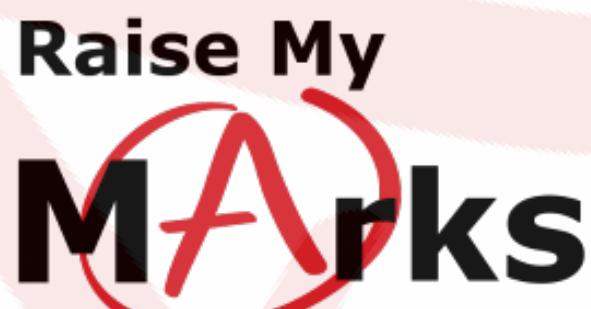


Factor Theorem 3



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2020

## Factor Theorem

$x - p$  is a factor of  $f(x)$  if and only if  $f(p) = 0$ .

### Factor Theorem Extended

A function,

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0$$

has a factor,

$$qx - p$$

if

$$f\left(\frac{p}{q}\right) = 0$$

where,

$q$  divides  $a_n$  and  
 $p$  divides  $a_0$ .

## Exercises

1. Factor fully.
  - a)  $18x^3 - 15x^2 - x + 2$
  - b)  $4x^4 - 19x^3 + 16x^2 - 19x + 12$
  - c)  $px^3 = (p - q)x^2 + (-2p - q)x + 2q$
  - d)  $5x^4 + x^3 - 22x^2 - 4x + 8$
  - e)  $abx^3 + (a - 2ab - b)x^2 + (2b - a - 2)x + 2$
  - f)  $6x^3 + x^2 - 46x + 15$
2. If  $-7$  is a root of  $x^2 + x - 2k = 0$ , determine the other roots and find the value of  $k$ .