

**A2.A.21: Roots of Quadratics 2: Determine the quadratic equation, given the sum and product of its roots**

- 1 If the equation  $x^2 - kx - 36 = 0$  has  $x = 12$  as one root, what is the value of  $k$ ?  
1) 9  
2) -9  
3) 3  
4) -3
- 2 If 2 and 3 are roots of the equation  $x^2 + kx + 6 = 0$ , what is the value of  $k$ ?  
1) 1  
2) 6  
3) 5  
4) -5
- 3 If -1 and 7 are the roots of the quadratic equation  $x^2 + kx - 7 = 0$ , then  $k$  must be  
1) -7  
2) -6  
3) 6  
4) 8
- 4 If one root of the equation  $x^2 + kx - 15 = 0$  is -3, what is the other root?  
1) -2  
2) 2  
3) 3  
4) 5
- 5 In the equation  $x^2 - 3x + c = 0$ , one value of  $x$  is 2.5. Find  $c$ . Find the other value of  $x$ .
- 6 For which equation is the sum of the roots equal to the product of the roots?  
1)  $x^2 + x + 1 = 0$   
2)  $x^2 + 3x - 6 = 0$   
3)  $x^2 - 8x - 4 = 0$   
4)  $x^2 - 4x + 4 = 0$
- 7 If the sum of the roots of the equation  $x^2 + kx - 3 = 0$  is equal to the product of the roots, the value of  $k$  is  
1) -6  
2) -3  
3) 3  
4) 6
- 8 What is the product of the roots of  $x^2 - 4x + k = 0$  if one of the roots is 7?  
1) 21  
2) -11  
3) -21  
4) -77
- 9 Which quadratic equation has the roots  $2 - \sqrt{3}$  and  $2 + \sqrt{3}$ ?  
1)  $x^2 - 4x + 7 = 0$   
2)  $x^2 + 4x + 7 = 0$   
3)  $x^2 - 4x + 1 = 0$   
4)  $x^2 + 4x - 1 = 0$

10 Which equation has roots of  $3 + \sqrt{2}$  and  $3 - \sqrt{2}$ ?

1)  $x^2 + 6x + 7 = 0$

3)  $x^2 - 7x - 4 = 0$

2)  $x^2 - 6x + 7 = 0$

4)  $x^2 - 7x + 6 = 0$

11 If  $2 + i$  and  $2 - i$  are the roots of the equation  $x^2 - 4x + c = 0$ , what is the value of  $c$ ?

1)  $-5$

3)  $-4$

2)  $5$

4)  $4$

12 If the solution set of  $x^2 + px + q = 0$  is  $\{1 + i, 1 - i\}$ , find the value of  $p$ .

13 Which quadratic equation has the roots  $3 + i$  and  $3 - i$ ?

1)  $x^2 + 6x - 10 = 0$

3)  $x^2 - 6x + 10 = 0$

2)  $x^2 + 6x + 8 = 0$

4)  $x^2 - 6x - 8 = 0$

14 Which quadratic equation has the roots  $(1 + 3i)$  and  $(1 - 3i)$ ?

1)  $x^2 + 2x - 10 = 0$

3)  $x^2 + 2x - 8 = 0$

2)  $x^2 - 2x + 10 = 0$

4)  $x^2 - 2x - 8 = 0$

15 Which quadratic equation has the roots  $5 + i$  and  $5 - i$ ?

1)  $x^2 - 10x + 24 = 0$

3)  $x^2 - 10x + 26 = 0$

2)  $x^2 + 10x + 24 = 0$

4)  $x^2 + 10x + 26 = 0$

16 Write a quadratic equation whose roots are  $5 + i\sqrt{2}$  and  $5 - i\sqrt{2}$ .

17 The roots of a quadratic equation are  $r_1 = 3 + 2i$  and  $r_2 = 3 - 2i$ . Find the sum of the roots  $r_1$  and  $r_2$ . Find the product of the roots  $r_1$  and  $r_2$ . Write a quadratic equation that has roots  $r_1$  and  $r_2$ .

18 Which equation has the complex number  $4 - 3i$  as a root?

1)  $x^2 + 6x - 25 = 0$

3)  $x^2 + 8x - 25 = 0$

2)  $x^2 - 6x + 25 = 0$

4)  $x^2 - 8x + 25 = 0$

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### Answer Section

1 ANS: 1

$$\begin{aligned}\frac{c}{a} &= 12r & -\frac{b}{a} &= x + 12 \\ \frac{-36}{1} &= 12r & -\frac{-k}{1} &= -3 + 12 \\ r &= -3 & k &= 9\end{aligned}$$

REF: 060606b

2 ANS: 4 REF: 018728siii

3 ANS: 2 REF: 019923siii

4 ANS: 4 REF: 060325siii

5 ANS:  
1.25, 0.5

REF: 069940siii

6 ANS: 4

$$-\frac{b}{a} = -\frac{-4}{1} = 4. \quad \frac{c}{a} = \frac{4}{1} = 4$$

REF: 080612b

7 ANS: 3 REF: 018633siii

8 ANS: 3

$$\frac{-b}{a} = \frac{-(-4)}{1} = 4. \text{ If the sum is 4, the roots must be 7 and } -3.$$

REF: 011418a2

9 ANS: 3

The sum of the roots is 4 and the product of the roots is 1.  $\text{sum} = \frac{-b}{a} = \frac{-(-4)}{1} = 4.$   $\text{product} = \frac{c}{a} = \frac{1}{1} = 1.$

REF: 061017b

10 ANS: 2 REF: 089628siii

11 ANS: 2

$$\frac{c}{a} = (2+i)(2-i)$$

$$\frac{c}{1} = 4 - i^2$$

$$c = 5$$

REF: 060719b

12 ANS:  
-2

REF: 018411siii

13 ANS: 3

The product of the roots equals  $(3+i)(3-i) = 9 - i^2 = 10 = \frac{c}{a}$ .

REF: 010714b

14 ANS: 2 REF: 088620siii

15 ANS: 3 REF: 089325siii

16 ANS:  
 $x^2 - 10x + 27 = 0$

REF: 089442siii

17 ANS:  
6, 13,  $x^2 - 6x + 13 = 0$

REF: 080041siii

18 ANS: 4  
If  $4 - 3i$  is one root, the other is  $4 + 3i$ . The sum of the roots is  $4 + 3i + 4 - 3i = 8 = -\frac{b}{a}$

REF: 080718b