Algebra 2 w/ Trig

2.4 Factor and Solve Polynomial Equations

Warm – Up:

**Multiply the polynomial.**

**1.** (*x* + 2)(*x* + 3) **2.** (2*x* *–* 1)(2*x* + 1) **3.** (*x –* 7)2 **4.** 3*x*2(*x* + 5)

**5. The dimension of a box are modeled by** (*x* +4), (*x* + 2) **and** (*x* + 6)**. Write a polynomial that models the volume of the box.**

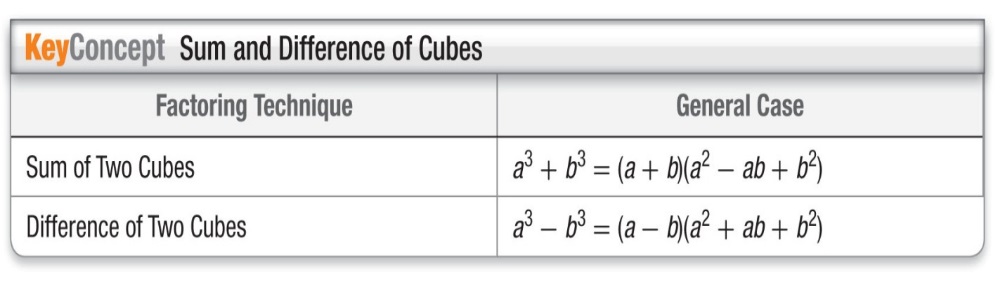
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Example 1: Find a Common Monomial Factor

**Factor the polynomial completely.**

**a.** *x*3 + 2*x*2 – 15*x* ***b.*** *2y5 – 18y3* **c.** 4*z*4 – 16*z*3 + 16*z*2

Example 2: Factor the Sum or Difference of Two Cubes



***a.*** *x3 + 64* ***b.*** *16z5 – 250z2*

***Factor the polynomial completely.***

***1.*** *x3 – 7x2 + 10x* ***2.*** *3y5 – 75y3* ***3.*** *16b5 + 686b2* ***4.*** *w3 – 27*

*Example 3: Factor by Grouping*

*x3 – 3x2 – 16x + 48*

*Example 4: Factor Polynomials in Quadratic Form*

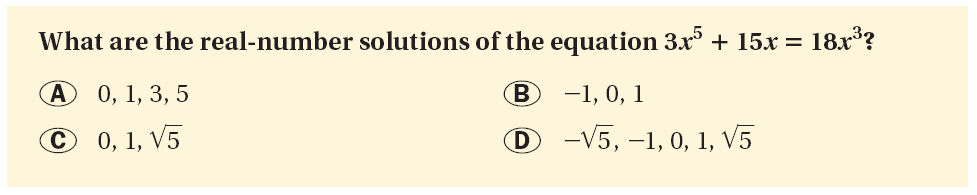
***Factor completely:*** *(a) 16x4 – 81**(b) 2p8 + 10p5 + 12p2****.***

YOU TRY:

**Factor the polynomial completely.**

**5.** *x*3 + 7*x*2 – 9*x* – 63 **6.** 16*g*4 – 625 **7.** 4*t*6 – 20*t*4 + 24*t*2

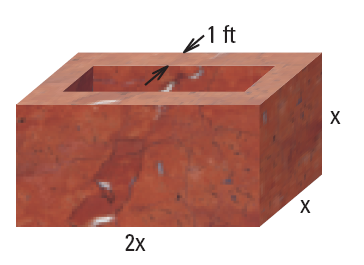
Example 5: Find the real-number solutions of the equation.



**Find the real-number solutions of the equation.**

**8.** 4*x*5 – 40*x*3 + 36*x* = 0 **9.** 2*x*5 + 24*x* = 14*x*3 **10.** – 27*x*3 + 15*x*2 = – 6*x*4

***Example 6: Solve a Polynomial Equation***

***You are designing a marble basin that will hold a fountain for a city park. The basin’s sides and bottom should be 1 foot thick. Its outer length should be twice its outer width and outer height.***

***What should the outer dimensions of the basin be if it is to hold 36 cubic feet of water?***

YOU TRY:

***What if ? In Example 6, what should the basin’s dimensions be if it is to hold 128 cubic feet of water and have outer length 6x, width 3x, and height x ?***

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*KEEP GOING:*

***Factor the polynomial completely.***

***1.*** *27 – y3* ***2.*** *28x3 – 7x2 + 36x – 9*

***3. What are the real number solutions of the equation*** *2x = x2 + x3?*

***4. The width of a rug is*** *3* ***feet shorter than its length. If the area of the rug is*** *108* ***square feet, what are the dimensions of the rug?***