

Bellwork: What is the fourth term in the expansion of  $(4x-y)^7$ ?

$$\begin{aligned}
 & 1 \binom{7}{0} (4x)^7 (-y)^0 + 7 \binom{7}{1} (4x)^6 (-y)^1 + 21 \binom{7}{2} (4x)^5 (-y)^2 + 35 \binom{7}{3} (4x)^4 (-y)^3 + 35 \binom{7}{4} (4x)^3 (-y)^4 + 21 \binom{7}{5} (4x)^2 (-y)^5 \\
 & + 7 \binom{7}{6} (4x)^1 (-y)^6 + 1 \binom{7}{7} (4x)^0 (-y)^7 \\
 & 35(4)^4(-1)^3 = -8960x^4y^3
 \end{aligned}$$

## Homework 1.3 Solutions:

1.  $x^2+5x-24$

2.  $9x^2-12xy+16y^2$

3.  $16x^2-9$

4.  $x^3-25x^2+75x-125$

5.  $x^3+25x^2+75x+125$

11.  $(3x-y)(9x^2+3xy+y^2)$

12.  $(2x-7)(2x+7)$

13.  $(x+8)(x+11)$

14.  $(6x+5)^2$

15.  $(12x-5i)(12x+5i)$

21.  $x = -1, 3/5$

22.  $x = -1/3, 2$

23.  $x = 10, 1$

24.  $x = \frac{3+i\sqrt{7}}{8}, \frac{3-i\sqrt{7}}{8}$

25.  $(x-2+i)(x+2+i)$

6)  $27x^3+8$

7)  $x^3-133ly^3$

8)  $36x^2+84x+49$

9)  $16x^2+4$

10)  $169x^2+64$

16)  $(x+y)^3$

17)  $(9x-y)^2$

18)  $(3x+8i)(3x-8i)$

19)  $(4x+10y)(4x-10y)$

20)  $(x-5)^3$

26)  $(x+4+i)(x+4-i)$

27)  $(x+\sqrt{6})(x-\sqrt{6})$

28)  $(x-4)$

$(x^2+4x+16)$

29.  $(x+2)(x+3)(x+2i)(x-2i)$

30  $(x+2i\sqrt{2})(x-2i\sqrt{2})$

## Homework 1.4 Solutions:

1.  $x^6+18x^5+135x^4+540x^3+1215x^2+1458x+729$

2.  $x^7-14x^6+84x^5-280x^4+560x^3-672x^2+448x-128$

3.  ~~$32x^5-16x^4+8x^3-4x^2+2x-1$~~   
Below ☺

4.  $15625x^6+18750x^5y+9375x^4y^2+2500x^3y^3$   
 $+375x^2y^4+30xy^5+y^6$

5.  $1024x^5-3840x^4y+5760x^3y^2-4320x^2y^3$   
 $+1620xy^4-243y^5$

6.  $81x^4+216x^3y+216x^2y^2+96xy^3+16y^4$

$$3) (2x-1)^5 \quad 1 \ 5 \ 10 \ 10 \ 5 \ 1$$

$$1(2x)^5 + 5(2x)^4(-1) + 10(2x)^3(-1)^2 + 10(2x)^2(-1)^3$$

$$+ 5(2x)^1(-1)^4 + 1(2x)^0(-1)^5$$

$$32x^5 - 80x^4 + 80x^3 - 40x^2 + 10x - 1$$

## Today's Objectives:

Review for Unit 1 Test

Don't forget to make your 3x5 notecard!

$$1. (8 - x^2 + 3x^4) - (5 - 5x^2 + x^3 + 3x^4)$$

$$\underline{8} - \underline{x^2} + \cancel{3x^4} - \underline{5} + \underline{5x^2} - \underline{x^3} - \cancel{3x^4}$$

$$\boxed{-x^3 + 4x^2 + 3}$$

$$2. (3n^3 - 2n^4 + 3n) - (4n^4 + 2n^3 - 3) - (2n^4 - 7n^3 + 6)$$

$$\underline{3n^3} - \underline{2n^4} + \underline{3n} - \underline{4n^4} - \underline{2n^3} + \underline{3} - \underline{2n^4} + \underline{7n^3} - \underline{6}$$

$$\boxed{-8n^4 + 8n^3 + 3n - 3}$$

3.  $(2x - 3)^2$

$$1(2x)^2(-3)^0 + 2(2x)^1(-3)^1 + 1(2x)^0(-3)^2$$

$$4x^2 - 12x + 9$$

$$\begin{array}{c} 1 \\ 1 \\ 2 \\ 1 \\ 1 \\ 3 \\ 3 \\ 1 \end{array}$$

4.  $(7v + 1)(7v^2 - 2v + 7)$

	$7v + 1$	
$7v^2$	$49v^3$	$7v^2$
$-2v$	$-14v^2$	$-2v$
$+7$	$49v$	$7$

$$A^3 + B^3 = (A+B)$$

$$(A^2 - AB + B^2)$$

$$49v^3 - 7v^2 + 47v + 7$$

5.  $(4x^2 + 2x - 3)(2x^3 - 5x^2 + 3)$

	$4x^2$	$+2x$	$-3$
$2x^3$	$8x^5$	$4x^4$	$-6x^3$
$-5x^2$	$-20x^4$	$-10x^3$	$15x^2$
$+3$	$12x^2$	$6x$	$-9$

$$8x^5 - 16x^4 - 16x^3 + 27x^2 + 6x - 9$$

6. Which of the following is a factor of :

$$2x^3 - 13x^2 + 26x - 15$$

NO a.  $x + 5$   $x = -5$   $2(-5)^3 - 13(-5)^2 + 26(-5) - 15$   
 b.  $x + 3$   $x = -3$  NO.  $= 0$   
 YES c.  $x - 3$   $x = 3$   
 d.  $x - 5$   $x = 5$   $= 40$  NOT factor ÷

7. Factor  $27x^3 - 64y^3$ , using polynomial identities.

cube root to find "A" and "B"

$$A^3 - B^3 = (A - B)(A^2 + AB + B^2)$$

$$(3x - 4y)(9x^2 + 12xy + 16y^2)$$

8. Multiply using polynomial identities:  $(4x + 3)^3$

$$1(4x)^3 + 3(4x)^2(3) + 3(4x)(3)^2 + 1(3)^3$$

$$(4x)^3 + 3(4x)^2(3) + 3(4x)(3)^2 + (3)^3$$

$$(64x^3 + 144x^2 + 108x + 27)$$

$$(a+b)^3$$

$$= a^3 + 3a^2b + 3ab^2 + b^3$$

9. Factor over the complex numbers.

$$x^2 - 8x + 20 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{8 \pm \sqrt{(-8)^2 - 4(1)(20)}}{2(1)}$$

$$\frac{8 \pm \sqrt{-16}}{2} \stackrel{i = \sqrt{-1}}{=} \frac{8 \pm 4i}{2}$$

$$x = 4 \pm 2i \quad x = 4 + 2i \quad x = 4 - 2i$$

switch signs

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

10. What is the 3<sup>th</sup> term in the expansion of  $(x + 2y)^6$ ?

$$1(x)^6(2y)^0 + 6(x)^5(2y)^1 + 15(x)^4(2y)^2 + 20(x)^3(2y)^3 + \dots$$

		1		1				
		1	2	1				
		1	3	3	1			
		1	4	6	4	1		
		1	5	10	10	5	1	
		1	6	15	20	15	6	1

→

$$15(x)^4(2y)^2 = 60x^4y^2$$

11. Given  $p(x) = x^2 - 2x - 8$ , which of the following are true?

I.  $(x - 2)$  is a factor of  $p(x)$ .

II.  $x = 4$  is a root of  $p(x)$ .

I.  $(2)^2 - 2(2) - 8 = -8$  not a factor.

II.  $(4)^2 - 2(4) - 8 = 0$  is a root / zero

12. Solve:

$$2a^2 = -7a - 6$$

$$+7a \quad +7a \quad +6$$

$$+6$$

Step 1: Move to one side  
(should equal 0)

$$2a^2 + 7a + 6 = 0$$

Step 2: Quadratic Formula  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(2)(6)}}{2(2)} = \frac{-7 \pm \sqrt{1}}{4} = \frac{-7 \pm 1}{4}$$

$$x = \frac{-7 + 1}{4} = \frac{-6}{4} = \frac{-3}{2}$$

$$x = \frac{-7 - 1}{4} = \frac{-8}{4} = -2$$

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



13. Expand the polynomial into standard form:  $(3x + 1)^4$

$$1(3x)^4(1)^0 + 4(3x)^3(1)^1 + 6(3x)^2(1)^2 + 4(3x)^1(1)^3 + 1(3x)^0(1)^4$$

$$\begin{array}{ccccccc} & & & & 1 & & & \\ & & & & 1 & & & \\ & & & 1 & 2 & 1 & & \\ & & 1 & 3 & 3 & 1 & & \\ \rightarrow & 1 & 4 & 6 & 4 & 1 & & \end{array}$$

$$81x^4 + 108x^3 + 54x^2 + 12x + 1$$