

October 5

Zeros From Factored Equations

Determine the zeroes of:

(Ex1) $f(x) = (x-5)^2(x+3)^5$

Step 1: Set each factor equal to zero and solve.

$$\begin{array}{r} x - 5 = 0 \\ +5 \quad +5 \\ \hline x = 5 \\ \text{mult: } 2 \end{array}$$

$$\begin{array}{r} x + 3 = 0 \\ -3 \quad -3 \\ \hline x = -3 \\ \text{mult: } 5 \end{array}$$

Step 2: The multiplicity is the exponent on the factor.

(Ex2) $f(x) = 3x(x+7)^{10}(2x-5)$

$$\begin{array}{r} 3x = 0 \\ \div 3 \\ \hline x = 0 \\ \text{mult: } 1 \end{array}$$

$$\begin{array}{r} x + 7 = 0 \\ -7 \quad -7 \\ \hline x = -7 \\ \text{mult: } 10 \end{array}$$

$$\begin{array}{r} 2x - 5 = 0 \\ +5 \quad +5 \\ \hline 2x = 5 \\ \div 2 \quad \div 2 \\ \hline x = 2.5 \\ \text{mult: } 1 \end{array}$$

(Ex3) $f(x) = -7(x-6)^5(x-1)^5$

↑
no x, not a factor

$$\begin{array}{r} x - 6 = 0 \\ +6 \quad +6 \\ \hline x = 6 \\ \text{mult: } 5 \end{array}$$

$$\begin{array}{r} x - 1 = 0 \\ +1 \quad +1 \\ \hline x = 1 \\ \text{mult: } 5 \end{array}$$

Write the polynomial using zeroes:

Ex 4 $x = 6$ mult: 2

$x = -4$ mult: 8

$x = 0$ mult: 15

Step 1: Make them equal to zero.

$$\begin{array}{r} x = 6 \\ -6 \quad -6 \\ \hline (x-6) = 0 \end{array}$$

$$\begin{array}{r} x = -4 \\ +4 \quad +4 \\ \hline (x+4) = 0 \end{array}$$

$$(x) = 0$$

Step 2: Make multiplicity the exponent.

$$f(x) = x^{15}(x-6)^2(x+4)^8$$