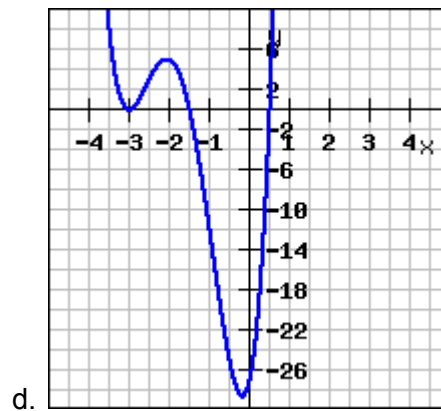
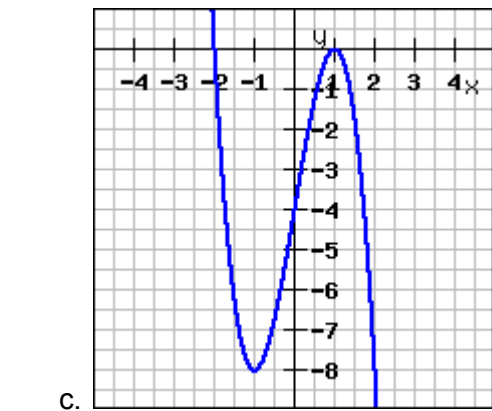
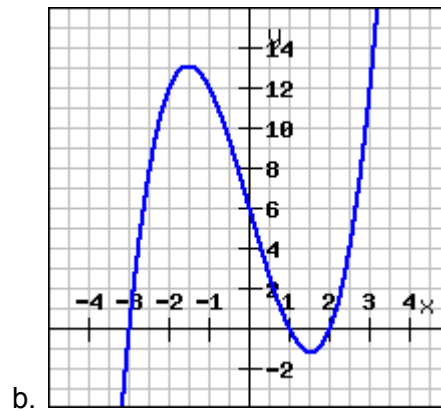
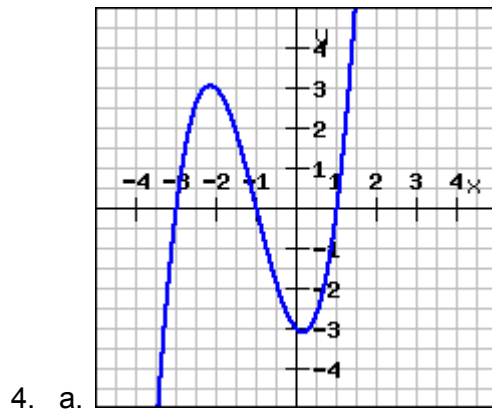


MHF4U: Solving Polynomial Equations

1. State the zeroes of each equation.
 - a. $(x - 5)(x + 2) = 0$
 - b. $(x + 4)(2x - 1)(3x + 4) = 0$
 - c. $2x(x + 1)^2(3x - 2)^3 = 0$
 - d. $6(x + 3)(5 - x)^3 = 0$
2. Solve each equation by factoring.
 - a. $x^2 + 4x - 12 = 0$
 - b. $4x^2 - 25 = 0$
 - c. $6x^2 + 5x - 4 = 0$
 - d. $x^4 - 5x^2 - 36 = 0$
3. Solve each equation by factoring.
 - a. $x^3 - 5x^2 - 2x + 24 = 0$
 - b. $x^3 + 11x^2 + 39x + 45 = 0$
 - c. $4x^4 + 16x^3 - 19x^2 + 5x = 0$
 - d. $12x^4 + 20x^3 - 25x^2 - 40x - 12 = 0$
4. Determine the x-intercepts for each polynomial function, and sketch a graph for each.
 - a. $f(x) = x^3 + 3x^2 - x - 3$
 - b. $g(x) = x^3 - 7x + 6$
 - c. $j(x) = -2x^3 + 6x - 4$
 - d. $k(x) = 4x^4 + 28x^3 + 57x^2 + 18x - 27$
5. The population of a small town is modelled by the equation $p(t) = t^3 + 19t^2 + 1100$, where t is the time in years since 2022. When will the population of the town reach 2000 people?
6. A manufacturer takes premade rectangular blocks of aluminum that are $4 \times 6 \times 10$ cm, and removes the same amount of material from the length, width and height. The new blocks have volumes of 64 cm^3 . What are the dimensions of the new blocks?
7. A rectangular piece of metal has a width of 24 cm and a length of 32 cm. An open-topped box is made by cutting squares from the four corners, then folding the edges up. What are the dimensions of the box if its volume is $1\,440 \text{ cm}^3$?
8. The height of a rider on a section of a roller coaster can be modelled by the quartic function $h(t) = -t^4 + 29t^3 - 291t^2 + 1179t - 1600$, where h is the rider's height in feet and t is the time in seconds. Determine the time(s) when a rider is 20 feet above the ground.

Solutions

- a. 5 and -2 b. $-4, \frac{1}{2}$ and $-\frac{4}{3}$ c. 0, -1 and $\frac{2}{3}$ d. -3 and 5
- a. $x = \{-6, 2\}$ b. $x = \{-\frac{5}{2}, \frac{5}{2}\}$ c. $x = \{\frac{1}{2}, -\frac{4}{3}\}$ d. $x = \{-3, 3\}$
- a. $x = \{-2, 3, 4\}$ b. $x = \{-5, -3\}$ c. $x = \{-5, 0, \frac{1}{2}\}$ d. $x = \{-2, -\frac{2}{3}, -\frac{1}{2}, \frac{3}{2}\}$



- 2028
- $2 \times 4 \times 8$ cm
- $6 \times 12 \times 20$ cm, or $11 - \sqrt{61} \times 10 + 2\sqrt{61} \times 2 + 2\sqrt{61}$ cm
- 3, 5, 9 and 12 seconds