$$x^2 - \text{sum}x + \text{Product} = 0$$

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Pre Calculus

Writing the Equation of a Quadratic Equation Given the Roots

Write an equation whose roots are:

1. $x = 3$, $x = -2$

$\text{Sum} = 3 + -2 = 1$

$\text{Product} = 3 \cdot -2 = -6$

$x^2 - 1x - 6 = 0$

2) $x = -1$, $x = -4$

$\text{Sum} = -1 + -4 = -5$

$\text{Product} = -1 \cdot 4 = 4$

$x^2 + 5x + 4 = 0$

3. $x = \frac{1}{2}$, 2

$2\left(x^2 - \frac{5}{2}x + 1 = 0\right)2$

$\text{Sum} = \frac{1}{2} + 2 = \frac{5}{2}$

$2x^2 - 5x + 2 = 0$

$\text{Product} = \frac{1}{2}(2) = 1$

4. $x = -2, \frac{4}{3}$

$3\left(x^2 + \frac{2}{3}x - \frac{8}{3} = 0\right)3$

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

$\text{Sum} = -2 + \frac{4}{3} = \frac{-2}{3}$

$\text{Product} = -2\left(\frac{4}{3}\right) = \frac{-8}{3}$

5. $x = 6 \pm \sqrt{3}$

$\text{Sum} = 6 + \sqrt{3} + 6 - \sqrt{3} = 12$

$\text{Product} = (6 + \sqrt{3})(6 - \sqrt{3}) = 36 - 3 = 33$

$x^2 - 12x + 33 = 0$

6. $x = -4 \pm \sqrt{6}$

$\text{Sum} = -4 + \sqrt{6} + -4 - \sqrt{6} = -8$

$\text{Product} = (-4 + \sqrt{6})(-4 - \sqrt{6}) = 16 - 6 = 10$

$x^2 + 8x + 10 = 0$

7. $x = -2 \pm 5i$

$\text{Sum} = -2 + 5i + -2 - 5i = -4$

$\text{Product} = (-2 + 5i)(-2 - 5i) = 4 - 25i^2$

$4 + 25 = 29$

$x^2 + 4x + 29 = 0$

8. $x = 3 \pm 6i$

$\text{Sum} = 3 + 6i + 3 - 6i = 6$

$\text{Product} = (3 + 6i)(3 - 6i) = 9 - 36i^2$

$9 + 36 = 45$

$x^2 - 6x + 45 = 0$

9. $x = 2 \pm \sqrt{5}$

Sum $= 2+\sqrt{5}+2-\sqrt{5} = 4$

Product $= (2+\sqrt{5})(2-\sqrt{5})$
$= 4-5 = -1$

$X^2 - 4x - 1 = 0$

10. $x = \dfrac{1}{3}, \dfrac{-1}{2}$

$6(x^2) - 6x - 6 = 0$

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

Sum $= \dfrac{1}{3} + \dfrac{-1}{2}$

$\dfrac{2}{6} + \dfrac{-3}{6} = \dfrac{-1}{6}$

Product $= \dfrac{1}{3} \cdot \dfrac{-1}{2} = \dfrac{-1}{6}$

11. $x = -4 \pm i$

Sum $= -4+i + -4-i = -8$

Product $= (-4+i)(-4-i)$
$16 - i^2$
$16+1 = 17$

$X^2 + 8x + 17 = 0$

12. $5 \pm 2\sqrt{3}$

Sum $= 5+2\sqrt{3}+5-2\sqrt{3} = 10$

Product $= (5+2\sqrt{3})(5-2\sqrt{3})$

$25 - 4(3) = 13$

$X^2 - 10x + 13 = 0$

13. Juan has been told to write a quadratic equation where the sum of the roots is equal to -3 and the product of the roots is equal to -9. Which equation meets these requirements?

1) $x^2 + 3x + 9 = 0$ 3) $2x^2 + 6x - 18 = 0$

2) $x^2 - 12x + 27 = 0$ 4) $(x+3)(x+9) = 0$

Sum $= -3$ $2(x^2+3x-9=0)$
Product $= -9$

$2x^2 + 6x - 18 = 0$

14. Which equation has the complex number $4 - 3i$ as a root? $4+3i$

1) $x^2 + 6x - 25 = 0$ 3) $x^2 + 8x - 25 = 0$

2) $x^2 - 6x + 25 = 0$ 4) $x^2 - 8x + 25 = 0$

Sum $= 4+3i + 4-3i = 8$

Product $= (4+3i)(4-3i) = 16+9 = 25$

$X^2 - 8x + 25 = 0$

15. For which equation is the sum of the roots equal to the product of the roots?

1) $x^2 + x + 1 = 0$ 3) $x^2 - 8x - 4 = 0$

2) $x^2 + 3x - 6 = 0$ 4) $x^2 - 4x + 4 = 0$

Sum $= \dfrac{4}{1} = 4$

Product $= \dfrac{4}{1} = 4$