

3.5: Zeros from factors

- To find:
 - must be in factored form
 - set each factor = 0 \Rightarrow solve
 - multiplicity = # of the exponent next to the factor

- Ex 1) find zeros \Rightarrow state multiplicity

$$f(x) = (x-5)^1(x+2)^3$$

$$\begin{array}{r} x-5=0 \\ +5 \quad +5 \end{array}$$

$$\boxed{x=5 \text{ mult: } 1}$$

$$\begin{array}{r} x+2=0 \\ -2 \quad -2 \end{array}$$

$$\boxed{x=-2 \text{ mult: } 3}$$

- Ex 2) find zeros \Rightarrow state multiplicity

$$f(x) = x^2(2x+3)^1$$

$$\boxed{x=0 \text{ mult: } 2}$$

$$\begin{array}{r} 2x+3=0 \\ -3 \quad -3 \end{array}$$

$$\frac{2x}{2} = \frac{-3}{2}$$

$$\boxed{x = -\frac{3}{2} \text{ mult: } 1}$$

◦ Write polynomial given zeros & multiplicity
→ set up (x minus # that x is equal to)
→ put multiplicity in the exponent

◦ Ex 3) $x=2$ mult 1, $x=-4$ mult 3

$$(x-2)^1(x-(-4))^3 = f(x)$$

$$(x-2)(x+4)^3 = f(x)$$

◦ Ex 4) $x=7$ mult 8, $x=0$ mult 4

$$(x-7)^8(x-\cancel{0})^4 = f(x)$$

$$x^4(x-7)^8 = f(x)$$