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Homework SOLUTIONS

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Questions: 10, 13, 15ab, 21ce

maybe 19 and 20

10. Copy and complete.

a) $(w + 3)(w + 2) = w^2 + \square w + 6$ **Multiply**   **Add**

$+3, +2$

add

$\boxed{+5}$

b) $(x + 5)(x + \square) = x^2 + \bigcirc x + 10$ **Multiply**   **Add**

$+5 + = \boxed{+2}$

$+5 \times \boxed{+2} = 10$

sign on largest

c) $(y + \bigcirc)(y + \square) = y^2 + 12y + 20$ **Multiply**   **Add**

$2 \quad 10$

$\bigcirc \times \square = 20$

$\bigcirc + \square = 12$

$+1 \times +20$

$+2 \times +10$

$+4 \times +5$

same

13. Find and correct the errors in each expansion.

a) $(r - 13)(r + 4) = r(r + 4) - 13(r + 4)$
$$= r^2 + 4r - 13r + 52$$
$$= r^2 + 9r + 52$$

b) $(s - 15)(s - 5) = s(s - 15) + 15(s + 5)$
$$= s^2 - 15s + 15s + 75$$
$$= s^2 + 75$$

15. Factor. Check by expanding.

a) $12 + 13k + k^2$

1ast

middle

$\times$

$+$

$k^2 + 13k + 12$

$+12$

$+13$

$+1 \times +12$

$(k+1)(k+12)$

2×6

3×4

b) $-16 - 6g + g^2$

$g^2 - 6g - 16$

$(g - 8)(g + 2)$

c) $60 + 17y + y^2$

$y^2 + 17y + 60$

d) $72 - z - z^2$

$z^2 - z - 72$

19. Find an integer to replace □ so that each trinomial can be factored. How many integers can you find each time?

a) $x^2 + \square x + 10$

b) $a^2 + \square a - 9$

c) $t^2 + \square t + 8$

d) $y^2 + \square y - 12$

e) $h^2 + \square h + 18$

f) $p^2 + \square p - 16$

20. Find an integer to replace ☐ so that each trinomial can be factored. How many integers can you find each time?

a) $r^2 + r + \square$

b) $h^2 - h + \square$

c) $b^2 + 2b + \square$

d) $z^2 - 2z + \square$

e) $q^2 + 3q + \square$

f) $g^2 - 3g + \square$

21. Factor.

c) $4x^2 + 4x - 48$

$4(x^2 + 1x - 12)$

$\underbrace{\qquad\qquad\qquad}_{\text{simple trinomial}}$

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

x	add
-12	+1

-1×12
-2×6
$\boxed{-3 \times 4}$

e) $-5n^2 + 40n - 35$

a) $4y^2 - 20y - 56$

b) $-3m^2 - 18m - 24$

d) $10x^2 + 80x + 120$

f) $7c^2 - 35c + 42$

Factoring Trinomials

⊕ same
⊖ different

#1

Sign on yer larger factor

Simple trinomial

$$1x^2 - 17x + 42$$

last
mult   middle add

+42   -17

$$(x-3)(x-14)$$

- 1 x -42
- 2 x -21
- 3 x -14
- 6 x -7

#2
last   middle
mult | add

-38 | -17

+1x-38
+2x-19

Sign on largest

⊕ same
⊖ different

$$x^2 - 17x - 38$$

$$(x+2)(x-19)$$

#3

$$4x^2 + 5x - 6$$

Hard trinomial
Decomposition

DECOMPOSITION

If there is a *numerical coefficient* in front of x^2, then we use a method for factoring called DECOMPOSITION.

$$4x^2 + 5x - 6$$

Hard Trinomials

- has <u>three</u> terms with the form...

$$ax^2 + bx + c$$

- a hard trinomial has an "a" value **not equal to 1**.

- we use a method of <u>decomposition</u> to factor them.

DECOMPOSITION METHOD

- here's how it goes... "What two numbers?"

Adds to get "b"

$$ax^2 + bx + c$$

Multiplies to get "a" times "c"

- once you find the two numbers, use them to break the MIDDLE TERM into two pieces (decomposition).

- then, factor by grouping.

Multiply

$\oplus$ same
$\ominus$ different

$4x^2 + 5x - 6$

Sign on largest factor

fist × last
(4)(-6)
multiply
-24

middle add
+5

$-1 \times {}^+ 24$
$-2x {}^+ 12$
$-3x {}^+ 8$
$-4x {}^+ 6$

$\_ + \_ = \blacksquare$
$\_ \times \_ = \blacksquare$

• Break down middle term using factors

$= 4x^2 + 8x - 3x - 6$

pull out gcf

$= 4x(x+2) - 3(x+2)$

factor out common bracket

$= (x+2)(4x-3)$

Always check the following when you are asked to factor:

1) G.C.F (# and Letters) {if not....}
2) Simple Trinomial
3) Hard Trinomial ...

**Factor Completely!** largest is ⊕ both sam

1. $2x^2 + 5x + 3$

I think I need to use decomposition!

first × last — multiply   middle — add

$+6$ $+5$

$+1 \times +6$
$+2 \times +3$

Decompose middle term
→ rewrite middle # using factors

$= \quad 2x^2 + 2x + 3x + 3$

factor GCF out   factor out GCF

$= \quad 2x(x+1) + 3(x+1)$

• factor out common bracket

$= \quad (x+1)(2x+3)$

__Factor Completely!__

largest

① same
⊖ different

mult
$1^{st} \times last$

-30
-1×80
-2×15
-5×10
-5×6

add
middle
$+13$

2. $10x^2 + 13x - 3$

$10x^2 - 2x + 15x - 3$

$2x(5x - 1) + 3(5x - 1)$

$(5x - 1)(2x + 3)$

We love Math!

$\dfrac{+}{-} \dfrac{}{-} = \dfrac{}{}$

$\dfrac{}{-} X \dfrac{}{-} =$

$10x^2 + 15x - 2x - 3$

$5x(2x + 3) - 1(2x + 3)$

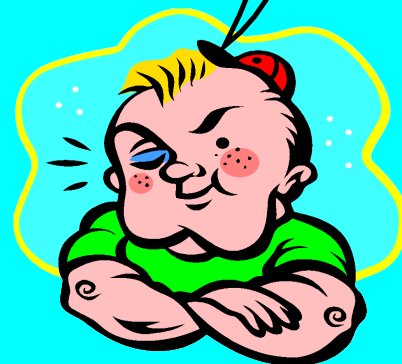$(2x + 3)(5x - 1)$

★ 4. $2x^2+6x+4$ ★

GCF first

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

simple

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

I suppose she wants me to do two types of factoring!

3.6   Polynomials of the Form $ax^2 + bx + c$

Homework

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Questions: 8, 13, 15, 19

$13(a, b)$