Factor Theorem 5

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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. Find a quadratic equation whose roots have the following sum and product,
   a) sum $= 3$, product $= 7$
   b) sum $= 1/5$, product $= -3/25$
   c) sum $= -11$, product $= -2/3$
   d) sum $= -6$, product $= 4$
   e) sum $= -13/12$, product $= 1/4$
2. Find the equation whose roots are each three times the roots of $3x^2+7x+3=0$.