

## 5-4 Synthetic Division

\*You must be dividing by a linear expression and the leading coefficient (first number) must be a 1.

\*\*In synthetic division --> Add instead of subtract!

Example: Use synthetic division to divide the polynomials.

$$(x^3 + 4x^2 + 6) \div (x + 3)$$



Divide.

$$x + 2 \overline{) x^3 - 2x^2 - 5x + 6}$$

Questions?  
**Click Here**



Useful for solving polynomials if factors are known.

$$\begin{aligned} x^3 - 2x^2 - 5x + 6 &= (x + 2)(x^2 - 4x + 3) \\ &= (x + 2)(x - 1)(x - 3) \end{aligned}$$

Divide.

$$x - 3 \overline{) 3x^3 - 10x^2 + 8x - 15}$$

Questions?  
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Divide using synthetic division.

21.  $(x^3 + 3x^2 - x - 3) \div (x - 1)$

23.  $(x^3 - 7x^2 - 7x + 20) \div (x + 4)$

25.  $(x^2 + 3) \div (x - 1)$

27.  $(x^3 + 27) \div (x + 3)$

31. **Geometry** The volume, in cubic inches, of the decorative box shown can be expressed as the product of the lengths of its sides as  $V(x) = x^3 + x^2 - 6x$ . What linear expressions with integer coefficients represent the length and height of the box?

22.  $(x^3 - 4x^2 + 6x - 4) \div (x - 2)$

24.  $(x^3 - 3x^2 - 5x - 25) \div (x - 5)$

26.  $(3x^3 + 17x^2 + 21x - 9) \div (x + 3)$

28.  $(6x^2 - 8x - 2) \div (x - 1)$

