Suffolk Public Schools

Factoring Trinomials : $ax^2 + bx + c$

Lesson 8-6

Lesson 8-6 Factoring Trinomials: ax + bx + c

Factoring $ax^2 + bx + c$: To factor quadratic trinomials of the form $ax^2 + bx + c$.

- A. Find the product of "a" and "c"
- B. Rewrite the problem, dropping the "a" coefficient and replacing "c" with the product of "a" and "c"
- C. Find two numbers whose product is "c" and whose sum is "b"
- D. Write the two factors.
- E. Divide each of the constants by the original "a"
- F. If the fraction can be simplified, do so, if not, move the denominator to become the new coefficient of the variable in that particular factor.

A.
$$5x^2 + 27x + 10$$

$$(5x^2 + 27x) = (10) = (10)$$

(multiply 5•10. Drop the 5 from the x² and replace the 10 with your answer.)

$$= (x+25)(x+2)$$

(find factors of 50 that add up to 27.)
Write out the two factors)

$$= (x + \frac{25}{5})(x + \frac{2}{5})$$

(Divide each constant term by 5 (the original "a")

$$= (x+5)(5x+2)$$

(Simplify, if possible. If not move the "denominator" so that it becomes the coefficient of the x term.)

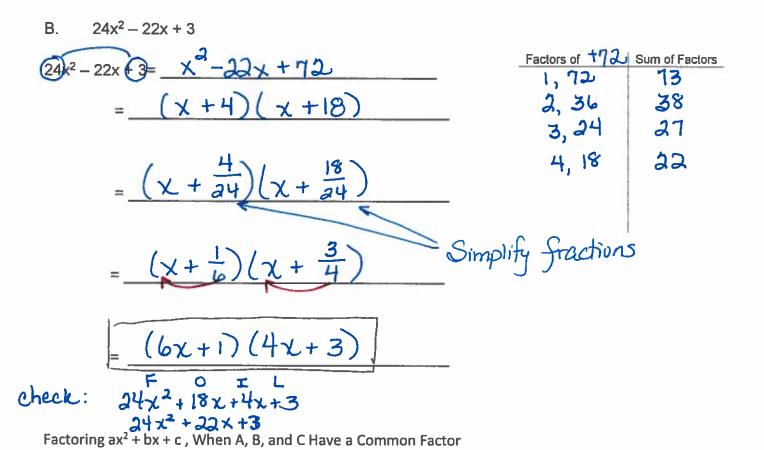
Check by multiplying the two factors.

$$5x 2$$

 $5x^{2} 2x$
 $525x 10$

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C.
$$4x^2 + 24x + 32 = 4 \cdot (x^2 + 6x + 8)$$

= $4(x+2)(x+4)$

=

Factor out the common factor

Factors of 8	Sum of Factors
1, 8	9
2,4	6

DON'T FORGET TO BRING DOWN YOUR COMMON FACTOR!!!!!

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Practice:

1.
$$3x^2 + 26x + 35 =$$
 _______ Factors of Sum of Factors = ______ = ______

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A polynomial that cannot be written as a product of

two polynomials with integral coefficients

D.
$$3x^2 + 7x - 5$$

$$3x^2 + 7x - 5$$
 $\chi^2 + 7x - 15$

There are $\underline{10}$ factors whose sum is $\underline{1}$. Therefore,

Factors of 💳	5	Sum of Factors
-1, 15		14
-3, 5		ک

E.
$$3x^2 - 5x + 3$$

$$x^{2} - 5x + 9$$

Prime polynomial (no factors of 9 add up to -5)

Solving Equations By Factoring

$$18c^{2} - 19c - 8 = 3c^{2} - 5c$$

$$3c^{2} + 5c - 3c^{2} + 5c$$

C-140-120=0

$$(C+\frac{6}{15})(C-\frac{20}{15})=0$$

$$(c+\frac{2}{3})(c-\frac{4}{3})=0$$

$$\frac{-2}{5c/} = -2, \qquad \frac{3c}{3}$$

Rewrite so one side equals 0.

Factors of 120	Sum of Factors
1, -120	-119
2,-60	- 58
3, -40	- 37
4,-30	-26
5,-24	-19
6,-20	-14
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Practice:

5.	$2a^2 - 11a + 7$
	$a^2 - 11a + 14$
	Prime Polynomial

6. Solve
$$(2x^2 + 19x + 5) = 0$$

 $x^2 + 19x + 60 = 0$
 $(x + 4)(x + 15) = 0$
 $(x + 4)(x + 5/4) = 0$

Factors of 60	Sum of Factors
1,60	6
2,30	32
3,20	23
4,15	19

The solution set is

7. Solve
$$6a^{2} + 7a(-20) = 0$$

$$a^{2} + 7a(-120) = 0$$

$$(a - 8)(a + 15) = 0$$

$$(a - 413)(a + 512) = 0$$

$$\frac{3a-4}{3} = 0 \text{ OR } 2a+5 = 0$$

$$\frac{3a-4}{3} = 4$$

$$\frac{3a-4}{3} = 4$$

$$\frac{3a-4}{3} = -5$$

$$\frac{3a-4}{3} = -5$$
The solution set is $\frac{5}{4}$ $\frac{4}{3}$, $-\frac{5}{2}$.

Factors of	Sum of Factors
-1, 120	119
-2,60	58
- 3,40	137
-4,30	27
- 5, 24	19
-6,20	1 .14
-8,15	Ч