

1. Simplify:  $(x - 7)(x^2 + 7x + 49) = x^3 - 343$

2. Factor *completely*:  $x^3 + 3x^2 \mid - 9x - 27$   
 $x^2(x+3) \mid - 9(x+3)$

$(x+3)(x^2 - 9)$

$(x+3)^2(x-3)$  or  $(x+3)(x+3)(x-3)$

3. Which is a factor of  $x^3 + 2x^2 \mid - 9x + 30$ ?

A)  $x + 2$

~~B)  $x - 3$~~

C)  $x + 5$

D)  $x - 6$

$x^2(x+2) \mid - 3(3x-10)$

$$\begin{array}{r} -5 \overline{) 1 \quad 2 \quad -9 \quad 30} \\ \underline{\phantom{-5} \phantom{0} \phantom{0} \phantom{0} \phantom{0}} -5 \quad 15 \quad -30} \\ 1 \quad -3 \quad 6 \quad 0 \end{array}$$

4.  $P(x)$  is a polynomial, and  $P(4) = P(-2) = P(-1) = 0$ . Which of the following could be  $P(x)$ ? Write  $P(x)$

A)  $x^3 + 7x^2 + 14x + 8$   
~~B)  $x^2 + 3x + 2$~~   
~~C)  $x^2 + 2x + 8$~~   
 D)  $x^3 - x^2 - 10x - 8$

$(x-4)(x+2)(x+1)$

$$\begin{array}{r|rrrr} 4 & 1 & -1 & -10 & -8 \\ & & 4 & 12 & 8 \\ \hline & 1 & 3 & 2 & 0 \end{array}$$

$$x^3 + 3x^2 - 28x - 60 = (x-5)(x+6)(x+2)$$

$$\begin{array}{r|rrrr} 5 & 1 & 3 & -28 & -60 \\ & & 5 & 40 & 60 \\ \hline & 1 & 8 & 12 & 0 \end{array}$$

$$x^2 + 8x + 12$$

$$(x+2)(x+6)$$

① graph

$$P(x) = x^3 + 3x^2 - 28x - 60$$

② identify one  
x-intercept of  $P(x)$

5 is an x-intercept

So  $(x-5)$  is a factor  
of  $P(x)$