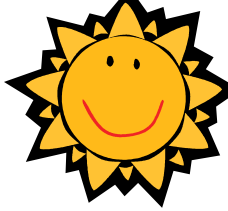
Unit 2 Day 1

Factoring Review

Warm Up



1. Write an equivalent expression for each of the problems below:

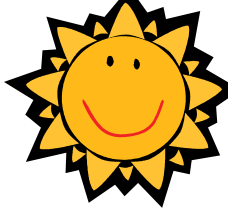
   a. $(x + 2)(x + 4)$
   b. $(x - 5)(x + 8)$
   c. $(x - 9)^2$
   d. $(x + 10)^3$
   e. $(x - 8)(x + 8)$
   f. $(x - 3)(x + 2)(x - 4)$

3. Simplify the following polynomial expressions

   a. $(2x^3 + 4x^2 - 3x + 8) - (6x^2 + 5x - 7) + 4x^3$

   b. $(5 + 30x - 16x^2) + (4x^3 + 6x^2) - (25x - 7)$

Warm Up



1. Write an equivalent expression for each of the problems below:

a. $(x + 2)(x + 4)$ $x^2 + 6x + 8$

b. $(x - 5)(x + 8)$ $x^2 + 3x - 40$

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

d. $(x + 10)^3$ $x^3 + 30x^2 + 300x + 1000$

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

f. $(x - 3)(x + 2)(x - 4)$ $x^3 - 5x^2 - 2x + 24$

3. Simplify the following polynomial expressions

a. $(2x^3 + 4x^2 - 3x + 8) - (6x^2 + 5x - 7) + 4x^3$

$6x^3 - 2x^2 + 8x + 15$

b. $(5 + 30x - 16x^2) + (4x^3 + 6x^2) - (25x - 7)$

$4x^3 - 10x^2 + 5x + 12$

Homework Answers
Radical Review (End of Unit 1 HW Packet)

1. 13
2. 18
3. 20
4. 9
5. 6
6. 2
7. 12
8. 19
9. 11
10. 16
11. 14
12. 21
13. 10
14 . 8
15. 5
16. 15

Homework Answers
Radical Review (End of Unit 1 HW Packet) Continued…

17. 25

18. 17

19. 4

20. 3

21. 7

22. 24

23. 1

24. $3\sqrt{15}$

25. $4\sqrt{2}$

26. $4\sqrt{3}$

27. $-2\sqrt{15}$

28. $7\sqrt{3}$

29. $48\sqrt{2}$

30. $36\sqrt{7}$

31. $27\sqrt{2}$

Tonight's Homework

- HW Packet Pg. 1 and 2 #1-9, 19-24
- Complete Notes Pg 5 if not yet complete.
- Print Unit 2 HW Packet, if not yet

Solving Quadratics Algebraically Investigation

Notes p.1 – 3

Show Investigation Notes pages on document camera when reviewing with class.

Notes p. 2

FACTORS	PRODUCT ax^2+bx+c	a	b	c
$(x+3)(x+5)$	$x^2+8x+15$	**1**	**8**	**15**
$(x+4)(x-2)$	x^2+2x-8	**1**	**2**	**-8**
$(x-1)(x-2)$	x^2-3x+2	**1**	**-3**	**2**

1. Initially, what patterns do you see?
2. How is the value of "**a**" related to the factors you see in each problem?
3. How is the value of "**b**" related to the factors you see in each problem?
4. How is the value of "**c**" related to the factors you see in each problem?

Check Notes p. 3

FACTORS	PRODUCT ax^2+bx+c	a	b	c	Hint: list factors of "c"
$(x+4)(x+2)$	x^2+6x+8	1	6	8	1, 2, 4, 8
$(x+4)(x+3)$	$x^2+7x+12$	1	7	12	1, 2, 3, 4, 6, 12
$(x+12)(x+1)$	$x^2+13x+12$	1	13	12	1, 2, 3, 4, 6, 12
$(x+5)(x-2)$	$x^2+3x-10$	1	3	-10	1, 2, 5, 10
$(x-5)(x+2)$	$x^2-3x-10$	1	-3	-10	1, 2, 5, 10
$(x-9)(x-6)$	$x^2-15x+54$	1	-15	54	1, 2, 3, 6, 9, 18, 27

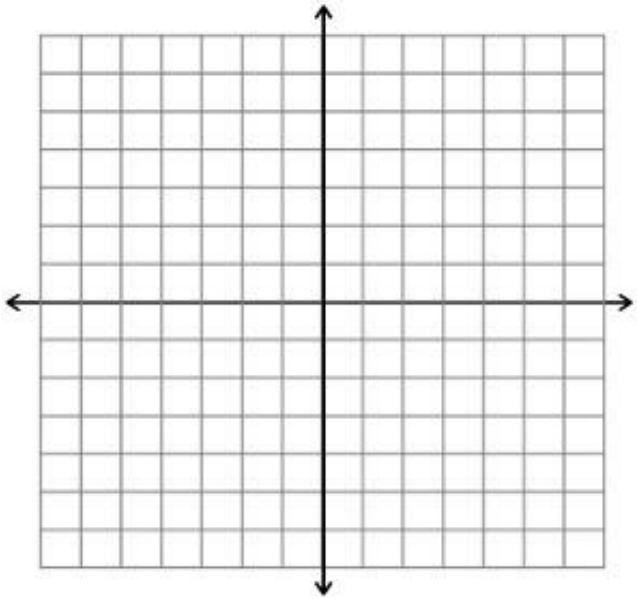
1. What do you notice about the relationship between the factors and the x-intercepts?

The x-intercepts are the opposite values of the factors!

2. Why is factoring a useful skill to learn?

It can help you identify the x-intercepts and graph quadratics!

3. Choose one of the quadratics above and create a rough sketch of the graph using all the information you know about quadratic equations.



Notes p. 4:

- **Summary: Factoring Polynomials**

- ALWAYS factor out the **greatest common factor** (**GCF**) FIRST!!

- A polynomial that can not be factored is **prime**.

- A polynomial is considered to be completely factored when it is expressed as the product of **prime** polynomials.

A. Factoring out the GCF

i. $16m^2n + 12mn^2$ $4mn(4m + 3n)$

ii. $14a^3b^3c - 21a^2b^4c + 7a^2b^3c$ $7a^2b^3c(2a - 3b + 1)$

iii. $-36x^4z^2 - 24x^2yz + 6x^2yz^3$ $-6x^2z(6x^2z + 4y - yz^2)$

B. Factor by grouping—for polynomials with 4 or more terms

i. $3x^3 + 2xy - 15x^2 - 10y$ $\qquad (x-5)(3x^2+2y)$

ii. $20ab - 35b - 63 + 36a$ $\qquad (5b+9)(4a-7)$

C. Factoring trinomials into the product of two binomials

a. When leading coefficient is one.

i. $x^2 + 5x + 4$ $(x+4)(x+1)$

ii. $x^2 + 6x - 16$ $(x+8)(x-2)$

D. Difference of "Two Squares"

i. $x^2 - 25$ $(x+5)(x-5)$

ii. $16x^4 - z^4$ $(4x^2+z^2)(2x+z)(2x-z)$

iii. $16x^2 - 36$ $4(2x+3)(2x-3)$

Factoring Flow Chart

ALWAYS FACTOR OUT A GCF FRIST!

→Ex. $16x^3 + 8x^2 - 2x = 2x(4x^2 + 2x - 1)$

2 Terms

Is this a Difference of Squares?

YES

$x^2 - 4$

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

NO

Can't Factor!

3 Terms

Is this a leading coefficient other than 1?

YES

$2x^2 + 7x + 3$

Use decomposition (busting the B)

$2x^2 + 6x + 1x + 3$

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

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

NO

$x^2 + x - 12$

Use sum and product

__+__ = 1

__ x __ = -12

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

4 Terms

Is there anything in common between the first two terms and the last 2 terms?

YES

$6x^2 + 9x + 2x + 3$

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

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

NO

$5x^2 y + 7x + 15xy + 21$

Reorganize the terms

$5x^2 y + 15xy + 7x + 21$

$5xy(x + 3) + 7(x + 3)$

$(5xy + 7)(x + 3)$

Reminders for Factoring

(Write on the back of the flow chart)

1. If you factor out a GFC, make sure it stays on the outside of the factors (it does not disappear)

Ex. $2x^2 + 10x - 4 \rightarrow 2(x^2 + 5x - 2)$

2. If the leading coefficient is negative, first factor out a -1

Ex. $-x^2 + 2x + 3 \rightarrow -1(x^2 - 2x - 3)$

3. Always check answers by re-distributing the factors!

Ex. Does $(x + 2)(x + 2) = x^2 + 4x + 4$? YES!

Practice Factoring

Notes p. 4-5

Practice p. 4-5

1) x^2+4x+4

$(x+2)^2$

2) x^2+5x+6

$(x+2)(x+3)$

3) x^2-6x+9

$(x-3)^2$

4) $x^2-7x+12$

$(x-3)(x-4)$

5) $x^2-11x+30$

$(x-5)(x-6)$

6) x^2+x-6

$(x-2)(x+3)$

7) $x^2+3x-18$

$(x-3)(x+6)$

8) $x^2-2x-15$

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

9) x^2-9

$(x+3)(x-3)$

10) x^2-16

$(x+4)(x-4)$

Practice p. 5

11) $3x^2+18x+15$

$3(x+5)(x+1)$

12) $4x^2-24x+20$

$4(x-5)(x-1)$

13) $-3x^2-x$

$-x(3x+1)$

14) $5x^3-5x$

$5x(x-1)(x+1)$

15) $9x^2-36$

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

16) x^3-3x^2+2x-6

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

17) $x^3-5x^2-3x+15$

$(x^2-3)(x-5)$

18) $-20x^3y^2-10xy-25x^2y$

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

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Hand back TEST! ☺