Solving Equations Using R-Form

Specification: AQA 7357: E6, E7 · Edexcel 9MA0: 5.6, 5.7

HOMEWORK Consolidation

1 Solve $12\cos x + 5\sin x = 10$ for $0° \le x < 360°$, to 1 decimal place.
AQA E6, E7 · Edexcel 5.6, 5.7

2 Solve $\sin x - \sqrt{3}\cos x = 1$ for $0 \le x < 2\pi$. Give exact answers.
AQA E6, E7 · Edexcel 5.6, 5.7

3 Solve $3\sin 2x + 4\cos 2x = 2.5$ for $0° \le x < 360°$, to 1 decimal place.
AQA E6, E7 · Edexcel 5.6, 5.7

4 Find the maximum and minimum values of $\dfrac{10}{6 + 3\sin x - 4\cos x}$.
AQA E6 · Edexcel 5.6

5 Find the set of values of k for which $8\sin x + 15\cos x = k$ has solutions.
AQA E6 · Edexcel 5.6

6 Solve $\sin x - \cos x = 1$ for $0° \le x < 360°$ by squaring both sides. Check every answer.
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7 Find the maximum and minimum values of $5\cos x - 12\sin x + 3$.
AQA E6 · Edexcel 5.6

8 Show that $3\cos x + 4\sin x = 5$ has exactly one solution for $0° \le x < 360°$, and find it.
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9 Solve $2\cos x + \sin x = 2$ for $0° \le x < 360°$, to 1 decimal place.
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10 Solve $\cos\theta + \sqrt{3}\sin\theta = -2$ for $0 \le \theta < 2\pi$.
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11 *AQA-style.*

(a) Express $5\sin\theta + 2\cos\theta$ in the form $R\sin(\theta + \alpha)$, where $R > 0$ and $0 < \alpha < \dfrac{\pi}{2}$. Give R exactly and α to 3 significant figures. [3 marks]

(b) Hence solve $5\sin\theta + 2\cos\theta = 4$ for $0 \le \theta < 2\pi$. Give your answers to 3 significant figures. [4 marks]

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12 *Edexcel-style.*

(a) Express $3\cos\theta - 2\sin\theta$ in the form $R\cos(\theta + \alpha)$, where $R > 0$ and $0° < \alpha < 90°$. Give α to 2 decimal places. [3 marks]

(b) Hence solve $3\cos\theta - 2\sin\theta = -1$ for $0° \le \theta < 360°$. Give your answers to 1 decimal place. [4 marks]

(c) Find the exact maximum value of $\dfrac{4}{5 + 3\cos\theta - 2\sin\theta}$. [2 marks]

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