Name: _____ Date: _____

Aim: How can we simplify algebraic expressions using properties?

Do Now

Simplify each expression by combining like-terms.

1. $2x + 2x + 2x + 2x + 2x =$ 10x 5(2x)

2. $8x + 8x + 8x =$ 24x 3(8x)

Is there another way to write the expressions in the Do Now and still get the same result?

3. 5(7w)
35w

4. 6(3y)
18y

Which property allows you to simplify these expressions?

Associative Property

Examples: Simplify

1. 2(3x)
6x

2. 3(4w)
12w

3. -5(6m)
-30m

4. (-3)(-8d)(-2)
-48d

5. $\frac{1}{2}$ (12x)
6x

6. 3(x +4)
3x +12

Why is 3(x + 4) different?

Distibutive Property

a(b + c) = ab +ac

a(b - c) = ab - ac

Simplify each expression using the Distributive Property

1. $5(x + 10)$

$5x + 50$

2. $2(3x + 5)$

$6x + 10$

3. $3(x - 6)$

$3x - 18$

4. $-2(x + 7)$

$-2x - 14$

5. $-3(x - 4)$

$-3x + 12$

6. $-(4x - 5)$

$-4x + 5$

7. $-2(3x)$

$-6x$

8. $3(2x) - 5(2x)$

$6x - 10x$

$-4x$

Multiply/Distribute 1st

9. $3(x + 6) + 2(4x)$

$3x + 18 + 8x$

$11x + 18$

10.) $8 - 4(2x - 2)$

$8 - 8x + 8$

$-8x + 16$

11) $2(2x - 3) + 3(3x - 4)$

$4x - 4 + 9x - 12$

$13x - 16$

Extra Practice

1. $4(5x)$

$20x$

2. $-2(3x)$

$-6x$

3. $2(x + 8)$

$2x + 16$

4. $4(2x + 1)$

$8x + 4$

5. $3(2x) - 5(2x)$

$6x - 10x$

$-4x$

6. $2(4x) - 1(3x + 1)$

$8x - 3x - 1$

$5x - 1$

7. $4(k + 10) + k$

$4K + 40 + K$

$5K + 40$

8. $6(p - 6) + 9p$

$6p - 36 + 9p$

$15p - 36$

9. $\frac{1}{2}(20m + 40) + \frac{1}{2}m$

$10m + 20 + \frac{1}{2}m$

$10\frac{1}{2}m + 20$

10. $-7.6s - 1.5(8s - 20)$

$-7.6s - 12.0s + 30$

$-19.6s + 30$

Write the property that justifies each step below.

1.) $2(3a + 4) + 6$

$6a + 8 + 6$ distrib. property

$6a + (8 + 6)$ associative (+)

$6a + 14$

2.) $5 + (7x + 3) + (-7x)$

$5 + (3 + 7x) + (-7x)$ commutative prop (+)

$(5 + 3) + [7x + (-7x)]$ associative (+)

$8 + 0$ inverse (+)

8 identity (+)

3.) $10(3q - 2) + 20$

$10(3q) + 10(-2) + 20$ distrib. prop

$30q + (-20) + 20$

$30q + [(-20) + 20]$ assoc. (+)

$30q + 0$ inverse (+)

$30q$ identity (+)

The TAKE AWAY	We must use the distrib. prop. in our expressions before combining like terms.