Algebra 1 8.5

Use the distributive property to factor polynomials

Solve quadratic equations by factoring

quadratic

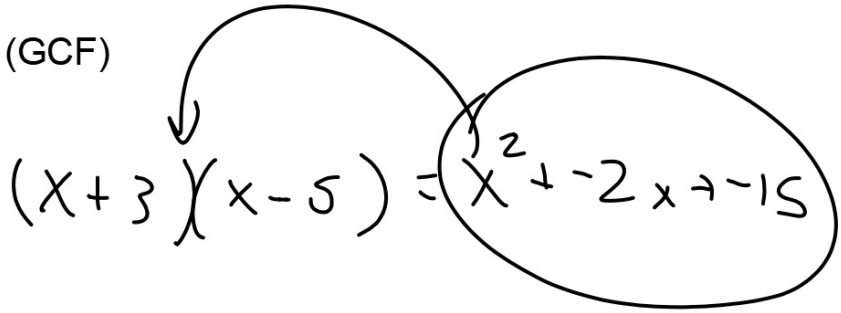
factor

distributive property

greatest common factor (GCF)

zero product property

whiteboards



GuidedPractice tor:

1A. $\frac{15w}{3} - \frac{3v}{3}$

$3(5w - v)$

What is GCF?
What is leftover?
Backwards distributive property

factoring

b. $\frac{-4a^2b}{2ab} - \frac{8ab^2}{2ab} + \frac{2ab}{2ab}$

$2ab(-2a-4b^2+1)$

Factor:
What is the GCF?

1B. $7u^2t^2 + 21ut^2 - ut$

Factor

$ut(7ut + 21t - 1)$

Example 2 Factor by Grouping

Factor $4qr + 8r + 3q + 6$.

$4r(q + 2) + 3(q + 2)$

$(q + 2)(4r + 3)$

Factor each polynomial.

2A. $rn + 5n - r - 5$

$n(r+5) - 1(r+5)$

$(r+5)(n-1)$

Might need to factor out (-)

2B. $3np + 15p - 4n - 20$

$(3p)(3p)(+4)(+4)(-4)(-4)$

$3p(n+5) - 4(n+5)$

$(n+5)(3p-4)$

Close but not quite...can you factor out (-) to make it work?

Example 3 Factor by Grouping with Additive Inverses

Factor $2mk - 12m + 42 - 7k$.

$(2m \quad 2m \quad -7 \quad -7)$

$2m(k-6) - 7(-6+k)$

$(k-6)(2m-7)$

Close but not... can you factor out (-) to make it work?

Factor each polynomial.

3A. $c - 2d + 8d - 4$

$(c \quad c \quad -4 \quad -4)$

$c(1-2d) \overline{+} 4(-2d+1)$

$(1-2d)(c \overline{+} 4)$

3B. $3p - 2p^2 - 18p + 27$

( )( ) = 0

KeyConcept Zero Product Property

Words	If the product of two factors is 0, then at least one of the factors must be 0.
Symbols	For any real numbers a and b, if $ab = 0$, then $a = 0$, $b = 0$, or both a and b equal zero.

( )( ) = 0

Example 4 Solve Equations

Solve each equation. Check your solutions.

a. $(2d + 6)(3d - 15) = 0$

$2d+6=0$ $\quad$ $3d-15=0$

$-6\ -6$ $\quad$ $+15\ +15$

$\frac{2d}{2} = \frac{-6}{2}$ $\quad$ $\frac{3d}{3} = \frac{15}{3}$

$d = -3$ $\quad$ $d = 5$

GuidedPractice

4A. $(3n)(n+2)=0$

$\frac{3n}{3}=\frac{0}{3}$

$n=0$

$n+2=0$

$-2 \quad -2$

$n=-2$

4B. $8b^2 - 40b = 0$

$\frac{8b}{8b} \quad \frac{40b}{8b}$

$8b(b - 5) = 0$

$\downarrow \qquad \downarrow$

$\frac{8b}{8} = \frac{0}{8}$ $\qquad$ $b - 5 = 0$

$b = 0$ $\qquad$ $+5 \quad +5$

$b = 5$

Is it a product?

$8b^2 - 40b = 0$

$8 \cdot 0^2 - 40 \cdot 0 \overset{?}{=} 0$ ✓

$8 \cdot 5^2 - 40 \cdot 5 = 0$

$200 - 200 = 0$ ✓

must be in factored form...
= 0

( )( ) = 0

b. $c^2 = 3c$

$-3c \quad -3c$

$c^2 - 3c = 0$

$\frac{}{c} \quad \frac{}{c}$

$c(c - 3) = 0$

$c = 0 \quad c - 3 = 0$

$c = 3$

4C. $x^2 = -10x$

$+10x \quad +10x$

$$\frac{x^2}{x} + \frac{10x}{x} = 0$$

$$x(x + 10) = 0$$

$x = 0$ $\quad x + 10 = 0$

$-10 \quad -10$

$x = -10$

$$\underline{x}^2 + \underline{6x} = 0$$
$$\underline{x} \quad \underline{x}$$

$$x(x+6) = 0$$

$x = 0$ $\quad x + 6 = 0$

$-6 \quad -6$

$x = -6$

$$(\quad)(\quad) = 0$$

$x^2 = 4x$

$-4x \quad -4x$

$$\underline{x}^2 - \underline{4x} = 0$$
$$\underline{x} \quad \underline{x}$$

$$x(x-4) = 0$$

$x = 0$ $\quad x - 4 = 0$

$x = 4$

$(2a+5)(3a-4)=0$

↓ ↓

8.5 p. 498

15-43 odd