

Base diagonal = $\sqrt{(4^2+3^2)} = 5$ cm

$\theta = \arctan\left(\frac{2}{5}\right)$

∴ $\theta \approx$ **21.8°**

[Problem Solving] Question 10

Distance d = 40/tan35° ≈ 57.1 m

Height gain = d×tan20° ≈ 20.8 m

Height of B = 40 + 20.8

∴ ≈ **60.8 m**

Section B — Higher — Worked Solutions

[Fluency] Question 1

$$b = \frac{8\sin 65°}{\sin 50°}$$

∴ **b ≈ 9.46 cm**

[Fluency] Question 2

$$a^2 = 7^2 + 9^2 - 2(7)(9)\cos 48°$$

∴ **a ≈ 6.76 cm**

[Fluency] Question 3

$$\cos A = \frac{8^2 + 10^2 - 6^2}{2 \times 8 \times 10} = \frac{128}{160} = 0.8$$

∴ **A ≈ 36.9°**

[Reasoning] Question 4

$$\text{Area} = \frac{1}{2} \times 9 \times 12 \times \sin 42°$$

∴ **≈ 36.2 cm²**

[Reasoning] Question 5

$$35 = \frac{1}{2} \times 11 \times 14 \times \sin C \Rightarrow \sin C = \frac{70}{154}$$

∴ **C ≈ 27.0°**

[Reasoning] Question 6

$$\sin R = \frac{12\sin 45°}{9} \approx 0.9428$$

R ≈ 70.5° or 109.5°

∴ **R ≈ 70.5° or 109.5°**

[Problem Solving] Question 7

Angle between bearings = 105 – 40 = 65°

$$d^2 = 50^2 + 30^2 - 2(50)(30)\cos 65°$$

∴ **d ≈ 46.8 km**

[Problem Solving] Question 8

$c^2 = 15^2 + 20^2 - 2(15)(20)\cos 110°$

$\therefore$ **c ≈ 28.8 cm**

[Problem Solving] Question 9

$\text{Area}_{ABC} = \frac{1}{2}(8)(12)\sin 55° \approx 39.3 \text{ cm}^2$

$\text{Area}_{ACD} = \frac{1}{2}(9)(12)\sin 70° \approx 50.8 \text{ cm}^2$

$\therefore$ **≈ 90.1 cm²**

[Problem Solving] Question 10

Drop perpendicular h from C to AB.

h = b sin A = a sin B

$\Rightarrow \frac{a}{\sin A} = \frac{b}{\sin B}$ ✓

$\therefore$ **Sine rule proved ✓**