Math 10

Lesson 2–2 Answers

Lesson Questions

Question 1

Determine each product.

a) $(x - 3)(x - 5)$
$= x(x - 5) - 3(x - 5)$
$= x^2 - 5x - 3x + 15)$
$= x^2 - 8x + 15$

b) $(5m - 1)(2m - 6)$
$= 5m(2m - 6) - 1(2m - 6)$
$= 10m^2 - 30m - 2m + 6)$
$= 10m^2 - 32m + 6$

Question 2

Determine each product.

a) $(r - 4)(3r^2 + 8r - 6)$
$= r(3r^2 + 8r - 6) - 4(3r^2 + 8r - 6)$
$= r(3r^2 + 8r - 6) - 4(3r^2 + 8r - 6)$
$= 3r^3 + 8r^2 - 6r - 12r^2 - 32r + 24$
$= 3r^3 - 4r^2 - 38r + 24$

b) $(5x - 3)(2x^2 - 6x + 12)$
$= 5x(2x^2 - 6x + 12) - 3(2x^2 - 6x + 12)$
$= 5x(2x^2 - 6x + 12) - 3(2x^2 - 6x + 12)$
$= 10x^3 - 30x^2 + 60x - 6x^2 + 18x - 36$
$= 10x^3 - 36x^2 + 78x - 36$

Question 3

Multiply and then combine like terms.

a) $(x + 3)(5x - 2) + 4(x - 1)(2x + 5)$
$= 5x^2 + 13x - 6 + 4(2x^2 + 3x - 5)$
$= 5x^2 + 13x - 6 + 8x^2 + 12x - 20$
$= 13x^2 + 25x - 26$

b) $2(3x - 2) - (4x + 7)(2x - 5)$
$= 6x - 4 - (8x^2 - 20x + 14x - 35)$
$= 6x - 4 - 8x^2 + 20x - 14x + 35$
$= -8x^2 + 12x + 31$

Question 4

When you have three factors, you can multiply in any order.
Multiply $3(2x + 4)(6x - 2)$ in three ways.

$3(2x + 4)(6x - 2)$ $= 3(12x^2 - 4x + 24x - 8)$ $= 36x^2 - 12x + 72x - 24$ $= 36x^2 + 60x - 24$	$3(2x + 4)(6x - 2)$ $= (6x + 12)(6x - 2)$ $= 36x^2 - 12x + 72x - 24$ $= 36x^2 + 60x - 24$	$3(2x + 4)(6x - 2)$ $= (2x + 4)3(6x - 2)$ $= (2x + 4)(18x - 6)$ $= 36x^2 - 12x + 72x - 24$ $= 36x^2 + 60x - 24$

Question 5

a) Let x represent the length of the red square. The length of the painting can be represented by x + 30 + 30 = x + 60. The area of the painting can be represented by the polynomial expression
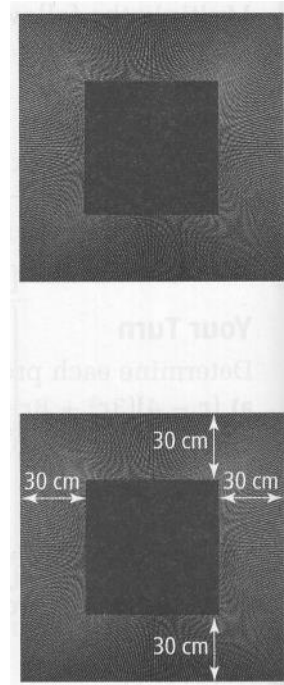$(x + 60)(x + 60) = x^2 + 120x + 3600$.

b) If the red square has an area of 3600 cm^2, the side length of the red square is, $x = \sqrt{3600} = 60$. Substitute this value into either $(x + 60)(x + 60)$ or $x^2 + 120x + 3600$.
$(x + 60)(x + 60)$
$= (60 + 60)(60 + 60)$
$= (120)(120)$
$= 14\ 400$

or

$x^2 + 120x + 3600$
$= (60)^2 + 120(60) + 3600$
$= 3600 + 7200 + 3600$
$= 14\ 400$

The area of the painting is 14 400 cm^2.
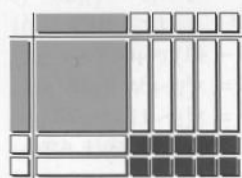
Assignment

1. a)
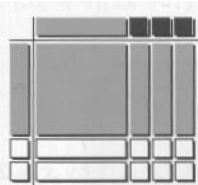
$x^2 + x - 6$

b)
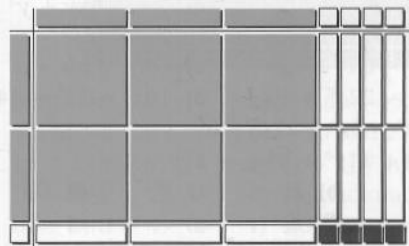
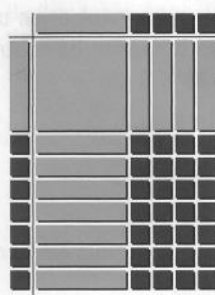

$6x^2 - 11x + 4$

c)

$x^2 - 7x + 10$

d)

$x^2 + 6x + 9$

e)

$x^2 + 11x + 28$

f)
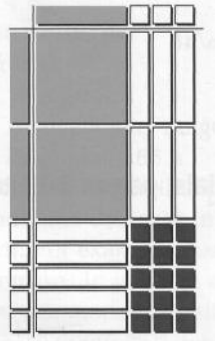
$2x^2 - 11x + 15$

2. a) $(x+5)(x-2)$
    $= x(x-2) + 5(x-2)$
    $= x^2 - 2x + 5x - 10$
    $= x^2 + 3x - 10$

   b) $(x-3)^2$
    $= (x-3)(x-3)$
    $= x(x-3) - 3(x-3)$
    $= x^2 - 3x - 3x + 9$
    $= x^2 - 6x + 9$

   c) $(c-d)(c+d)$
    $= c(c+d) - d(c+d)$
    $= c^2 + cd - cd + d^2$
    $= c^2 - d^2$

   d) $(4x+y)(x+y)$
    $= 4x(x+y) + y(x+y)$
    $= 4x^2 + 4xy + xy + y^2$
    $= 4x^2 + 5xy + y^2$

   e) $(y+3)^2$
    $= (y+3)(y+3)$
    $= y^2 + 3y + 3y + 9$
    $= y^2 + 6y + 9$

   f) $(4j+2k)(6j-3k)$
    $= 24j^2 - 12jk + 12jk - 6k^2$
    $= 24j^2 - 6k^2$

3. a) $3x^3 - 5x^2 + 8x$ b) $7ab^2 + ab - a$

    c) $(x-3)(6x^2 - 4x - 12)$
       $= x(6x^2 - 4x - 12) - 3(6x^2 - 4x - 12)$
       $= 6x^3 - 4x^2 - 12x - 18x^2 + 12x + 36$
       $= 6x^3 - 22x^2 + 36$

    d) $(2x-1)(5x^2 + 4x - 5)$
       $= 2x(5x^2 + 4x - 5) - 1(5x^2 + 4x - 5)$
       $= 10x^3 + 8x^2 - 10x - 5x^2 - 4x + 5$
       $= 10x^3 + 3x^2 + 14x + 5$

    e) $(4s^2 + s)(3s^2 - 2s + 6)$
       $= 12s^4 - 8s^3 + 24s^2 + 3s^3 - 2s^2 + 6s$
       $= 12s^4 - 5s^3 + 22s^2 + 6s$

    f) $\left(2y^2 + 3y - 1\right)\left(y^2 + 4y + 5\right)$
       $= 2y^2\left(y^2 + 4y + 5\right) + 3y\left(y^2 + 4y + 5\right) - 1\left(y^2 + 4y + 5\right)$
       $= 2y^4 + 8y^3 + 10y^2 + 3y^3 + 12y^2 + 15y - y^2 - 4y - 5$
       $= 2y^4 + 11y^3 + 21y^2 + 11y - 5$

4. a) B   b) H   c) F   d) D
    e) J   f) E   g) A   h) G

5. a) $(4n+2) + (2n-3)(3n-2)$
       $= 4n + 2 + (6n^2 - 4n - 9n + 6)$
       $= 4n + 2 + 6n^2 - 4n - 9n + 6$
       $= 6n^2 - 9n + 8$

    b) $(f+7)(2f-4) - (3f+1)^2$
       $= (f+7)(2f-4) - (3f+1)(3f+1)$
       $= 2f^2 - 4f + 14f - 28 - (9f^2 + 3f + 3f + 1)$
       $= 2f^2 - 4f + 14f - 28 - 9f^2 - 3f - 3f - 1$
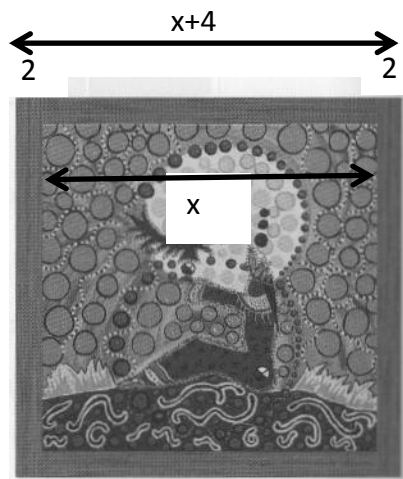 $= -7f^2 + 4f - 29$

    c) $\left(b - 2d\right)\left(5b - 3d\right) + \left(b + d\right)\left(4b + d\right)$
       $= 5b^2 - 3bd - 10bd + 6d^2 + 4b^2 + bd + 4bd + d^2$
       $= 9b^2 - 8bd + 7d^2$

    d) $\left(4x - 2\right)\left(3x - 5\right) + 2\left(7x + 5\right)\left(2x - 6\right)$
       $= 12x^2 - 20x - 6x + 10 + 2(14x^2 - 42x + 10x - 30)$
       $= 12x^2 - 20x - 6x + 10 + 28x^2 - 84x + 20x - 60$
       $= 40x^2 - 90x - 50$

    e) $3\left(5a + 3c\right)\left(2a - 3c\right) - \left(4a + c\right)\left(4a + c\right)$
       $= 3(10a^2 - 9ac - 9c^2) - (16a^2 + 8ac + c^2)$
       $= 30a^2 - 27ac - 27c^2 - 16a^2 - 8ac - c^2$
       $= 14a^2 - 35ac - 28c^2$

    f) $\left(y^2 - 5y - 6\right)\left(4y^2 + 6y + 1\right)$
       $= 4y^4 + 6y^3 + y^2 - 20y^3 - 30y^2 - 5y - 24y^2 - 36y - 6$
       $= 4y^4 - 14y^3 - 53y^2 - 41y - 6$

6. $A = (x + 4)(x + 4)$
    $A = x^2 + 8x + 16$

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7. A = (x − 7)(x − 4); A = x² − 11x + 28

8. The diameter of the circle is 6x + 4. Radius is ½ the diameter

$$\frac{6x+4}{2} = 3x+2$$

$$A = \pi r^2$$

$$A = \pi(3x+2)^2$$

$$A = 9\pi x^2 + 12\pi x + 4\pi$$

9. a) No. Step 3 is incorrect, stop after Step 2.
   b) You can choose any value for p except zero. I chose p = 1. Evaluate the left side and the right side

   $$(2p-3)(p+4) = 2p^2 - 5p - 12$$
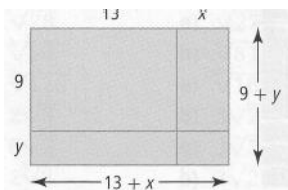
   $$(2(1)-3)(1+4) = 2(1)^2 - 5(1) - 12$$

   $$(-1)(5) = 2 - 5 - 12$$

   $$-5 \neq -15$$

   Therefore the equation is not true.

10. a)

   b) A = (y + 9)(x + 13) c) 154 m²

11. a) x + 2 by x − 1
    b) A = (x + 2)(x − 1) = x² + x − 2
    c) The new rug has the greater area by 1 ft².

12. a) A = (3x + 8)(2x + 4) = 6x² + 28x + 32
    b) 1232 cm²

13. a) In the check, the left side does not equal the right side.
    b) In step 1, Andre multiplied −4 and 5 to get +20. This is actually equal to −20.

14. a) As the price of a burger increases, the average number of burgers sold decreases.
    b) $b = 550 - 100p$

    $$b - 550 = -100p$$

    $$p = \frac{b-550}{-100} \ or \ p = \frac{550-b}{100}$$

    c) $R = np$

    $$R = n\left(\frac{550-b}{100}\right) or \ R = \frac{550n - bn}{100}$$