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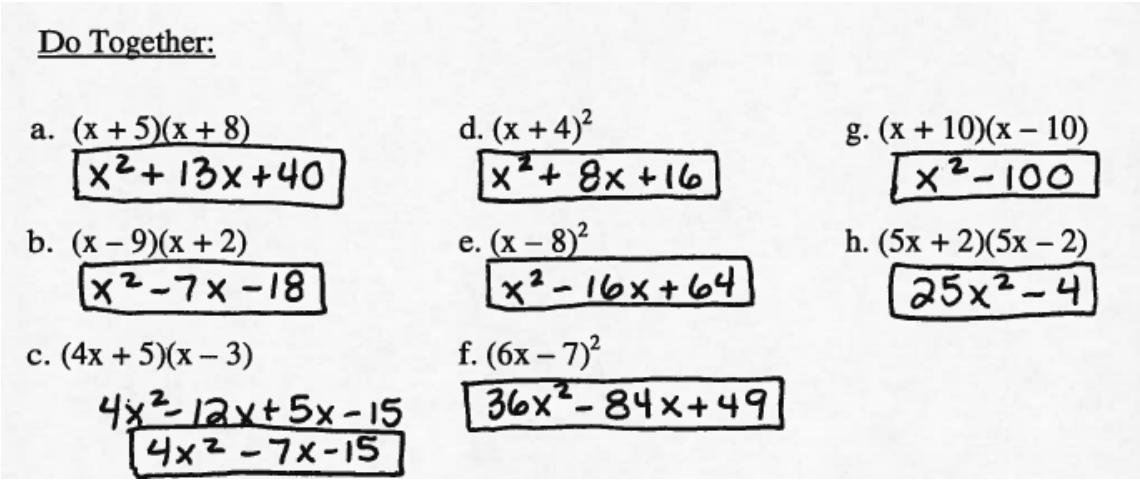


Do Together:

a. $(x+5)(x+8)$
$x^2+13x+40$

b. $(x-9)(x+2)$
$x^2-7x-18$

c. $(4x+5)(x-3)$
$4x^2-12x+5x-15$
$4x^2-7x-15$

d. $(x+4)^2$
$x^2+8x+16$

e. $(x-8)^2$
$x^2-16x+64$

f. $(6x-7)^2$
$36x^2-84x+49$

g. $(x+10)(x-10)$
x^2-100

h. $(5x+2)(5x-2)$
$25x^2-4$

1. $(x+2)(x+3)$
x^2+5x+6

2. $(x-4)(x-5)$
$x^2-9x+20$

3. $(x+6)(x-8)$
$x^2-2x-48$

4. $(x-3)(x+5)$
$x^2+2x-15$

5. $(x+4)(x-6)$
$x^2-2x-24$

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

7. $(x+3)^2$
x^2+6x+9

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

9. $(x+7)^2$
$x^2+14x+49$

10. $(x-10)^2$
$x^2-20x+100$

11. $(x+1)^2$
x^2+2x+1

12. $(3x-5)^2$
$9x^2-30x+25$

13. $(x+9)(x-9)$
x^2-81

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

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

16. $(x+12)(x-12)$
x^2-144

17. $(x+1)(x-1)$
x^2-1

18. $(4x+3)(4x-3)$
$16x^2-9$

$16x^2-12x+12x-9$

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

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

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

$x^2-10x-10x+100$

$x^2-20x+100$

Sample Exam Questions

Standard A1.1.1

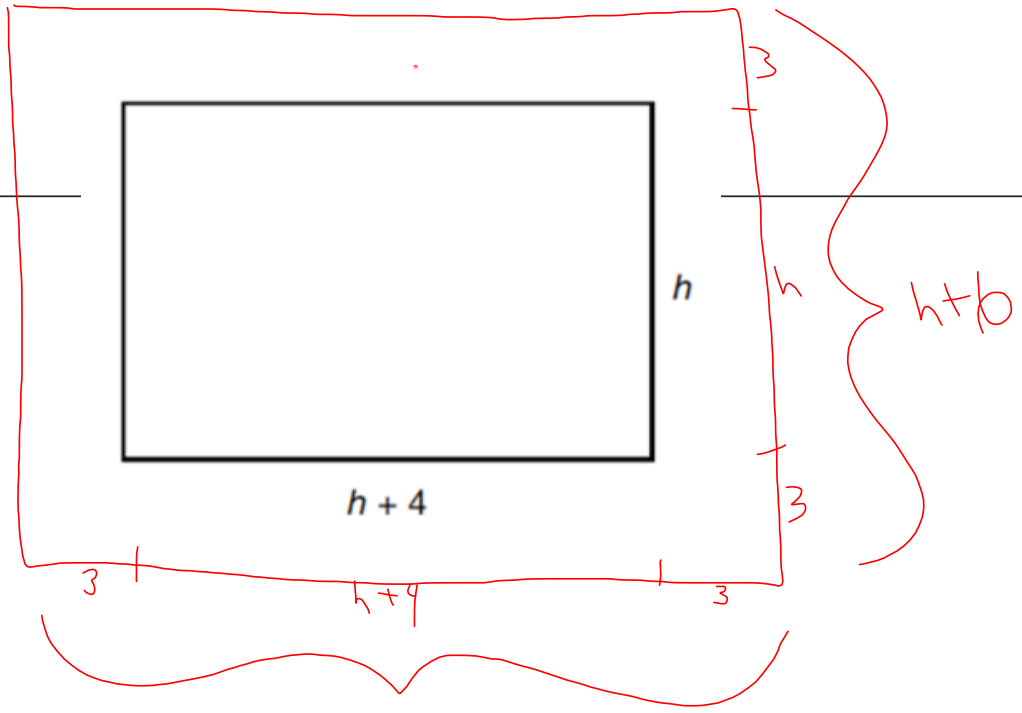
Keng creates a painting on a rectangular canvas with a width that is four inches longer than the height, as shown in the diagram below.

A. Write a polynomial expression, in simplified form, that represents the area of the canvas.

$h(h+4)$

Keng adds a 3-inch-wide frame around all sides of his canvas.

B. Write a polynomial expression, in simplified form, that represents the **total area** of the canvas and the frame.



$h + 10$

$(h+6)(h+10)$

$h^2 + 16h + 60$

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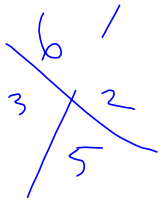
8–5 Factoring Trinomials of the Type $x^2 + bx + c$

Factoring a trinomial means reversing the answer of a FOIL problem back to the $(x + a)(x + b)$ that made it. In order to go backwards it is helpful to look at the answers you get when multiplying forwards.

Given $(x + 2)(x + 3)$, you get the answer $x^2 + 5x + 6$

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



Notice the middle coefficient is $2 + 3$
and the end constant is $2 \cdot 3$

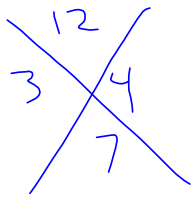
Knowing this will always happen helps you to work backwards!

Example 1: Factoring $x^2 + bx + c$

To factor this trinomial, you must find two numbers which multiply to 12 and add to 7. (Hint: A diamond problem can help you think of the numbers.)

Factor: $x^2 + 7x + 12$

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



Step 1: Set up a diamond.

Step 2: Find the side numbers.

Step 3: Write the factors using the numbers you found.

Step 4: Multiply to check

Factor each expression:

1. $x^2 + 21x + 20$ $(x+20)(x+1)$

2. $a^2 + 13a + 30$ $(a+3)(a+10)$

3. $d^2 - 17d + 42$ $(d-3)(d-14)$

4. $m^2 + 6m - 27$ $(m-3)(m+9)$

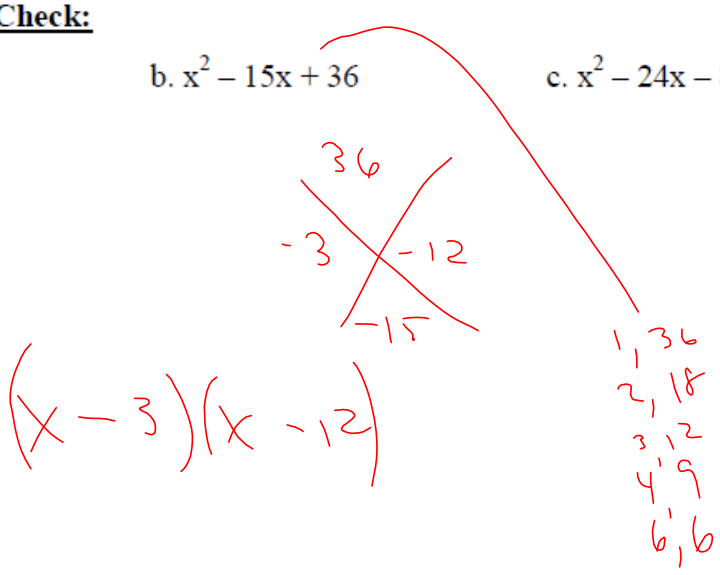
5. $p^2 - 3p - 18$ $(p-6)(p+3)$

6. $y^2 - y - 56$ $(y+7)(y-8)$

Hint*** Check your answers by multiplying them forward again!

√ Understanding Check:

a. $g^2 + 12g + 32$ b. $x^2 - 15x + 36$ c. $x^2 - 24x - 81$



√ Understanding Check:

a. $g^2 + 12g + 32$

32
8 4
12

$(g+8)(g+4)$

b. $x^2 - 15x + 36$

36
-3 -12
-15

$(x-3)(x-12)$

c. $x^2 - 24x - 81$

-81
-27 3
-24

$(x-27)(x+3)$

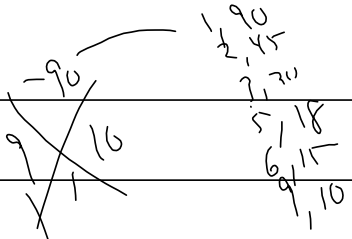
Factor each completely.

1) $b^2 + 8b + 7$

$(b+1)(b+7)$

2) $n^2 - 11n + 10$

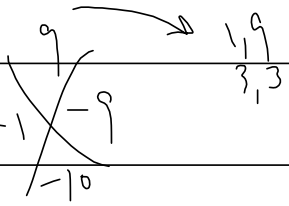
3) $m^2 + m - 90$



$(m-9)(m+10)$

4) $n^2 + 4n - 12$

5) $n^2 - 10n + 9$



$(n-1)(n-9)$

6) $b^2 + 16b + 64$

7) $m^2 + 2m - 24$

8) $x^2 - 4x + 24$

9) $k^2 - 13k + 40$

10) $a^2 + 11a + 18$

11) $n^2 - n - 56$

12) $n^2 - 5n + 6$

13) $b^2 - 6b + 8$

14) $n^2 + 6n + 8$

15) $2n^2 + 6n - 108$

16) $5n^2 + 10n + 20$

17) $2k^2 + 22k + 60$

18) $a^2 - a - 90$

19) $p^2 + 11p + 10$

20) $5v^2 - 30v + 40$

21) $2p^2 + 2p - 4$

22) $4v^2 - 4v - 8$

23) $x^2 - 15x + 50$

24) $v^2 - 7v + 10$

25) $p^2 + 3p - 18$

26) $6v^2 + 66v + 60$

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Example 3: Factoring the Difference of Squares for a = 1

The answer to $(a+b)(a-b)$ is always $a^2 - b^2$. Knowing this pattern will help you factor quickly.

Factor: $x^2 - 64$

√ Understanding Check:

Factor:

a. $x^2 - 16$ b. $k^2 - 25$ c. $9x^2 - 100$ d. $x^2 - 1$

e. $x^2 - 36$ f. $36g^2 - 100$ g. $w^2 - 676$ h. $49x^2 - 289$

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

b. $k^2 - 25$ $(k+5)(k-5)$

c. $9x^2 - 100$ $(3x+10)(3x-10)$

d. $x^2 - 1$ $(x+1)(x-1)$

e. $x^2 - 36$ $(x+6)(x-6)$

f. $36g^2 - 100$ $(6g+10)(6g-10)$

g. $w^2 - 676$ $(w+26)(w-26)$

h. $49x^2 - 289$ $(7x+17)(7x-17)$

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