

3. a) Determine the zeros of each polynomial function. Indicate whether they are of order 1, 2, or 3.
- $f(x) = -2(x - 3)(x + 2)(4x - 3)$
 - $g(x) = (x - 1)(x + 3)(1 + x)(3x - 9)$
 - $h(x) = -(x + 4)^2(x - 1)^2(x + 2)(2x - 3)$
 - $p(x) = 3(x + 6)(x - 5)^2(3x - 2)^3$
- b) Determine algebraically if each function is even or odd.
- c) Sketch a graph of each function in part a).

For help with questions 4 and 5, refer to Example 3.

4. Determine, algebraically, whether each function in question 1 has point symmetry about the origin or line symmetry about the y -axis. State whether each function is even, odd, or neither. Give reasons for your answer.
5. i) Determine whether each function even, odd, or neither. Explain.
- ii) Without graphing, determine if each polynomial function has line symmetry about the y -axis, point symmetry about the origin, or neither. Explain.
7. Determine an equation for each polynomial function. State whether the function is even, odd, or neither. Sketch a graph of each.
- a cubic function with zeros -2 (order 2) and 3 and y -intercept 9
 - a quartic function with zeros -1 (order 3) and 1 and y -intercept -2
 - a quintic function with zeros -1 (order 3) and 3 (order 2) that passes through the point $(-2, 50)$
 - a quintic function with zeros -3 , -2 (order 2), and 2 (order 2) that passes through the point $(1, -18)$
8. Without graphing, determine if each polynomial function has line symmetry, point symmetry, or neither. Verify your response using technology.
- $f(x) = -6x^5 + 2x$
 - $g(x) = -7x^6 + 3x^4 + 6x^2$
 - $h(x) = x^3 - 3x^2 + 5x$
 - $p(x) = -5x^3 + 2x$

12. a) Determine the zeros of each polynomial function.
- $f(x) = x^4 - 13x^2 + 36$
 - $g(x) = 6x^5 - 7x^3 - 3x$
- b) State whether each function is even, odd, or neither. Verify your answers algebraically.
- c) Sketch a graph of each function.

- $y = x^4 - x^2$
- $y = -2x^3 + 5x$
- $y = -4x^5 + 2x^2$
- $y = x(2x + 1)^2(x - 4)$
- $y = -2x^6 + x^4 + 8$

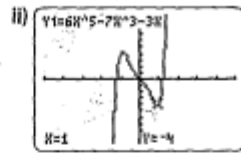
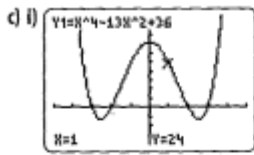
14. a) Write equations for two even functions with four x -intercepts, two of which are $\frac{2}{3}$ and 5 .



- b) Determine an equation for a function with x -intercepts at $\frac{2}{3}$ and 5 , passing through the point $(-1, -96)$.
- c) Determine an equation for a function with x -intercepts at $\frac{2}{3}$ and 5 that is a reflection in the x -axis of the function in part b).

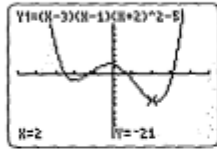
ANSWERS:

12. a) i) 3, 2, -2, -3 ii) $0, -\frac{\sqrt{6}}{2}, \frac{\sqrt{6}}{2}$ b) i) even ii) odd

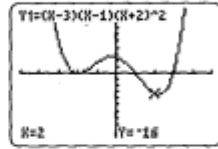


13. Answers may vary. Sample answers:

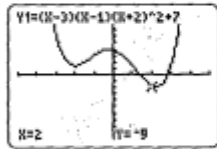
a) $c = -5$



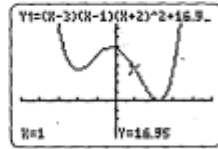
b) $c = 0$



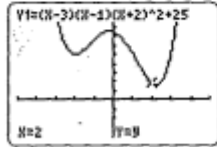
c) $c = 7$



d) $c \doteq 16.95$



e) $c = 25$



14. a) Answers may vary. Sample answer:

$$f(x) = (3x - 2)(3x + 2)(x - 5)(x + 5),$$

$$g(x) = 2(3x - 2)(3x + 2)(x - 5)(x + 5)$$

$$b) y = -3.2(3x - 2)(x - 5) \quad d) y = 3.2(3x - 2)(x - 5)$$