Trigonometry - Past Edexcel Exam Questions

1. **(Question 8 - C2 June 2018)**

8 *In this question solutions based entirely on graphical or numerical methods are not acceptable.*

(i) Solve for $0 \leqslant x < 360°$,

$$4\cos(x + 70°) = 3$$

giving your answers in degrees to one decimal place.

(4)

(ii) Find, for $0 \leqslant \theta < 2\pi$, all the solutions of

$$6\cos^2\theta - 5 = 6\sin^2\theta + \sin\theta$$

giving your answers in radians to 3 significant figures.

(5)

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2. **(Question 8 - C2 June 2017)**

8. (a) Show that the equation

$$\cos^2 x = 8\sin^2 x - 6\sin x$$

can be written in the form

$$(3\sin x - 1)^2 = 2$$

(3)

(b) Hence solve, for $0 \leqslant x < 360°$,

$$\cos^2 x = 8\sin^2 x - 6\sin x$$

giving your answers to 2 decimal places.

(5)

3. **(Question 2 - C2 June 2017)**

2. In the triangle ABC, $AB = 16\,\text{cm}$, $AC = 13\,\text{cm}$, angle $ABC = 50°$ and angle $BCA = x°$

Find the two possible values for x, giving your answers to one decimal place.

(4)

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4. **(Question 6 - C2 June 2016)**

6. (i) Solve, for $-\pi < \theta \leqslant \pi$,

$$1 - 2\cos\left(\theta - \frac{\pi}{5}\right) = 0$$

giving your answers in terms of π.

(3)

(ii) Solve, for $0 \leqslant x < 360°$,

$$4\cos^2 x + 7\sin x - 2 = 0$$

giving your answers to one decimal place.
(*Solutions based entirely on graphical or numerical methods are not acceptable.*)

(6)

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5. **(Question 8 - C2 June 2015)**

8. (i) Solve, for $0 \leqslant \theta < \pi$, the equation

$$\sin 3\theta - \sqrt{3}\cos 3\theta = 0$$

giving your answers in terms of π.

(3)

(ii) Given that

$$4\sin^2 x + \cos x = 4 - k, \qquad 0 \leqslant k \leqslant 3$$

(a) find $\cos x$ in terms of k.

(3)

(b) When $k = 3$, find the values of x in the range $0 \leqslant x < 360°$

(3)

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6. **(Question 7 - C2 June 2014)**

7. (i) Solve, for $0 \leqslant \theta < 360°$, the equation

$$9\sin(\theta + 60°) = 4$$

giving your answers to 1 decimal place.
You must show each step of your working.

(4)

(ii) Solve, for $-\pi \leqslant x < \pi$, the equation

$$2\tan x - 3\sin x = 0$$

giving your answers to 2 decimal places where appropriate.
[*Solutions based entirely on graphical or numerical methods are not acceptable.*]

(5)

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7. **(Question 8 - C2 June 2013)**

8. (i) Solve, for $-180° \leqslant x < 180°$,

$$\tan(x - 40°) = 1.5$$

giving your answers to 1 decimal place.

(3)

(ii) (a) Show that the equation

$$\sin\theta \tan\theta = 3\cos\theta + 2$$

can be written in the form

$$4\cos^2\theta + 2\cos\theta - 1 = 0$$

(3)

(b) Hence solve, for $0 \leqslant \theta < 360°$,

showing each stage of your working.

(5)

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8. **(Question 4 - C2 January 2013)**

4. Solve, for $0 \leqslant x < 180°$,

$$\cos(3x - 10°) = -0.4$$

giving your answers to 1 decimal place. You should show each step in your working.

(7)

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9. **(Question 6 - C2 June 2012)**

6. (a) Show that the equation

$$\tan 2x = 5 \sin 2x$$

can be written in the form

$$(1 - 5 \cos 2x) \sin 2x = 0$$

(2)

(b) Hence solve, for $0 \leqslant x \leqslant 180°$,

$$\tan 2x = 5 \sin 2x$$

giving your answers to 1 decimal place where appropriate.
You must show clearly how you obtained your answers.

(5)

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10. **(Question 9 - C2 January 2012)**

9. (i) Find the solutions of the equation $\sin(3x - 15°) = \frac{1}{2}$, for which $0 \leqslant x \leqslant 180°$

(6)

(ii)

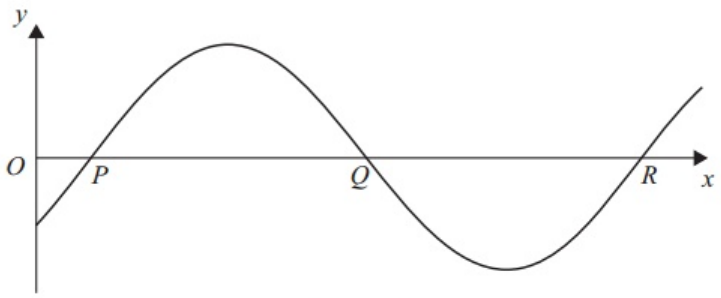

Figure 4

Figure 4 shows part of the curve with equation

$$y = \sin(ax - b), \text{ where } a > 0, \ 0 < b < \pi$$

The curve cuts the x-axis at the points P, Q and R as shown.

Given that the coordinates of P, Q and R are $\left(\frac{\pi}{10}, 0\right)$, $\left(\frac{3\pi}{5}, 0\right)$ and $\left(\frac{11\pi}{10}, 0\right)$ respectively, find the values of a and b.

(4)

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11. **(Question 7 - C2 June 2011)**

7. (a) Solve for $0 \leqslant x < 360°$, giving your answers in degrees to 1 decimal place,

$$3\sin(x+45°) = 2$$

(4)

(b) Find, for $0 \leqslant x < 2\pi$, all the solutions of

$$2\sin^2 x + 2 = 7\cos x$$

giving your answers in radians.

You must show clearly how you obtained your answers.

(6)

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12. **(Question 7 - C2 January 2011)**

7. (a) Show that the equation

$$3\sin^2 x + 7\sin x = \cos^2 x - 4$$

can be written in the form

$$4\sin^2 x + 7\sin x + 3 = 0$$

(2)

(b) Hence solve, for $0 \leqslant x < 360°$,

$$3\sin^2 x + 7\sin x = \cos^2 x - 4$$

giving your answers to 1 decimal place where appropriate.

(5)

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13. **(Question 2 - C2 January 2011)**

2. In the triangle ABC, $AB = 11$ cm, $BC = 7$ cm and $CA = 8$ cm.

(a) Find the size of angle C, giving your answer in radians to 3 significant figures.

(3)

(b) Find the area of triangle ABC, giving your answer in cm^2 to 3 significant figures.

(3)

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14. **(Question 5 - C2 June 2010)**

5. (*a*) Given that $5 \sin \theta = 2 \cos \theta$, find the value of $\tan \theta$.

(1)

(*b*) Solve, for $0 \leq x < 360°$,

$$5 \sin 2x = 2 \cos 2x ,$$

giving your answers to 1 decimal place.

(5)

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15. **(Question 2 - C2 January 2010)**

2. (a) Show that the equation

$$5 \sin x = 1 + 2 \cos^2 x$$

can be written in the form

$$2 \sin^2 x + 5 \sin x - 3 = 0$$

(2)

(b) Solve, for $0 \leqslant x < 360°$,

$$2 \sin^2 x + 5 \sin x - 3 = 0$$

(4)

Solutions

1. (a) 248.6°, 331.4°
   (b) 0.253, 2.89, 3.48, 5.94
2. (a) -
   (b) 53.58°, 126.42°, 187.94°, 352.06°
3. 70.5°, 109.5°
4. (a) $\frac{-2\pi}{15}$, $\frac{8\pi}{15}$
   (b) 194.5°, 345.5°
5. (a) $\frac{\pi}{9}$, $\frac{4\pi}{9}$, $\frac{7\pi}{9}$
   (b) $\cos(x) = \frac{1\pm\sqrt{1+16k}}{8}$
   (c) 0°, 139°, 221° to nearest whole number
6. (a) 93.6°, 326.4°
   (b) -3.14, -0.84, 0, -0.84
7. (a) 96.3°, −83.7°
   (b) i. -
   ii. 72°, 144°, 216°, 288°
8. 41.2°, 85.5°, 161.2°
9. (a) -
   (b) 39.2°, 140.8°, 0°, 90°, 180°.
10. $a = 2$, $b = \frac{\pi}{5}$
11. (a) 93.2°, 356.8°
    (b) $\frac{\pi}{3}$, $\frac{5\pi}{3}$

12. (a) -
    (b) 228.6°, 270°, 311.4°
13. (a) 1.64cm
    (b) 27.9cm^2
14. (a) $\frac{2}{5}$
    (b) 10.9°, 100.9°, 190.9°, 280.9°
15. (a) -
    (b) 30°, 150°