

1. Give three different polynomials of degree 8, each with zeroes at $x = -3, 5.7$ and π , and nowhere else.
2. Give three different polynomials of degree 6, each with zeroes at $x = 2, -3.7$ and 5 , and nowhere else.
3. Give three different polynomials of degree 9, each with zeroes at $x = 3, 2.7$ and $\sqrt{7}$, and nowhere else.
4. Give three different polynomials of degree 15 with zeroes at $x = 0, -7$ and $-\pi$, and nowhere else.
5. Factor $p(x) = 2x^2 + 7.6x - 13.26$.
6. Factor $p(x) = x^2 - 0.6x - 3.91$
7. Factor $p(x) = 2x^2 - 1.2x - 7.82$
8. Factor $p(x) = 3x^2 - 0.9x - 26.04$
9. Factor $p(x) = -2x^2 + 1.2x + 7.82$
10. Give three different polynomials of degree 7 with zeroes at $x = 2, -3.7, \sqrt{2}$, and nowhere else.

$$p_1(x) = \underline{\hspace{10em}}$$

$$p_2(x) = \underline{\hspace{10em}}$$

$$p_3(x) = \underline{\hspace{10em}}$$

$$11. \text{ Factor } p(x) = 2x^2 - 1.2x - 7.82. \quad p(x) = \underline{\hspace{10em}}$$

12. Give three different polynomials of degree 9, each having zeroes at $x = 3.6, 2, -7$, and nowhere else.

$$p_1(x) = \underline{\hspace{10em}}$$

$$p_2(x) = \underline{\hspace{10em}}$$

$$p_3(x) = \underline{\hspace{10em}}$$

$$13. \text{ Factor } p(x) = 3x^2 + 0.6x - 14.49.$$

$$p(x) = \underline{\hspace{10em}}$$

14. Give three different polynomials of degree 9, each with zeroes at $x = 3, -2.7, -\sqrt{7}$, and nowhere else.

$$p_1(x) = \underline{\hspace{10em}}$$

$$p_2(x) = \underline{\hspace{10em}}$$

$$p_3(x) = \underline{\hspace{10em}}$$

$$15. \text{ Factor } p(x) = x^2 - 0.6x - 3.91$$

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$$p(x) = \underline{\hspace{4cm}}$$

16. Factor algebraically $p(x) = 3x^2 - 0.9x - 26.04$

$$p(x) = \underline{\hspace{4cm}}$$

17. Give two different polynomials of degree 8, each with zeroes at $x = -2, 3.7$ and -5 , and nowhere else.

$$p_1(x) = \underline{\hspace{4cm}}$$

$$p_1(x) = \underline{\hspace{4cm}}$$

18. Give two different polynomials of degree 6, each with zeroes at $x = 2, -3.7$ and 5 , and nowhere else.

19. Give two different polynomials of degree 7, each with zeroes at $x = 2, -3.7$ and -5 , and nowhere else.

20. Factor $p(x) = 2x^4 - 19.2x^2 + 5.3x - 5.1$ given that $p(3) = 0$.

21. Factor $p(x) = 2x^4 - 19.2x^2 + 5.3x - 5.1$ given that $p(3) = 0$.

22. Factor $p(x) = 2x^4 - 5.2x^3 + 2.1x^2 + 3x - 6.3$ given that $p(2.1) = 0$.

23. Factor $p(x) = 2x^3 - 1.6x^2 + 0.4x - 2.21$ given that $p(1.3) = 0$.

$$p(x) = \underline{\hspace{4cm}}$$

24. Divide $\frac{3x^4 - 11x^2 + x + 3}{x + 2} = \boxed{\hspace{4cm}} + \frac{\hspace{1cm}}{x + 2}$

25. Factor $p(x) = 2x^3 - 4.2x^2 - 1.7x + 3.57$ given that $p(2.1) = 0$.

$$p(x) = \underline{\hspace{4cm}}$$

26. Divide $\frac{3x^4 - 11x^2 + x + 3}{x + 2} = \boxed{\hspace{4cm}} + \frac{\hspace{1cm}}{x + 2}$

27. Divide $\frac{3x^4 - 7x^2 + x + 3}{x - 1} = \boxed{\hspace{4cm}} + \frac{\hspace{1cm}}{x - 1}$

28. Divide $\frac{2x^4 - 3x^2 + 5x + 3}{x + 2} = \boxed{\hspace{4cm}} + \frac{\hspace{1cm}}{x + 2}$

29. Divide $\frac{3x^4 - 6x^2 + x + 3}{x - 2} = \boxed{\hspace{4cm}} + \frac{\hspace{1cm}}{x - 2}$

30. Factor $p(x) = x^4 - 3x^3 + 2x^2 + x - 2$ given that $p(2) = 0$

31. Factor $p(x) = 2x^4 - 5.2x^3 + 2.1x^2 + 3x - 6.3$ given that $p(2.1) = 0$.

32. Factor $p(x) = x^3 - 0.7x^2 - 0.4x - 13.5$ given that $p(2.7) = 0$.

33. Factor $p(x) = x^4 + 1.9x^3 - x^2 + 3.1x + 9.5$ given that $p(-1.9) = 0$.

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34. Factor $p(x) = 2x^4 + 3.8x^3 - x^2 + 3.1x + 9.5$ given that $p(-1.9) = 0$.

35. Factor $p(x) = 2x^4 - 4.8x^3 + 1.9x^2 + 5x - 9.5$ given that $p(1.9) = 0$.

36. A polynomial $p(x)$ has a zeros of multiplicity 1 at $x = 2$ and at $x = 5$. It has a zero of multiplicity 6 at $x = 4$. It has a leading coefficient of 7. Give its completely factored form.

a. $p(x) = 5(x - 1)(x - 2)(x - 4)^7$ b. $p(x) = 7(x - 2)^7(x - 4)(x - 5)$

c. $p(x) = 7(x - 2)(x - 5)(x - 4)^6$ d. $p(x) = 7(x - 2)^6(x - 4)(x - 5)$

e. $p(x) = 6(x - 2)(x - 4)(x - 5)^7$

37. Solve exactly $2x^2 - 3.2x - 12.24 = 0$. Give the answers in decimal form.

a. 3.8, -1.4

b. -3.8, 1.4

c. 3.4, -1.8

d. -3.4, 1.8

38. Based on the multiplicity of the zeros, which polynomial has a graph like the one below?

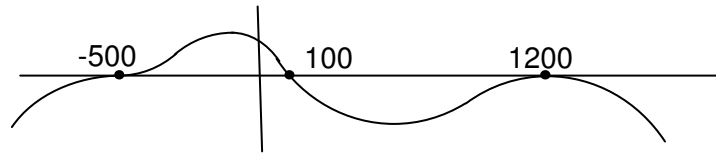
a. $p(x) = -200(x + 500)(x - 100)^4(x - 1200)^{11}$

b. $p(x) = -200(x + 500)^9(x - 100)(x - 1200)^{16}$

c. $p(x) = -200(x + 500)^9(x - 100)^8(x - 1200)$

d. $p(x) = -200(x + 500)^8(x - 100)(x - 1200)^{19}$

e. $p(x) = -200(x + 500)^8(x - 100)^{13}(x - 1200)$



39. Based on the multiplicity of the zeros, which polynomial has a graph like the one below?

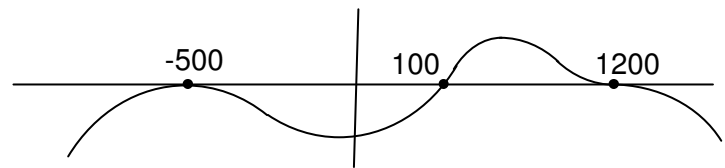
a. $p(x) = -200(x + 500)(x - 100)^4(x - 1200)^{11}$

b. $p(x) = -200(x + 500)^9(x - 100)(x - 1200)^{16}$

c. $p(x) = -200(x + 500)^9(x - 100)^8(x - 1200)$

d. $p(x) = -200(x + 500)^8(x - 100)(x - 1200)^{19}$

e. $p(x) = -200(x + 500)^8(x - 100)^{13}(x - 1200)$

**Answers:**

1. $p_1(x) = (x + 3)(x - 5.7)(x - \pi)^6$

$p_2(x) = 2(x + 3)(x - 5.7)(x - \pi)^6$

$p_3(x) = -(x + 3)^2(x - 5.7)^3(x - \pi)(x^2 + 9)$

2. $p_1(x) = (x - 2)(x + 3.7)(x - 5)^4$

$p_2(x) = 2(x - 2)(x + 3.7)(x - 5)^4$

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$$p_3(x) = -(x - 2)(x + 3.7)(x - 5)^4$$

$$3. p_1(x) = (x - 3)(x - 2.7)^3(x - \sqrt{7})^5$$

$$p_2(x) = 2(x - 3)(x - 2.7)^3(x - \sqrt{7})^5$$

$$p_3(x) = -(x - 3)(x - 2.7)^3(x - \sqrt{7})^5$$

$$4. p_1(x) = x(x + 7)(x + \pi)^{13}$$

$$p_2(x) = 2x(x + 7)(x + \pi)^{13}$$

$$p_3(x) = -x(x + 7)(x + \pi)^{13}$$

$$5. p(x) = 2(x - 1.3)(x + 5.1)$$

$$6. p(x) = (x - 2.3)(x + 1.7)$$

$$7. p(x) = 2(x - 2.3)(x + 1.7)$$

$$8. p(x) = 3(x - 3.1)(x + 2.8)$$

$$9. p(x) = -2(x - 2.3)(x + 1.7)$$

10.

$$p_1(x) = (x - 2)(x + 3.7)(x - \sqrt{2})^5$$

$$p_2(x) = (x - 2)(x + 3.7)^5(x - \sqrt{2})$$

$$p_3(x) = 7(x - 2)(x + 3.7)^5(x - \sqrt{2})$$

$$11. p(x) = 2(x - 2.3)(x + 1.7)$$

12.

$$p_1(x) = (x - 3.6)(x - 2)(x + 7)^7$$

$$p_2(x) = 2(x - 3.6)^7(x - 2)(x + 7)$$

$$p_3(x) = -2(x - 3.6)^7(x - 2)(x + 7)$$

$$13. p(x) = 3(x - 2.1)(x + 2.3)$$

14.

$$p_1(x) = (x - 3)(x + 2.7)(x + \sqrt{7})^7$$

$$p_2(x) = -8(x - 3)(x + 2.7)(x + \sqrt{7})^7$$

$$p_3(x) = (x - 3)^2(x + 2.7)(x + \sqrt{7})(x^2 + 1)^3$$

$$15. p(x) = (x - 2.3)(x + 1.7) \text{ since } (0.6 \pm \sqrt{(0.6^2 - 4 \cdot 1 \cdot -3.91)}) / (2 \cdot 1) = 2.3, -1.7$$

$$16. p(x) = 3(x - 3.1)(x + 2.8) \text{ since } (0.9 \pm \sqrt{(0.9^2 - 4 \cdot 3 \cdot -26.04)}) / (2 \cdot 3) = 3.1, -2.8$$

$$17. p_1(x) = (x + 2)(x - 3.7)(x + 5)^6 \quad p_1(x) = 5(x + 2)(x - 3.7)(x + 5)^6$$

$$18. p_1(x) = (x - 2)(x + 3.7)(x - 5)^4 \quad p_2(x) = 3(x - 2)(x + 3.7)(x - 5)^4$$

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$$19. p_1(x) = (x - 2)(x + 3.7)(x + 5)^5 \quad p_2(x) = -9(x - 2)^3(x + 3.7)(x + 5)(x^2 + 1)$$

$$20. p(x) = (x - 3)(2x^3 + 6x^2 - 1.2x + 1.7)$$

$$21. p(x) = (x - 3)(2x^3 + 6x^2 - 1.2x + 1.7)$$

$$22. p(x) = (x - 2.1)(2x^3 - x^2 + 3)$$

$$23. p(x) = (x - 1.3)(x^2 + x + 1.7)$$

$$24. \frac{3x^4 - 11x^2 + x + 3}{x + 2} = 3x^3 - 6x^2 + x - 1 + \frac{5}{x + 2}$$

$$25. p(x) = (x - 2.1)(x^2 - 1.7)$$

$$26. \frac{3x^4 - 11x^2 + x + 3}{x + 2} = \boxed{3x^3 - 6x^2 + x - 1} + \frac{5}{x + 2}$$

$$27. \frac{3x^4 - 7x^2 + x + 3}{x - 1} = \boxed{3x^3 + 3x^2 - 4x - 3} + \frac{0}{x - 1}$$

$$28. \frac{2x^4 - 3x^2 + 5x + 3}{x + 2} = \boxed{2x^3 + 2x^2 - x + 4} + \frac{7}{x + 2}$$

$$29. \frac{3x^4 - 6x^2 + x + 3}{x - 2} = \boxed{} + \frac{45}{x - 2}$$

$$30. p(x) = (x - 2)(x^3 - x^2 + 1)$$

$$31. p(x) = (x - 2.1)(2x^3 - x^2 + 3)$$

$$32. p(x) = (x - 2.7)(x^2 + 2x + 5)$$

$$33. p(x) = (x + 1.9)(x^3 - x + 5)$$

$$34. p(x) = (x + 1.9)(2x^3 - x + 5)$$

$$35. p(x) = (x - 1.9)(2x^3 - x^2 + 5)$$

36. c

37. c

38. b

39. d