

Math 10

Lesson 2–3 Answers

Lesson Questions

Question 1

If possible, factor each trinomial.

a) $x^2 + 5x + 6$

two factors of 6 that add up to 5

$$3 \cdot 2 = 6$$

$$3 + 2 = 5$$

$$\begin{aligned}x^2 + 5x + 6 &= x^2 + 3x + 2x + 6 \\&= (x^2 + 3x) + (2x + 6) \\&= x(x + 3) + 2(x + 3) \\&= (x + 3)(x + 2)\end{aligned}$$

b) $x^2 - 29x + 28$

two factors of 28 that add up to -29

$$-1(-28) = 28$$

$$-1 + -28 = -29$$

$$\begin{aligned}x^2 - 29x + 28 &= x^2 - 28x - x + 28 \\&= (x^2 - 28x) + (-x + 28) \\&= x(x - 28) - 1(x - 28) \\&= (x - 28)(x - 1)\end{aligned}$$

c) $x^2 - 3xy - 18y^2$

two factors of -18 that add up to -3

$$-6(3) = -18$$

$$-6 + 3 = -3$$

$$\begin{aligned}x^2 - 3xy - 18y^2 &= x^2 - 6xy + 3xy - 18y^2 \\&= (x^2 - 6xy) + (3xy - 18y^2) \\&= x(x - 6y) + 3y(x - 6y) \\&= (x - 6y)(x + 3y)\end{aligned}$$

Question 2

If possible, factor each trinomial

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

$$2 \cdot -4 = -8$$

two factors of -8 that add up to 7

$$-1(8) = -8$$

$$-1 + 8 = 7$$

$$\begin{aligned}2x^2 + 7x - 4 &= (2x^2 + 8x) + (-x - 4) \\&= 2x(x + 4) - 1(x + 4) \\&= (2x - 1)(x + 4)\end{aligned}$$

b) $-3s^2 - 51s - 30$

1st there is a GCF of -3

$$-3(s^2 + 17s + 10)$$

two factors of 10 that add up to 17

Not possible!

$$\begin{aligned}-3s^2 - 51s - 30 &= -3(s^2 + 17s + 10)\end{aligned}$$

c) $3x^2 + x - 4$

$$3 \cdot -4 = -12$$

two factors of -12 that add up to 1

$$-3(4) = -12$$

$$-3 + 4 = 1$$

$$\begin{aligned}3x^2 + x - 4 &= (3x^2 - 3x) + (4x - 4) \\&= 3x(x - 1) + 4(x - 1) \\&= (x - 1)(3x + 4)\end{aligned}$$

Question 3

If possible, factor each trinomial

a) $x^2 + 7x + 10$

two factors of 10 that add up to 7

$$2(5) = 10$$

$$2 + 5 = 7$$

$$\begin{aligned}x^2 + 7x + 10 &= (x + 2)(x + 5)\end{aligned}$$

Note: for any equation $ax^2 + bx + c$, if $a = 1$ we do not have to decompose, we can write the factored form directly!! Check it out!!

b) $6x^2 - 5xy + y^2$

two factors of 6 that add up to -5

$$-2(-3) = 6$$

$$-2 + -3 = -5$$

$$\begin{aligned}6x^2 - 5xy + y^2 &= (6x^2 - 2xy) - (3xy + y^2) \\&= 2x(3x - y) - y(3x - y) \\&= (2x - y)(3x - y)\end{aligned}$$

c) $2y^2 + 7xy + 3x^2$

two factors of 6 that add up to 7

$$6(1) = 6$$

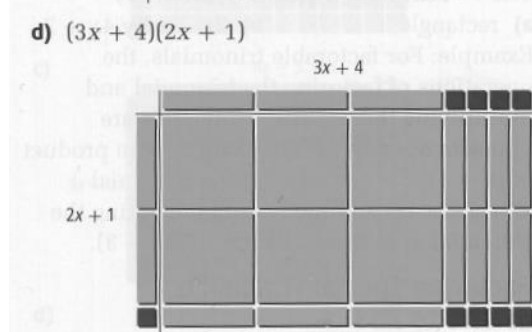
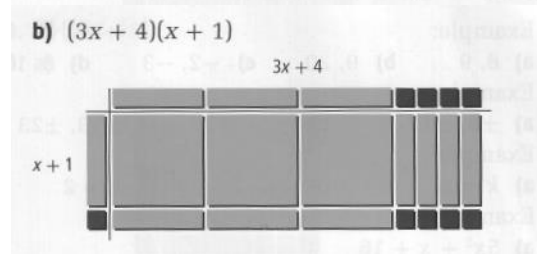
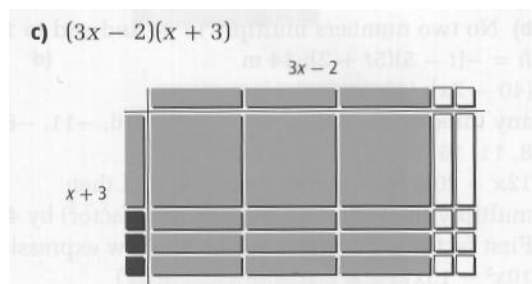
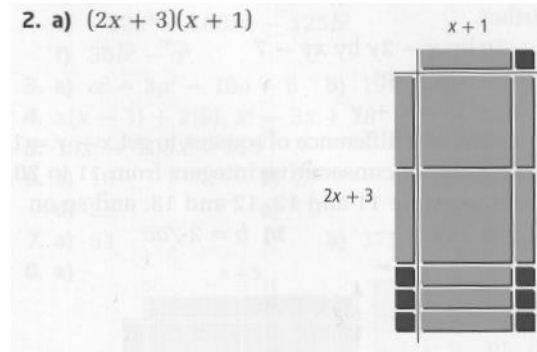
$$6 + 1 = 7$$

$$\begin{aligned}2y^2 + 7xy + 3x^2 &= (2y^2 + 6xy) + (xy + 3x^2) \\&= 2y(y + 3x) + x(y + 3x) \\&= (2y + x)(y + 3x)\end{aligned}$$



Assignment

- $x^2 + 4x + 3; (x + 1)(x + 3)$
 - $x^2 + 2x + 1; (x + 1)(x + 1)$
 - $x^2 + x - 2; (x + 2)(x - 1)$
 - $x^2 + 5x + 4; (x + 4)(x + 1)$



- $(x + 2)(x + 5)$
 - $(j + 3)(j + 9)$
 - $(k + 4)(k + 1)$
 - not factorable
 - $(d + 6)(d + 4)$
 - not factorable
- $(m - 5)(m - 2)$
 - $(s + 5)(s - 2)$
 - $(f - 6)(f - 1)$
 - $(g - 7)(g + 2)$
 - $(b - 4)(b + 1)$
 - $2(r - 3s)(r - 4s)$
- | | |
|-----------------------|-----------------------|
| a) $(2x + 5)(x + 1)$ | b) $(3y + 8)(2y + 1)$ |
| c) $(3m + 4)(m + 2)$ | d) not factorable |
| e) $(4q + 3)(3q + 2)$ | f) $(3x + y)(x + 2y)$ |
- | | |
|------------------------|-----------------------|
| a) $(4x - 3)(x - 2)$ | b) not factorable |
| c) $(x - 2)(x - 3)$ | d) $(2m - 3)(m + 3)$ |
| e) $3(2x + y)(x - y)$ | f) $(4y - 1)(3y + 1)$ |
| g) $(6c - 5d)(c + 2d)$ | h) $(k + 3)(4k + 3)$ |
| i) $(a + 3b)(a + 8b)$ | j) $(6m + n)(m + 2n)$ |

7. a) $x + 10$ and $x + 8$; 25 cm by 23 cm
b) $3x + 8$ and $2x - 1$; 53 cm by 29 cm
8. $h = -(t - 5)(5t + 2)$; 34 m
9. First factor out 3. Then, factor the new expression $10x^2 - 13xy - 3y^2$
 $3(5x + y)(2x - 3y)$
10. $h = -16(t - 10)(t + 1)$; 465 ft