

4.8 More Multiplying



A. Multiplying

$$1. \quad 2(x+3) - 4(x+5)$$

$$= 2x+6 - 4x-20$$

$$= -2x-14$$

	$x$	$3$
$2$	$2x$	$6$

	$x$	$5$
$-4$	$-4x$	$-20$

$$2. \quad (x+2y)(x-2y) + 3(x+3y)^2$$

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

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

$$= x^2 - 4y^2 + 3x^2 + 18xy + 27y^2$$

$$= 4x^2 + 18xy + 23y^2$$

	$x$	$2y$
$x$	$x^2$	$2xy$
$-2y$	$-2xy$	$-4y^2$

	$x$	$3y$
$x$	$x^2$	$3xy$
$3y$	$3xy$	$9y^2$

$$3. \quad 3(5x-1)(2x+3) - 4(x-1)(3x+2)$$

$$= (15x-3)(2x+3) - (4x-4)(3x+2)$$

$$= 30x^2 + 39x - 9 - (12x^2 - 4x - 8)$$

$$= 30x^2 + 39x - 9 - 12x^2 + 4x + 8$$

$$= 18x^2 + 43x - 1$$

	$15x$	$-3$
$2x$	$30x^2$	$-6x$
$3$	$45x$	$-9$

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

$$4. \quad 5x^2 - 3x(2x-1) + (x+1)^2$$

$$= 5x^2 - 6x^2 + 3x + x^2 + 2x + 1$$

$$= 5x^2 + 5x + 1$$

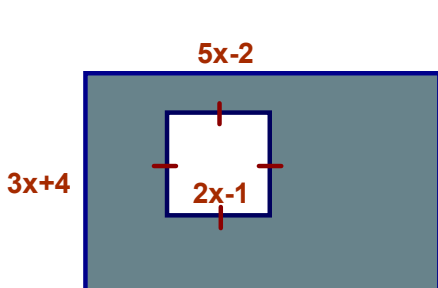
	$2x$	$-1$
$-3x$	$-6x^2$	$+3x$

	$x$	$1$
$x$	$x^2$	$x$
$1$	$x$	$1$

$x^2 + x + x + 1 = x^2 + 2x + 1$

B. Applications of Multiplying

1. Determine a simplified expression for the area of the shaded region.



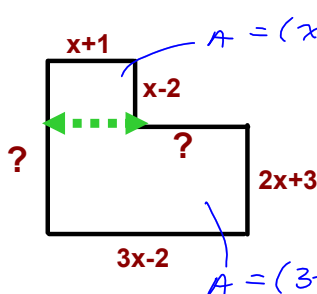
$$A_{BIG} = (5x-2)(3x+4)$$

$$A_{SMALL} = (2x-1)^2$$


	$2x$	$-1$
$2x$	$4x^2$	$-2x$
$-1$	$-2x$	$+1$

$$\begin{aligned} A_{SHADED} &= A_{BIG} - A_{SMALL} \\ &= (5x-2)(3x+4) - (2x-1)^2 \\ &= 15x^2 + 20x - 6x - 8 - (4x^2 - 2x - 2x + 1) \\ &= 15x^2 + 14x - 8 - 4x^2 + 4x - 1 \\ &= 11x^2 + 18x - 9 \end{aligned}$$

2. Determine a simplified expression for the area of the figure.



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

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

	$x$	$+1$
$x$	$x^2$	$x$
$-2$	$-2x$	$-2$

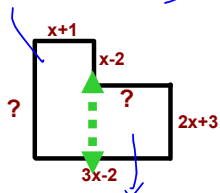
	$3x$	$-2$
$2x$	$6x^2$	$-4x$
$3$	$9x$	$-6$

$$\begin{aligned} A_{TOTAL} &= (x+1)(x-2) + (3x-2)(2x+3) \\ &= x^2 - x - 2 + 6x^2 + 5x - 6 \\ &= 7x^2 + 4x - 8 \end{aligned}$$

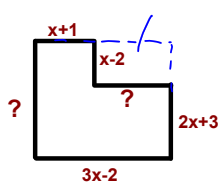
Is there more than one way to do this one?

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

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



$$(2x+3)(3x-2 - [x+1])$$



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

