# Mathsbase Exam Questions Factor theorem

1) Use the factor theorem to solve the cubic equation: $x^3 + 3x^2 - 4x - 12 = 0$. (4 marks)

Answer: _____

2) Determine whether the given factor is a root of the cubic equation: $x^3 - 2x^2 - 5x + 6 = 0$, where $x = 2$. (3 marks)

Answer: _____

3) Find the value of k if $(x - 1)$ is a factor of the cubic equation $x^3 + kx^2 - 4x + 20 = 0$. (5 marks)

Answer: _____

4) Solve the cubic equation $x^3 + 5x^2 - 2x - 8 = 0$, given that $x = -2$ is a root of the equation. (4 marks)

Answer: _____

5) Use the factor theorem to determine if $(x - 3)$ is a factor of $x^3 + 6x^2 - 13x - 30 = 0$. (3 marks)

Answer: _____

6) Find all the roots of the cubic equation $2x^3 + 5x^2 - 7x - 6 = 0$. (5 marks)

Answer: _____

7) Determine the value of m if $(x + 2)$ is a factor of the cubic equation $x^3 + 5x^2 + mx - 10 = 0$. (4 marks)

Answer: _____

8) Solve the cubic equation $x^3 - 2x^2 - 13x + 10 = 0$, given that $(x - 1)$ is a factor of the equation. (5 marks)

Answer: _____

9) Use the factor theorem to verify if (x - 6) is a factor of the cubic equation $x^3 - 8x^2 + 25x - 30 = 0$. (3 marks)

Answer: _____

10) Find all the roots of the cubic equation $3x^3 + 7x^2 - 2x - 4 = 0$. (5 marks)

Answer: _____

11) Determine the value of k if (x + k) is a factor of the cubic equation $x^3 + 2x^2 + 5x - 10 = 0$. (4 marks)

Answer: _____

12) Solve the cubic equation $x^3 - 9x^2 + 15x - 6 = 0$, given that x = 2 is a root of the equation. (5 marks)

Answer: _____

13) Use the factor theorem to check if (x - 4) is a factor of $x^3 + 6x^2 - 17x + 12 = 0$. (3 marks)

Answer: _____

14) Find all the roots of the cubic equation $4x^3 + x^2 - 10x - 3 = 0$. (5 marks)

Answer: _____

15) Determine the value of m if (x - 3) is a factor of the cubic equation $x^3 + mx^2 + 5x - 15 = 0$. (4 marks)

Answer: _____

16) Solve the cubic equation $x^3 - 4x^2 - 3x + 2 = 0$, given that (x + 2) is a factor of the equation. (5 marks)

Answer: _____

17) Use the factor theorem to verify if $(x + 5)$ is a factor of the cubic equation $2x^3 - 3x^2 - 27x + 45 = 0$. (3 marks)

Answer: _____

18) Find all the roots of the cubic equation $3x^3 + x^2 - 4x - 4 = 0$. (5 marks)

Answer: _____

19) Determine the value of k if $(x - k)$ is a factor of the cubic equation $x^3 + 6x^2 + 7x - 30 = 0$. (4 marks)

Answer: _____

20) Solve the cubic equation $x^3 - 7x^2 + 17x - 10 = 0$, given that $x = 5$ is a root of the equation. (5 marks)

Answer: _____

21) Use the factor theorem to check if $(x + 2)$ is a factor of $x^3 + 4x^2 - 11x - 30 = 0$. (3 marks)

Answer: _____

22) Find all the roots of the cubic equation $2x^3 + 8x^2 - 11x - 15 = 0$. (5 marks)

Answer: _____

23) Determine the value of m if $(x - 1)$ is a factor of the cubic equation $x^3 + mx^2 - 8x + 16 = 0$. (4 marks)

Answer: _____

24) Solve the cubic equation $x^3 - 5x^2 - 16x + 80 = 0$, given that $(x + 4)$ is a factor of the equation. (5 marks)

Answer: _____

25) Use the factor theorem to verify if $(x - 3)$ is a factor of the cubic equation $x^3 - 7x^2 + 12x - 4 = 0$. (3 marks)

Answer: _____

26) Find all the roots of the cubic equation $3x^3 + 2x^2 + 5x + 2 = 0$. (5 marks)

Answer: _____

27) Determine the value of k if $(x + k)$ is a factor of the cubic equation $x^3 - 9x^2 + 15x - 8 = 0$. (4 marks)

Answer: _____

28) Solve the cubic equation $x^3 + 2x^2 - 19x + 20 = 0$, given that $x = -5$ is a root of the equation. (5 marks)

Answer: _____

29) Use the factor theorem to check if $(x - 4)$ is a factor of $x^3 + 5x^2 - 16x + 16 = 0$. (3 marks)

Answer: _____

30) Find all the roots of the cubic equation $4x^3 + 3x^2 - 17x - 10 = 0$. (5 marks)

Answer: _____

31) Determine the value of m if $(x - 2)$ is a factor of the cubic equation $x^3 + mx^2 + 4x - 8 = 0$. (4 marks)

Answer: _____

32) Solve the cubic equation $x^3 - 2x^2 - 9x + 18 = 0$, given that $(x + 1)$ is a factor of the equation. (5 marks)

Answer: _____

33) Use the factor theorem to verify if $(x + 3)$ is a factor of the cubic equation $2x^3 + 5x^2 - 7x - 21 = 0$. (3 marks)

Answer: _____

34) Find all the roots of the cubic equation $2x^3 + 7x^2 - 10x - 3 = 0$. (5 marks)

Answer: _____

35) Determine the value of k if $(x - k)$ is a factor of the cubic equation $x^3 + 4x^2 + 7x - 14 = 0$. (4 marks)

Answer: _____

36) Solve the cubic equation $x^3 - 4x^2 - 13x + 52 = 0$, given that $x = 3$ is a root of the equation. (5 marks)

Answer: _____

37) Use the factor theorem to check if $(x - 6)$ is a factor of $x^3 - 10x^2 + 25x - 15 = 0$. (3 marks)

Answer: _____

38) Find all the roots of the cubic equation $3x^3 + x^2 - 7x - 3 = 0$. (5 marks)

Answer: _____

39) Determine the value of m if $(x + 3)$ is a factor of the cubic equation $x^3 + mx^2 + 3x - 9 = 0$. (4 marks)

Answer: _____

40) Solve the cubic equation $x^3 - 8x^2 + 16x - 8 = 0$, given that $(x - 2)$ is a root of the equation. (5 marks)

Answer: _____

41) Use the factor theorem to verify if $(x + 4)$ is a factor of the cubic equation $x^3 - 2x^2 - 17x + 28 = 0$. (3 marks)

Answer: _____

42) Find all the roots of the cubic equation $4x^3 - 7x^2 + 5x - 2 = 0$. (5 marks)

Answer: _____

43) Determine the value of k if $(x - k)$ is a factor of the cubic equation $x^3 + 2x^2 + 9x - 18 = 0$. (4 marks)

Answer: _____

44) Solve the cubic equation $x^3 + 7x^2 - 4x - 84 = 0$, given that $x = -6$ is a root of the equation. (5 marks)

Answer: _____

45) Use the factor theorem to check if $(x - 2)$ is a factor of the cubic equation $x^3 + 2x^2 - 7x - 10 = 0$. (3 marks)

Answer: _____

46) Find all the roots of the cubic equation $3x^3 + 8x^2 - 17x - 20 = 0$. (5 marks)

Answer: _____

47) Determine the value of m if $(x - 3)$ is a factor of the cubic equation $x^3 + mx^2 - 9x + 27 = 0$. (4 marks)

Answer: _____

48) Solve the cubic equation $x^3 - 3x^2 - 22x + 60 = 0$, given that $(x + 5)$ is a factor of the equation. (5 marks)

Answer: _____

49) Use the factor theorem to verify if $(x + 1)$ is a factor of the cubic equation $2x^3 - 5x^2 - 11x - 6 = 0$. (3 marks)

Answer: _____

50) Find all the roots of the cubic equation $4x^3 + 2x^2 - 3x - 1 = 0$. (5 marks) (Mark Scheme) 1) Factors of -12: $\pm1, \pm2, \pm3, \pm4, \pm6, \pm12$. Test each factor by substituting into the equation to see if it gives a remainder of 0. Factors that give a remainder of 0 are roots. (1 mark for each correct factor, 1 mark for correct conclusion) 2) Substitute the given value into the equation. If it gives a result of 0, the factor is a root. (1 mark for correct substitution, 1 mark for correct conclusion) 3) Rearrange the equation to match the form $(x - a)(x^2 + bx + c)$. Compare the coefficients to determine the value of k. (1 mark for rearrangement, 1 mark for correct comparison and conclusion) 4) Divide the cubic equation by $(x + 2)$ using synthetic division. If the remainder is 0, then $x = -2$ is a root. (1 mark for correct synthetic division, 1 mark for correct conclusion) 5) Substitute the value into the equation. If it gives a result of 0, then $(x - 3)$ is a factor. (1 mark for substitution, 1 mark for correct conclusion) 6) Solve the equation simultaneously by trial and error, substitution, or a graphical method. (1 mark for each correct root, up to 3 marks maximum) 7) Rearrange the equation to match the form $(x + 2)(x^2 + bx + c)$. Compare the coefficients to determine the value of m. (1 mark for rearrangement, 1 mark for correct comparison and conclusion) 8) Use synthetic division to divide the cubic equation by $(x - 1)$. If the remainder is 0, then $x = 1$ is a root. (1 mark for correct synthetic division, 1 mark for correct conclusion) 9) Substitute the value into the equation. If it gives a result of 0, then $(x - 6)$ is a factor. (1 mark for substitution, 1 mark for correct conclusion) 10) Solve the equation simultaneously by trial and error, substitution, or a graphical method. (1 mark for each correct root, up to 3 marks maximum)

Answer: _____