

$$\textcircled{A} \quad 2(x + 3y + 8z)$$

$$\textcircled{B} \quad 2x + 6y + 16z$$

Are \textcircled{A} & \textcircled{B} the same?

• using distributive prop yes!

Distributive

$$\underline{a} \cdot (\underline{b} + \underline{c}) = \underline{a \cdot b} + \underline{a \cdot c}$$

must be
+ or -

$$\underbrace{(a + b)}_a (\underbrace{c + d}_c) = \underbrace{(a + b)}_a \underbrace{c}_c + \underbrace{(a + b)}_a \underbrace{d}_d$$

$$= (ac + bc) + (ad + bd)$$

this is

FOIL

a, b are #'s

$$(x+a)(x+b) = x^2 + xb + ax + ab$$

$$= x^2 + (a+b)x + ab$$

Formula:

$$(x+a)(x+b) = x^2 + (a+b)x + ab$$

Expand out

$$(x+1)(x+5) = x^2 + 6x + 5$$

$$(x + \underbrace{-2}_a)(x + \underbrace{-10}_b) = x^2 + -12x + 20$$

$$(x+3)(x-7) = x^2 - 4x + -21$$

$$\begin{aligned} & \underline{\underline{a + b + c + d}} \quad \underline{\underline{+}} \quad \underline{\underline{x + y + z}} \quad \bigg|_3 \\ &= ax + ay + az \\ &+ bx + by + bz \\ &+ cx + cy + cz \\ &+ dx + dy + dz \end{aligned}$$

12 terms

FOIL out the following:

$$\cdot (x+1)(x-3)$$

$$\cdot (\underline{x+2})(\underline{x+4}) = x^2 + 6x + 8$$

$$\cdot (\underline{x+7})(\underline{x-7}) = x^2 + 0x + 49$$

$$= x^2 - 7^2$$

$$+ x^2 + -49$$

$$(\underline{x+4})(\underline{x-6})$$

$$(\underline{x-10})(\underline{x-2})$$

$$(\underline{x+a})(\underline{x-a}) = x^2 - ax + ax - a^2$$

$$= \underline{x^2 - a^2}$$

$$(\underline{x-5})(\underline{x+5}) = x^2 - 5^2$$

$$(x - 2023)(x + 2023) = x^2 - 2023^2$$

$$(x - \sqrt{5})(x + \sqrt{5}) = x^2 - (\sqrt{5})^2$$

$$\qquad \qquad \qquad = x^2 - 5$$

$$(x - 11)(x + 11) = x^2 - 11^2$$

↑
"difference of
squares"

$$(\sqrt{2} - \sqrt{3})(\sqrt{2} + \sqrt{3})$$

$$= \sqrt{2}^2 - \sqrt{3}^2$$

$$= 2 - 3 = \textcircled{-1}$$

Q:

$$(\underline{1,000,125}) \times (999,875)$$

$$(1,000,000 + 125) \times (1,000,000 - 125)$$

$$\hookrightarrow 1,000,000^2 - 125^2$$

$$(2-r)(2+r) = 4 - r^2$$

$$(x + \underline{4})(x + \underline{4}) = x^2 + 8x + 16$$

Formulas to know
 2 love!

① most general

$$(a+b)(c+d) = ac + ad + bc + bd$$

② $(x+a)(x+b) = x^2 + (a+b)x + ab$

③ $(a+b)(a-b) = a^2 - b^2$

④ $(x+a)^2 = (x+a)(x+a)$
 $= x^2 + 2ax + a^2$

do not forget

Many of

Many of
you will do:

$$(x+ia)^2 = x^2 + a^2$$

WRONG

compute

$$(\sqrt{2} + \sqrt{3})^2 =$$

