

QUESTION 5.2

(a) $\cos ADB = \frac{12^2 + 20^2 - 28^2}{2(12)(20)}$ (MI)(AI)

Notes: Award (MI) for substituted cosine rule formula, (AI) for correct substitutions.

$\angle ADB = 120^\circ$ (AI)(G2) [3 marks]

(b) $\text{Area} = \frac{(12)(20)\sin 120^\circ}{2}$ (MI)(AI)(ft)

Notes: Award (MI) for substituted area formula, (AI)(ft) for their correct substitutions.

$= 104 \text{ cm}^2 \quad (103.923... \text{ cm}^2)$ (AI)(ft)(G2) [3 marks]

Note: The final answer is 104 cm^2 , the units are required.
 Accept 100 cm^2 .

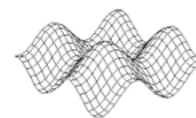
(c) $\frac{\sin BCD}{12} = \frac{\sin 60^\circ}{13}$ (AI)(ft)(MI)(AI)

Note: Award (AI)(ft) for their 60 seen, (MI) for substituted sine rule formula, (AI) for correct substitutions.

$BCD = 53.1^\circ \quad (53.0736...)$ (AI)(G3) [4 marks]

Note: Accept 53, do not accept 50 or 53.0.

continued...



Question 5.2 continued

(d) Using triangle ABC

$$\frac{\sin BAC}{13} = \frac{\sin 53.1^\circ}{28}$$

(M1)(A1)(ft)

OR

Using triangle ABD

$$\frac{\sin BAD}{12} = \frac{\sin 120^\circ}{28}$$

(M1)(A1)(ft)

Note: Award **(M1)** for substituted sine rule formula (one of the above), **(A1)(ft)** for their correct substitutions. Follow through from (a) or (c) as appropriate.

$$BAC = BAD = 21.8^\circ \quad (21.7867\dots)$$

(A1)(ft)(G2)

Notes: Accept 22, do not accept 20 or 21.7.
 Accept equivalent methods, for example cosine rule.

$$180^\circ - (53.1^\circ + 21.8^\circ) \neq 90^\circ, \text{ hence triangle ABC is not right angled}$$

(R1)(AG)

OR

$$\frac{CD}{\sin 66.9^\circ} = \frac{13}{\sin 60^\circ}$$

(M1)(A1)(ft)

Note: Award **(M1)** for substituted sine rule formula, **(A1)(ft)** for their correct substitutions. Follow through from (a) and (c).

$$CD = 13.8 \quad (13.8075\dots)$$

(A1)(ft)

$$13^3 + 28^2 \neq 33.8^2, \text{ hence triangle ABC is not right angled.}$$

(R1)(ft)(AG)

[4 marks]

Note: The complete statement is required for the final **(R1)** to be awarded.

Total [14 marks]