Roots of polynomials

Answers

Further Maths topic practice

This topic online

Q	Answer	Marks
1	**a)** 19/9 **b)** 7/5	4
2	**a)** $\alpha + \beta + \gamma = 5/2$, $\alpha\beta + \beta\gamma + \gamma\alpha = 4$, $\alpha\beta\gamma = 3/2$ **b)** -7/4 **c)** The sum of the squares is negative, so the roots cannot all be real: there is a pair of complex conjugate roots	5
3	$w^2 - 6w + 29 = 0$	4
4	**a)** 1 - 4i **b)** z = 3, p = -5, q = 23 **c)** Points at 1 + 4i, 1 - 4i and 3 on an Argand diagram	6
5	**a)** -2/5 **b)** 136/3 **c)** 64/25	7
6	**a)** 14 **b)** -29 **c)** 14/3	6
7	$w^3 + 2w^2 - 15w + 16 = 0$	5
8	**p)** -10 **q)** -16 **c)** -39	6
9	**a)** shown **b)** -2 - 3i, 1 + i, 1 - i; a = 7, b = -18 **c)** Points at -2 + 3i, -2 - 3i, 1 + i and 1 - i on an Argand diagram	9
10	**a)** 21 **b)** 3/4 **c)** 1 **d)** $\alpha\beta\gamma\delta = -4 < 0$, but two conjugate pairs would give a positive product, so at least two roots are real	9
11	**a)** $\alpha\beta\gamma = 28$, total edge length 48 cm **b)** 1 cm, 4 cm, 7 cm; k = 39 **c)** 78 cm^2 **d)** $w^3 - 18w^2 + 99w - 162 = 0$; 162 cm^3	8
12	**a)** $\beta = 1 + 3i$, $\gamma = 3/2$ **b)** p = -7, q = 26 **c)** $w^3 - 4w^2 + 41w - 74 = 0$ **d)** 6	10

Full worked solutions, written out by hand, are on the solutions sheet for this topic.

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