3.4 Trigonometric Graphs and Transformations: 30-minute Pack

AQA 8365 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 State the amplitude of $y = 5\sin(x)$.

(Total for Question 1 is 1 mark)

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2 State the period, in degrees, of $y = \cos(x)$.

(Total for Question 2 is 1 mark)

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3 For the graph of $y = \sin(x)$, $0 \leq x \leq 360$, state (i) the coordinates of the y-intercept, and (ii) the coordinates of the maximum point.

(Total for Question 3 is 2 marks)

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4 Solve $\tan(x) = 2.5$ for $0 \leq x \leq 360$, giving your answers correct to 1 decimal place.

(Total for Question 4 is 3 marks)

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5 Describe fully the single transformation that maps $y = \cos(x)$ onto $y = \cos(x + 30)$.

(Total for Question 5 is 1 mark)

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6 Solve $2\sin(x) + 1 = 0$ for $0 \leq x \leq 360$, giving all solutions.

(Total for Question 6 is 4 marks)

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7 Find the values of x between 0 and 360 inclusive where the graph of $y = 6\sin(2x)$ crosses the x-axis.

(Total for Question 7 is 3 marks)

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8 The graph of $y = -\sin(2x) - 3$ is drawn for $0 \leq x \leq 360$. Write down the maximum value of y, the minimum value of y and the period of the graph.

(Total for Question 8 is 3 marks)

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9 The graph of $y = \sin(x)$ is transformed to give the graph of $y = \sin(x + 60)$. Describe fully the single transformation.

(Total for Question 9 is 2 marks)

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10 The graph of $y = 2\sin(x) - 1$ is drawn for $0 \leq x \leq 360$.

(a) Find the coordinates of the maximum point. **(2)**

.....

(b) Find the coordinates of the minimum point. **(2)**

.....

(c) State the coordinates of the y-intercept. **(1)**

(Total for Question 10 is 5 marks)

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11 The graph of $y = \cos(x)$ is stretched by scale factor 3 parallel to the y-axis, then translated by vector (0, 2). Write down the equation of the resulting graph.

(Total for Question 11 is 2 marks)

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Mark scheme · 3.4 Trigonometric Graphs and Transformations: 30-minute Pack

Question 1

5 cao **B1**

Answer: 5

Question 2

360 cao **B1**

Answer: 360

Question 3

(0, 0) oe **B1**

(90, 1) oe **B1**

Answer: (0, 0) and (90, 1)

Question 4

$\tan^{-1}(2.5) = 68.2$ (awrt, principal value) **M1**

x = 68.2 (awrt 1 d.p.) **A1**

x = 248.2 (awrt 1 d.p., using 68.2 + 180) **A1**

Answer: x = 68.2, 248.2 (to 1 d.p.)

Question 5

translation by vector (-30, 0) oe **B1**

Answer: Translation by vector (-30, 0)

Question 6

rearrange to sin(x) = -0.5 **M1**

reference angle $\sin^{-1}(0.5) = 30$ **M1**

x = 210 (using 180 + 30) **A1**

x = 330 (using 360 - 30) cao **A1**

Answer: x = 210, 330

Question 7

sin(2x) = 0 **M1**

2x = 0, 180, 360, ... **M1**

x = 0, 90, 180, 270, 360 cao **A1**

Answer: x = 0, 90, 180, 270, 360

Question 8

maximum -2 **B1**

minimum -4 **B1**

period 180 degrees **B1**

Answer: maximum = -2, minimum = -4, period = 180 degrees

Question 9

translation (correct type) **B1**

full correct detail (vector, factor or axis) **B1**

Answer: translation by vector (-60, 0)

Question 10

(a) maximum of sin(x) is 1, giving y = 2(1) - 1 = 1 **M1**

(a) (90, 1) cao **A1**

(a) Answer: (90, 1)

(b) minimum of sin(x) is -1, giving y = 2(-1) - 1 = -3 **M1**

(b) (270, -3) cao **A1**

(b) Answer: (270, -3)

(c) (0, -1) oe **B1**

(c) Answer: (0, -1)

Question 11

applies the stretch to give 3cos(x) **M1**

y = 3cos(x) + 2 oe cao **A1**

Answer: y = 3cos(x) + 2

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