# Mark scheme

## Trigonometric graphs and equations

Mathematics 0580 · Questions from Paper 2 and Paper 4

Total marks

**31**

**MARKS FOR EACH QUESTION**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | **31** |

**Question 1** **[2]**

| | | | |
|---|---|---|---|
| **1**(a) | 21.1 or 21.10… | **1** | |
| **1**(b) | 158.9 or 158.8 to 158.9 | **1** | **FT** 180 – *their* **(a)** providing answer is an obtuse angle |

**Question 2** **[2]**

| | | | |
|---|---|---|---|
| **2** | 63.4 or 63.43...<br>243.4 or 243.4... | **2** | **B1** for each<br><br>If 0 scored **SC1** for two answers with a difference of 180 |

**Question 3** **[2]**

| | | | |
|---|---|---|---|
| **3** | 48.6 or 48.59…<br><br>and<br><br>131.4 or 131.4… | **2** | **B1** for each<br><br>If 0 scored **SC1** for two answers with a sum of 180° |

**Question 4** **[3]**

| | | | |
|---|---|---|---|
| **4** | 126.9 or 126.86 to 126.87 and 306.9 or 306.86 to 306.87 | **3** | **B2** for one correct<br>or **M1** for $\tan x = -\frac{4}{3}$<br>if 0 scored then **SC1** for two answers with a difference of 180° |

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**Question 5** **[3]**

| | | | |
|---|---|---|---|
| **5** | 109.4 to 109.5<br>and 250.5 to 250.6 | **3** | **B2** for one correct angle<br>or **M1** for $\cos x = \frac{5}{3} - 2$ or better<br>If 0 scored **SC1** for two angles that sum to 360 |

**Question 6** **[3]**

| | | | |
|---|---|---|---|
| **6** | 221.8 or 221.81...<br>and<br>318.2 or 318.18 to 318.19 | **3** | **B2** for one correct<br>or **M1** for $\sin x = -\frac{2}{3}$ oe<br>If **0** scored, **SC1** for two reflex angles with a sum of 540 or two non-reflex angles with a sum of 180 |

**Question 7** **[3]**

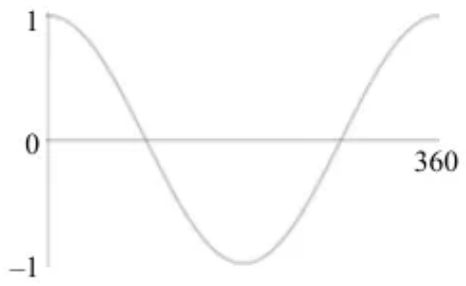
| | | | |
|---|---|---|---|
| **7** | 150 and 330 | **3** | **B2** for one correct answer<br>or **B1** for $[\tan^{-1}\ldots] = 30$ or $-30$<br>If 0 scored, **SC1** for two answers in range with a difference of 180 |

**Question 8** **[4]**

| | | | |
|---|---|---|---|
| **8**(a) | $\sqrt{3}$ | **1** | |
| **8**(b) | 30, 150 | **3** | **B2** for 30 or 150<br>or **M1** for $\sin x = \frac{1}{2}$<br>If 0 or M1 scored, **SC1** for one acute angle and one obtuse angle with a sum of 180 |

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**Question 9** **[4]**

| | | | |
|---|---|---|---|
| **9**(a) | Correct sketch to go through (0, 1), (180, –1) and (360, 1)<br><br> | **2** | **M1** for correct cos curve shape through (0, 1)<br><br>or for almost correct sketch within tolerance but with an omission at either end<br><br>or for almost correct sketch within tolerance but with incorrect curvature in one place only |
| **9**(b) | 315 | **2** | **B1** for 45 |

**Question 10** **[5]**

| | | | |
|---|---|---|---|
| **10**(a) | Correct sketch to go through (0, 0), (180, 0) and (360, 0) | **2** | **B1** for correct sine curve shape through the origin (minimum one cycle) |
| **10**(b) | 191.5, 348.5 and no others | **3** | **B2** for one correct<br><br>or **M1** for $\sin x = -\frac{1}{5}$ oe<br><br>If M1 or 0 scored, **SC1** for two reflex angles with a sum that rounds to 540.0 or two non-reflex angles with a sum that rounds to 180.0 |

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