Check your answers: HW page 78

1. $(x+2)(x+5)$

$x^2+5x+2x+10$

$\boxed{x^2+7x+10}$

2. $(x+4)(x+8)$

$x^2+8x+4x+32$

$\boxed{x^2+12x+32}$

3. $(x+10)(x+3)$

$x^2+3x+10x+30$

$\boxed{x^2+13x+30}$

4. $(x-5)(x-4)$

$x^2-4x-5x+20$

$\boxed{x^2-9x+20}$

11. $(2x+4)(x+3)$

$2x^2+6x+4x+12$

$\boxed{2x^2+10x+12}$

12. $(5x+6)(x+2)$

$5x^2+10x+6x+12$

$\boxed{5x^2+16x+12}$

13. $(3x-6)(x-5)$

$3x^2-15x-6x+30$

$\boxed{3x^2-21x+30}$

14. $(9x-2)(x-3)$

$9x^2-27x-2x+6$

$\boxed{9x^2-29x+6}$

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5. $(x-3)(x-8)$

$x^2-8x-3x+24$

$\boxed{x^2-11x+24}$

6. $(x-7)(x-2)$

$x^2-2x-7x+14$

$\boxed{x^2-9x+14}$

7. $(x+8)(x-5)$

$x^2-5x+8x-40$

$\boxed{x^2+3x-40}$

8. $(x+6)(x-7)$

$x^2-7x+6x-42$

$\boxed{x^2-x-42}$

15. $(2x+5)(x-4)$

$2x^2-8x+5x-20$

$\boxed{2x^2-3x-20}$

16. $(3x-5)(x+8)$

$3x^2+24x-5x-40$

$\boxed{3x^2+19x-40}$

17. $(4x+2)(6x+3)$

$24x^2+12x+12x+6$

$\boxed{24x^2+24x+6}$

18. $(5x-6)(3x-2)$

$15x^2-10x-18x+12$

$\boxed{15x^2-28x+12}$

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9. $(x-9)(x+3)$

$x^2+3x-9x-27$

$\boxed{x^2-6x-27}$

10. $(x-4)(x+7)$

$x^2+7x-4x-28$

$\boxed{x^2+3x-28}$

19. $(4x+2)(3x^2+5x+6)$

$12x^3+20x^2+24x+6x^2+10x+12$

$\boxed{12x^3+26x^2+34x+12}$

20. $(3x+5)(8x^2-6x+2)$

$24x^3-18x^2+6x+40x^2-30x+10$

$\boxed{24x^3+22x^2-24x+10}$

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Example 1: Squaring a Binomial (When there is a coefficient on x)

Find: $(2x + 7)^2$

$= (2x+7)(2x+7)$

$= 4x^2 + 14x + 14x + 49$

$= 4x^2 + 28x + 49$

FOIL

Step 1: Write (2x + 7) twice.

Step 2: FOIL and combine like terms.

Step 3: Notice the pattern?

Do the following with just the pattern:

a. $(3t + 6)^2$

$9t^2 + 36t + 36$

$(3t)^2 + (2)(3)(6)t + 6^2$

$9t^2 + 36t + 36$

b. $(5y - 4)^2$

$25y^2 - 40y + 16$

$(5y)^2 - (2)(5)(4)y + (4)^2$

$25y^2 - 40y + 16$

Rule: The Square of a Binomial

$(a+b)^2 =$ $a^2 + 2ab + b^2$

$(a-b)^2 =$ $a^2 - 2ab + b^2$

The square of a binomial is the square of the first term, plus twice the product of the two terms, plus the square of the last term.

√ Understanding Check:

Find each square using either method (long way or shortcut pattern):

a. $(x+9)^2$ $x^2 + 18x + 81$

b. $(x-4)^2$ $x^2 - 8x + 16$

c. $(7m+2)^2$ $49m^2 + 28m + 4$

d. $(9c-1)^2$ $81c^2 - 18c + 1$

a. $(x+9)^2$ $x^2 + 18x + 81$

b. $(x-4)^2$ $x^2 - 8x + 16$

c. $(7m+2)^2$ $49m^2 + 28m + 4$

*tricky

d. $(9c-1)^2$ $81c^2 - 18c + 1$

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Investigating Special Products Continued…

Row 3:

g. $(x + 4)(x - 4)$ $x^2 - 4x + 4x - 16$ $x^2 - 16$

h. $(k + 9)(k - 9)$ $k^2 - 9k + 9k - 81$ $k^2 - 81$

i. $(3c + 7)(3c - 7)$ $9c^2 - 21c + 21c - 49$ $9c^2 - 49$

Do you notice ~~any patterns~~ in Row 3? The middle terms cancel each other out.

Based on the pattern you found, predict the answers to the following problems before working them out by FOIL.

1. $(x + 8)(x - 8)$ $x^2 - 64$

2. $(m + 3)(m - 3)$ $m^2 - 9$

$x^2 - 64$ $m^2 - 9$

Rule: The Difference of Squares

$$(a+b)(a-b)=a^2-b^2$$

The ___product___ of the ___sum___ and ___difference___ of the ___same___ two terms is the ___difference___ of their squares.

Example 4: Finding the Difference of Squares (When there is a coefficient on x)

Find: $(3m+5)(3m-5)$

Step 1: ~~FOIL~~

Step 2: ~~Combine like terms.~~ Just do it.

$9m^2-25$

√ Understanding Check:

Find each difference of squares:

a. $(d+11)(d-11)$ b. $(c+8)(c-8)$ c. $(7x+3)(7x-3)$

a. $(d+11)(d-11)$ d^2-121

b. $(c+8)(c-8)$ c^2-64

c. $(7x+3)(7x-3)$ $49x^2-9$

Whiteboard practice: $(x-8)(x+8) = x^2 - 64$

$(x + 5)(x + 8)$

$(x + 5)(x + 8)$

$x^2 + 13x + 40$

$$(x + 4)^2$$

$x^2 + 8x + 16$

d. $(x + 4)^2$

$\boxed{x^2 + 8x + 16}$

$(x + 10)(x - 10)$

$x^2 - 100$

g. $(x + 10)(x - 10)$

$\boxed{x^2 - 100}$

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

$x^2 + 2x - 9x - 18$

b. $(x-9)(x+2)$

$x^2 - 7x - 18$

$$(x-8)^2$$

$$x^2 - 16x + 64$$

e. $(x-8)^2$

$x^2 - 16x + 64$

$(5x + 2)(5x - 2)$

h. $(5x + 2)(5x - 2)$

$25x^2 - 4$

$(4x + 5)(x - 3)$

$-12x$

$+5x$

$4x^2 - 7x - 15$

c. $(4x + 5)(x - 3)$

$4x^2 - 12x + 5x - 15$

$\boxed{4x^2 - 7x - 15}$

$(6x - 7)^2$

$36x^2 - 84x + 49$

f. $(6x - 7)^2$

$\boxed{36x^2 - 84x + 49}$

Homework

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(use a separate sheet of paper if needed for work)