

IB Maths AA SL Unit 3 Geometry and Trigonometry Practice Exam: Mark Scheme

IB Mathematics: Analysis and Approaches SL · 9 questions · 55 marks

- M marks are for a correct method; A marks for an accurate answer that follows a correct method; R marks are for clear reasoning.
- Accept any correct method that reaches a correct answer, unless the question says which method to use.
- Practise these topics online with instant feedback: ibmathrevision.com/SLAAUnit3

Section A: no calculator

Question 1

4 marks

- a. $\tan 30^\circ = \frac{h}{60}$ (M1)
 $h = 60 \times \frac{1}{\sqrt{3}} = 20\sqrt{3}$ m A1
- b. $\cos 30^\circ = \frac{60}{d}$ (or Pythagoras) (M1)
 $d = 40\sqrt{3}$ m A1

Question 2

3 marks

- a. 225° A1
- b. $8 \cos 45^\circ$ (M1)
 $= 4\sqrt{2}$ km A1

Question 3

8 marks

- a. $\cos^2 \theta = 1 - \frac{25}{169}$ (M1)
 $\cos \theta = -\frac{12}{13}$ (second quadrant) A1R1
- b. $-\frac{5}{12}$ A1
- c. $\sin(\pi + \theta) = -\frac{5}{13}$ A1
 $\cos(2\pi - \theta) = \cos \theta = -\frac{12}{13}$ A1
- d. $2 \times \frac{5}{13} \times \left(-\frac{12}{13}\right)$ (M1)
 $= -\frac{120}{169}$ A1



Question 4

7 marks

- a. bearing of A from B is 210° **A1**
 $210^\circ - 150^\circ = 60^\circ$ **R1AG**
- b. $AC^2 = 6^2 + 10^2 - 2(6)(10)\cos 60^\circ$ **M1**
 $= 76$ **A1**
 $AC = 2\sqrt{19}$ km **A1**
- c. $\frac{1}{2}(6)(10)\sin 60^\circ$ **(M1)**
 $= 15\sqrt{3}$ km² **A1**

Section B: calculator allowed

Question 5

5 marks

- a. angle of elevation from boat is 12° **(M1)**
 $\tan 12^\circ = \frac{85}{d}$ **(M1)**
 $d = 400$ m **A1**
- b. new distance $= \frac{85}{\tan 20^\circ} = 234$ m **(A1)**
moved 166 m **A1**

Question 6

7 marks

- a. bearing of A from B is 250° **A1**
 $250^\circ - 160^\circ = 90^\circ$ **R1AG**
- b. $AC = \sqrt{12^2 + 9^2}$ **(M1)**
 $= 15$ km **A1**
- c. $\hat{BAC} = \tan^{-1}\left(\frac{9}{12}\right) = 36.87^\circ$ **(M1)(A1)**
bearing $= 070^\circ + 36.87^\circ = 106.9^\circ$ **A1**

Question 7

7 marks

- a. $\hat{TAB} = 180^\circ - 38^\circ = 142^\circ$ **(A1)**
 $\hat{ATB} = 180^\circ - 142^\circ - 25^\circ = 13^\circ$ **A1**
- b. $\frac{AT}{\sin 25^\circ} = \frac{50}{\sin 13^\circ}$ **M1A1**
 $AT = 93.9$ m **A1**
- c. $FT = AT \sin 38^\circ$ **(M1)**
 $= 57.8$ m **A1**



Question 8**7 marks**

- a. $\frac{\sin B}{10} = \frac{\sin 40^\circ}{7}$ **M1**
 $B = 66.7^\circ$ **A1**
or $B = 180^\circ - 66.7^\circ = 113^\circ$ **A1**
- b. $C = 73.3^\circ$ or 26.7° **(A1)**
area = $\frac{1}{2}(7)(10)\sin C$ **(M1)**
areas 33.5 and 15.7 cm² **A1**
difference = 17.8 cm² **A1**

Question 9**7 marks**

- a. $h = x \tan 28^\circ$ **A1**
 $h = QF \tan 20^\circ$ with $QF = \sqrt{x^2 + 200^2}$ **A1**
- b. $x \tan 28^\circ = \sqrt{x^2 + 40\,000} \tan 20^\circ$ **M1**
 $x = 188$ m **A1**
- c. $h = 99.9$ m **A1**
- d. $F\hat{Q}P = \tan^{-1}\left(\frac{x}{200}\right) = 43.2^\circ$ **(M1)**
bearing = $270^\circ + 43.2^\circ = 313.2^\circ$ **A1**

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