

## MHF4U – Practice for Test

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Let's see how ready you are. Put away the books and give it a try. Solutions are on the class website. If you have to look BEFORE you try the question, you are not ready.

1. A cubic function is given by  $y = k(x + 2)(x - 3)(x - 8)$ .
  - a) What are the zeroes of this family of functions?
  - b) Write equations for TWO functions that belong to that family.
  - c) Determine an equation for the member of the family that has a y-intercept at 192.
  
2.
  - a) Determine an equation of a polynomial that has zeroes of -4, -3, 1, -3.
  - b) Sketch the polynomial.
  
3. Factor  $4x^3 - 8x^2 + x + 3$ .
  
4. Factor the sums and difference of cubes.
  - a)  $\frac{1}{8}x^3 + \frac{1}{64}$
  - b)  $135x^3 - 625y^3$
  
5. Determine the value of  $k$  so that  $x^3 + 5x^2 + kx + 6$  has  $x + 2$  as a factor.

## Solutions

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1. A cubic function is given by  $y = k(x + 2)(x - 3)(x - 8)$ .

a) What are the zeroes of this family of functions?

$$X = -2, 3, 8$$

b) Write two equations for TWO functions that belong to that family.

$Y = 2(x+2)(x-3)(x-8)$  or  $y=3(x+2)(x-3)(x-8)$  or various other combinations with different positive k values.

c) Determine an equation for the member of the family that has a y-intercept at 192.

$$192 = k(0 + 2)(0 - 3)(0 - 8)$$

$$192 = k(2)(-3)(-8)$$

$$\frac{192}{48} = k$$

$$4 = k$$

$$y = 4(x + 2)(x - 3)(x - 8)$$

2. a) Determine an equation of a polynomial that has zeroes of -4, -3, 1, -3.

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

b) Sketch the polynomial.

3. Factor  $4x^3 - 8x^2 + x + 3$ .

$$f(1) = 0$$

|   |   |    |    |    |
|---|---|----|----|----|
|   | 4 | -8 | 1  | 3  |
| 1 |   | 4  | -4 | -3 |
|   | 4 | -4 | -3 | 0  |

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

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

4. Factor the sums and difference of cubes.

a)

$$\frac{1}{8}x^3 + \frac{1}{64} = \left(\frac{x}{2} + \frac{1}{4}\right)\left(\frac{x^2}{4} - \frac{x}{8} + \frac{1}{16}\right)$$

$$135x^3 - 625y^3 = 5(27x^3 - 125y^3)$$

$$135x^3 - 625y^3 = 5(3x - 5y)(9x^2 + 15xy + 25y^2)$$

5. Determine the value of  $k$  so that  $x^3 + 5x^2 + kx + 6$  has  $x + 2$  as a factor.

$$2^3 + 5(2)^2 + 2k + 6 = 0$$

$$8 + 20 + 2k + 6 = 0$$

$$2k = 34$$

$$k = 17$$