

Factor each of the following completely.

Hint: you may need to use substitution to make the question look more familiar. Finish for HW any problems you did not complete in class.

1.  $(x^2 + 3x)^2 - 2(x^2 + 3x) - 8$

Let  $u = x^2 + 3x$   
 $u^2 - 2u - 8$  Substitution  
 $:(u-4)(u+2)$   
 $:(x^2 + 3x - 4)(x^2 + 3x + 2)$   
 $:(x+4)(x-1)(x+2)(x+1)$

HW  
 2.  $(x^2 - x)^2 - 8(x^2 - x) + 12$

Product of 2  
 3.  $x^4 - 3x^2 - 10 + 4x^2 + 8x$

HW  
 $4x^4 - 7x^2 - 18 + x^3 - 9x$   
 $:(x^2-5)(x^2+2) + 4x(x^2-2)$   
 $:(x^2+2)(x^2+4x-5)$   
 $:(x^2+2)(x+5)(x-1)$

Oct 31-7:43 PM

Oct 31-7:44 PM

HW Hint: cubic  
 5.  $x^4 + 2x^3 - 8x - 16$

Standard Grouping

HW  
 6.  $x^4 + 2x^3 - 16x^2 - 32$

7. Let  $x$  and  $y$  be integers such that  $x^3 - y^3 = 48$ . If  $x - y = 3$  and  $xy = 18$ , what is  $x^2 + y^2$ ?

Diff of 2 cubes  
 $\sqrt[3]{x^3} = x$   
 $\sqrt[3]{y^3} = y$   
 $(x-y)(x^2 + xy + y^2) = 48$   
 $3(x^2 + xy + y^2) = 48$   
 $3(x^2 + 6 + y^2) = 48$   
 $x^2 + y^2 = 10$   
 Finish

Oct 31-7:44 PM

Oct 31-7:44 PM

8. If  $(2x^3 + bx - 10)(x + 5) = 2x^3 + 17x^2 + 25x - 50$  is true for all values of  $x$ , what is  $b$ ?

$x(2x^2 + bx - 10) + 5(2x^2 + bx - 10) = 2x^3 + 17x^2 + 25x - 50$   
 $2x^3 + bx^2 - 10x + 10x^2 + 5bx - 50 = 2x^3 + 17x^2 + 25x - 50$   
 $2x^3 + bx^2 + 10x^2 - 10x + 5bx - 50 = 2x^3 + 17x^2 + 25x - 50$   
 $b + 10 = 17 \quad -10x + 5b = 25$   
 $b = 7$

9. If  $(2x + 3)(4x^2 - 5x + 6) = ax^3 + bx^2 + cx + d$ , what is the value of  $2b + c$ ?

Oct 31-7:44 PM

Oct 31-7:45 PM

10. From Alg2CC Regents January 2017  
Algebraically determine the values of h and k to correctly complete the identity stated below:

$$2x^3 - 10x^2 + 11x - 7 = (x - 4)(2x^2 + hx + 3) + k$$

Oct 31-7:45 PM

11. Similar question  
Algebraically determine the values of h and k to correctly complete the identity stated below:

$$3x^3 - 2x^2 - 13x + 8 = (x - 2)(3x^2 + hx - 5) + k$$

Oct 31-7:46 PM

Nov 6-7:51 AM