

W1 – Multiplying Binomials

Unit 3

MPM2D

Jensen

1) Simplify the following expressions

a) $(3x + 4) + (5x + 2)$

$$= 3x + 4 + 5x + 2$$

$$= 3x + 5x + 4 + 2$$

$$= 8x + 6$$

b) $(2 - 3yz) + (7 + 6yz)$

$$= 2 - 3yz + 7 + 6yz$$

$$= -3yz + 6yz + 2 + 7$$

$$= 3yz + 9$$

c) $(5x + 7) - (2x - 1)$

$$= 5x + 7 - 2x + 1$$

$$= 5x - 2x + 7 + 1$$

$$= 3x + 8$$

2) Multiply

a) $(4x)(7x^2)$

$$= 28x^3$$

b) $(-6m^2n^3)(-7mn^2)$

$$= 42m^3n^5$$

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

$$= 18x^5y^4$$

3) Expand and simplify

a) $2(x - 4) + 5(x + 3)$

$$= 2x - 8 + 5x + 15$$

$$= 2x + 5x - 8 + 15$$

$$= 7x + 7$$

b) $4(2x - 7) - 5(4x + 9)$

$$= 8x - 28 - 20x - 45$$

$$= 8x - 20x - 28 - 45$$

$$= -12x - 73$$

c) $4x + 3(2x - 5) + 6(1 - 5x)$

$$= 4x + 6x - 15 + 6 - 30x$$

$$= 4x + 6x - 30x - 15 + 6$$

$$= -20x - 9$$

4) Expand and simplify

a) $(x + 1)(x + 5)$

$$= x^2 + 5x + x + 5$$

$$= x^2 + 6x + 5$$

b) $(x - 4)(x - 3)$

$$= x^2 - 3x - 4x + 12$$

$$= x^2 - 7x + 12$$

c) $(c + 2)(c - 8)$

$$= c^2 - 8c + 2c - 16$$

$$= c^2 - 6c - 16$$

$$\text{d) } (a-3)(2a-5)$$

$$= 2a^2 - 5a - 6a + 15$$

$$= 2a^2 - 11a + 15$$

$$\text{e) } (x-5)(4x+3)$$

$$= 4x^2 + 3x - 20x - 15$$

$$= 4x^2 - 17x - 15$$

$$\text{f) } (3a-5)(3a+5)$$

$$= 9a^2 + 15a - 15a - 25$$

$$= 9a^2 - 25$$

$$\text{g) } 2(x+3)(x+5)$$

$$= (2x+6)(x+5)$$

$$= 2x^2 + 10x + 6x + 30$$

$$= 2x^2 + 16x + 30$$

$$\text{h) } -2(4y+1)(y-3)$$

$$= -2(4y^2 - 12y + y - 3)$$

$$= -2(4y^2 - 11y - 3)$$

$$= -8y^2 + 22y + 6$$

$$\text{i) } (3x+y)(x+4y)$$

$$= 3x^2 + 12xy + xy + 4y^2$$

$$= 3x^2 + 13xy + 4y^2$$

$$\text{j) } (-3a+4b)(2a+3b)$$

$$= -6a^2 - 9ab + 8ab + 12b^2$$

$$= -6a^2 - ab + 12b^2$$

$$\text{k) } (x+6)(x+4) + (x+2)(x+3)$$

$$= x^2 + 4x + 6x + 24 + x^2 + 3x + 2x + 6$$

$$= 2x^2 + 15x + 30$$

$$\text{l) } 2(3x+2)(3x+2) - 3(2x-1)(x+4)$$

$$= 2(9x^2 + 6x + 6x + 4) - 3(2x^2 + 8x - x - 4)$$

$$= 2(9x^2 + 12x + 4) - 3(2x^2 + 7x - 4)$$

$$= 18x^2 + 24x + 8 - 6x^2 - 21x + 12$$

$$= 12x^2 + 3x + 20$$

$$\text{m) } 12 - 2(3y-2)(3y+2) - (2y+5)(y-4)$$

$$= 12 - 2(9y^2 + 6y - 6y - 4) - (2y^2 - 8y + 5y - 20)$$

$$= 12 - 2(9y^2 - 4) - (2y^2 - 3y - 20)$$

$$= 12 - 18y^2 + 8 - 2y^2 + 3y + 20$$

$$= -20y^2 + 3y + 40$$

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

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

$$= 4x^2 + 6x + 6x + 9$$

$$= 4x^2 + 12x + 9$$

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

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

$$= (2x+3)(4x^2+12x+9)$$

$$= 8x^3 + 24x^2 + 18x + 12x^2 + 36x + 27$$

$$= 8x^3 + 36x^2 + 54x + 27$$

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

$$= x^3 + 4x^2 + 3x^2 + 12x - 2x - 8$$

$$= x^3 + 7x^2 + 10x - 8$$

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

$$= x^4 + 3x^3 + 5x^2 - 4x^3 - 12x^2 - 20x + x^2 + 3x + 5$$

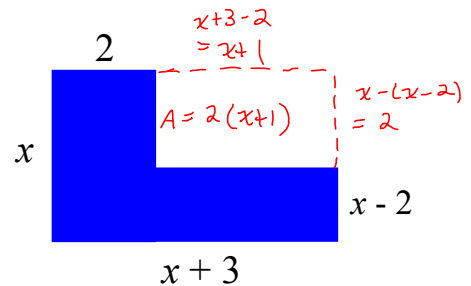
$$= x^4 - x^3 - 6x^2 - 17x + 5$$

6) Write and simplify an expression for the area of the following figure.

$$A = x(x+3) - 2(x+1)$$

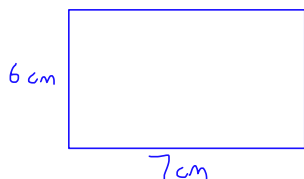
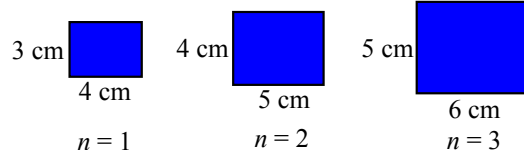
$$= x^2 + 3x - 2x - 2$$

$$= x^2 + x - 2$$



7) The diagrams show the first three rectangles in a pattern.

a) State the area of the 4th rectangle.



$$n = 4$$

$$A = 6(7) = 42 \text{ cm}^2$$

b) Write a product of two binomials to represent the area of the n^{th} rectangle in terms of n .

$$A = (n+2)(n+3)$$

c) State the area of the 28th rectangle

$$\begin{aligned} A &= (28+2)(28+3) \\ &= (30)(31) \\ &= 930 \text{ cm}^2 \end{aligned}$$

Answers

- 1)a) $8x + 6$ b) $3yz + 9$ c) $3x + 8$
2)a) $28x^3$ b) $42m^3n^5$ c) $18x^5y^4$
3)a) $7x + 7$ b) $-12x - 73$ c) $-20x - 9$
4)a) $x^2 + 6x + 5$ b) $x^2 - 7x + 12$ c) $c^2 - 6c - 16$
d) $2a^2 - 11a + 15$ e) $4x^2 - 17x - 15$ f) $9a^2 - 25$
g) $2x^2 + 16x + 30$ h) $-8y^2 + 22y + 6$ i) $3x^2 + 13xy + 4y^2$
j) $-6a^2 - ab + 12b^2$ k) $2x^2 + 15x + 30$
l) $12x^2 + 3x + 20$ m) $-20y^2 + 3y + 40$
5)a) $4x^2 + 12x + 9$ b) $8x^3 + 36x^2 + 54x + 27$
c) $x^3 + 7x^2 + 10x - 8$ d) $x^4 - x^3 - 6x^2 - 17x + 5$
6) $x^2 + x - 2$
7)a) 42 cm^2 b) $A = (n + 2)(n + 3)$ c) 930 cm^2