

Factor Theorem 6

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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. State all possible values  $\frac{p}{q}$  that could make the given polynomial 0.
  - a)  $3x^3 - 4x^2 + 7x + 8$
  - b)  $2x^3 - 8x^2 + 5x - 6$
  - c)  $4x^3 + 3x^2 - 11x + 2$
  - d)  $6x^3 - 7x^2 + 4x + 3$
  - e)  $8x^3 - 7x^2 + 23x - 4$
2. Find the equation whose roots are each five more than the roots of  $2x^2 - 17x + 20 = 0$ .