

**Section 3.4 Extra Practice**

1. Solve.

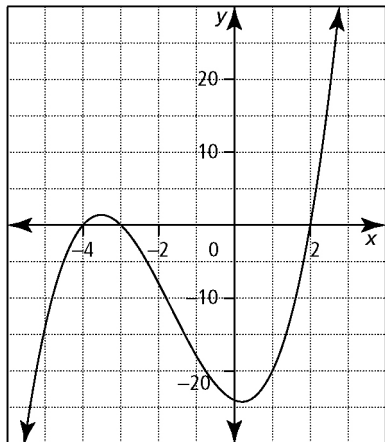
a)  $(x + 5)(x + 2)(x - 3)(x - 6) = 0$

b)  $x^3 - 27 = 0$

c)  $(3x + 1)(x - 4)(x - 7) = 0$

d)  $x(x + 4)^3(x + 2)^2 = 0$

2. For this graph, identify the following:

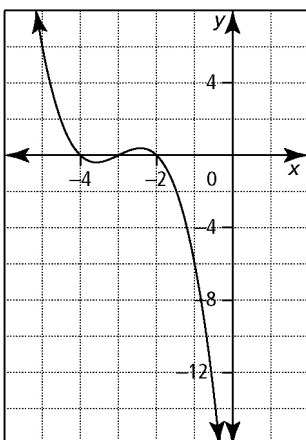


a) the zeros

b) the intervals where the function is positive

c) the intervals where the function is negative

3. For the graph of this polynomial function, determine the following:



a) the least possible degree

b) the sign of the leading coefficient

c) the  $x$ -intercepts and the factors of the function

d) the intervals where the function is positive and the intervals where it is negative

4. The graph of  $y = x^3$  is transformed to obtain the graph of  $y = -2(4(x + 1))^3 - 5$ . Copy and complete the table.

$y = x^3$	$y = (4x)^3$	$y = -2(4x)^3$	$y = -2(4(x + 1))^3 - 5$
$(-2, -8)$			
$(-1, -1)$			
$(0, 0)$			
$(1, 1)$			
$(2, 8)$			

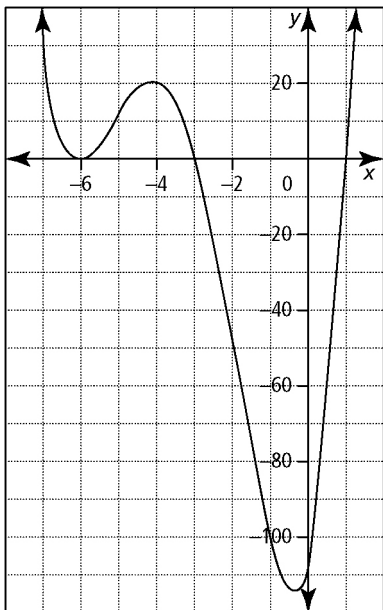
5. The graph of  $y = x^4$  is transformed to obtainthe graph of  $y = \frac{1}{4}\left(\frac{1}{2}(x - 9)\right)^4 + 3$ . Copy

and complete the table.

$y = x^4$	$y = \left(\frac{1}{2}x\right)^4$	$y = \frac{1}{4}\left(\frac{1}{2}x\right)^4$	$y = \frac{1}{4}\left(\frac{1}{2}(x - 9)\right)^4 + 3$
$(-2, -16)$			
$(-1, 1)$			
$(0, 0)$			
$(1, 1)$			
$(2, 16)$			



6. For the graph of this polynomial function, determine the following:



- the least possible degree
  - the sign of the leading coefficient
  - the  $x$ -intercepts and the factors of the function
  - the intervals where the function is positive and the intervals where it is negative
7. Without using a graphing calculator, determine the following for  $y = x^3 + 4x^2 - x - 4$ :
- the zeros of the function
  - the degree and end behaviour of the function
  - the  $y$ -intercept
  - the intervals where the function is positive and the intervals where it is negative
8. Sketch a graph of each function without using technology. Label all intercepts.
- $y = x^3 - 4x^2 - 5x$
  - $f(x) = -x^4 + 19x^2 + 6x - 72$
  - $g(x) = x^5 - 14x^4 + 69x^3 - 140x^2 + 100x$
9. Determine the equation with least degree for each polynomial function.
- a cubic function with zeros 3 (multiplicity 2) and  $-1$ , and  $y$ -intercept = 18
  - a quintic function with zeros  $-2$  (multiplicity 3) and 4 (multiplicity 2), and  $y$ -intercept =  $-32$
  - a quartic function with zeros  $-1$  (multiplicity 2) and 5 (multiplicity 2), and  $y$ -intercept =  $-10$
10. Determine three consecutive integers with a product of  $-504$ .
11. A toothpaste box has square ends. The length of the box is 12 cm greater than the width. The volume is  $135 \text{ cm}^3$ . What are the dimensions of the box?
12. The dimensions of a rectangular prism are 10 cm by 10 cm by 5 cm. When each dimension is increased by the same length, the new volume is  $1008 \text{ cm}^3$ . What are the dimensions of the new prism?

