

1. Identify the function that corresponds to each graph below.

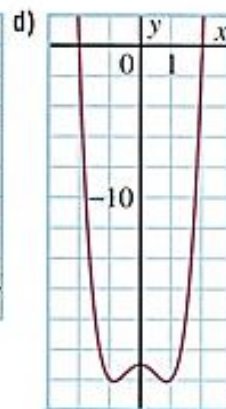
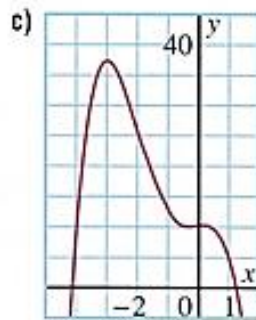
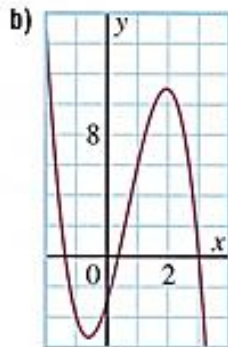
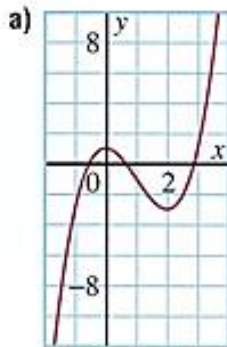
Justify your choices.

$$h(x) = -x^4 - 4x^3 + 10$$

$$k(x) = 2x^4 - 3x^2 - 21$$

$$f(x) = x^3 - 3x^2 + 1$$

$$g(x) = -2x^3 + 4x^2 + 7x - 3$$



3. Determine the zeros of each polynomial function.

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

b)  $f(x) = 2x^2(3x + 4)(x + 5)(x - 1)$

4. The zeros of four functions are given below.

i) Which function has a zero of order 2?

ii) Which function has a zero of order 3?

iii) Write a polynomial function that has each set of zeros.

a) 3, -2, 1

b) 0, 0, 1

c) -4, 5, -1

d) -3, -3, -3

5. Refer to the graphs on page 245.

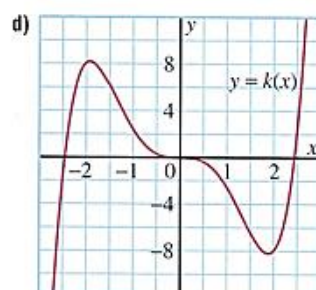
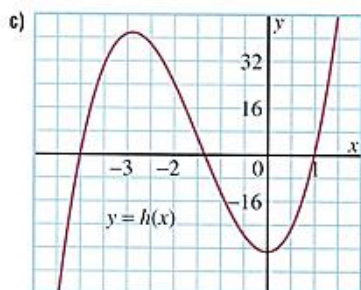
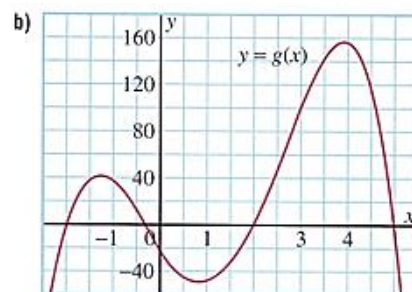
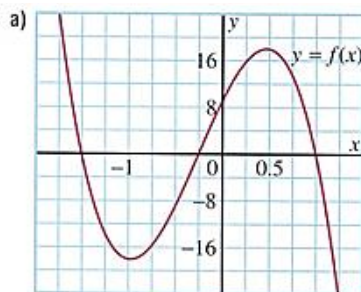
i) Which functions have an odd degree? Explain.

ii) Which functions have an even degree? Explain.

iii) Which functions have a negative leading coefficient? Explain.

iv) Which functions have a positive leading coefficient? Explain.

v) Which graphs have symmetry? Describe the symmetry.



6. State the zeros of each function, then sketch its graph.

a)  $f(x) = (x + 3)(x - 4)$

b)  $f(x) = -(x + 3)^2(x - 4)$

c)  $f(x) = (x - 1)(x + 2)(x - 3)$

7. Determine the equation of each function, then sketch its graph.

a) a cubic function with zeros  $-3, 4, 4$ ; graph passes through  $(5, 12)$

b) a quartic function with zeros  $-2, 0, 0, 1$ ; graph passes through  $(-3, -12)$

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Sketch a graph of each function. State its domain and range.

a)  $y = (x - 1)^2(x + 2)(x - 3)$

b)  $y = (x - 3)^2(x + 4)^2$

c)  $y = x^3(x - 1)$

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1. a)  $f(x) = x^3 - 3x^2 + 1$

b)  $g(x) = -2x^3 + 4x^2 + 7x - 3$

c)  $h(x) = -x^4 - 4x^3 + 10$

d)  $k(x) = 2x^4 - 3x^2 - 21$

3. a)  $x = 3, -\frac{5}{2}, -2$  (of order 2)

b)  $x = 0$  (of order 2),  $-\frac{4}{3}, -5, 1$

4. i) b

ii) d

iii) Answers may vary.

a)  $y = (x - 3)(x + 2)(x - 1)$

b)  $y = x^2(x - 1)$

c)  $y = (x + 4)(x - 5)(x + 1)$

d)  $y = (x + 3)^3$

5. i)  $y = f(x), y = h(x), y = k(x)$

ii)  $y = g(x)$

iii)  $y = f(x), y = g(x)$

iv)  $y = h(x), y = k(x)$

v) Point symmetry:  $y = f(x), y = h(x), y = k(x)$

6. a)  $x = -3, 4$

b)  $x = -3$  (of order 2), 4

c)  $x = 1, -2, 3$

7. a)  $y = 1.5(x + 3)(x - 4)^2$

b)  $y = -\frac{1}{3}x^2(x + 2)(x - 1)$

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17. a) D:  $\{x \in \mathbf{R}\}$  R:  $\{y \in \mathbf{R} / y \geq -16.3\}$

b) D:  $\{x \in \mathbf{R}\}$  R:  $\{y \in \mathbf{R} / y \geq 0\}$

c) D:  $\{x \in \mathbf{R}\}$  R:  $\{y \in \mathbf{R} / y \geq -0.1\}$