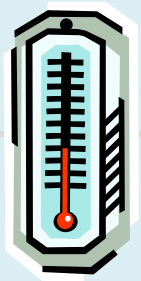
Warm Up: Evaluate each expression for $y = 3$.

DOK Level 2

1. $3y + y$ 12
2. $y + 5y + 6y$ 36
3. $10y - 4y$ 18
4. $9y$ 27
5. Use the expression $\frac{9}{5}C + 32$ when C=25. 45



Real Life Application: **This is how you convert a temperature from degrees Celsius to degrees Fahrenheit.**

EQ: How can I tell if two expressions are equivalent?

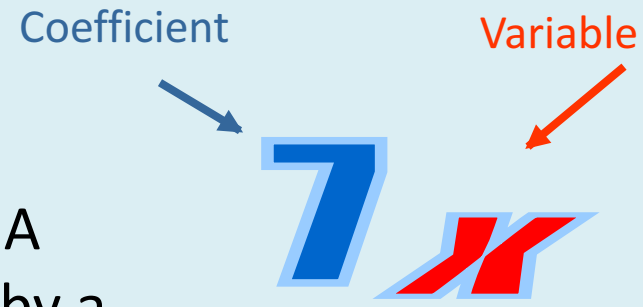
Simplifying Expressions

MGSE6.EE.3 Apply the properties of operations to generate equivalent expressions.

MGSE6.EE4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them.)

In the expression $7x + 9y + 15$, $7x$, $9y$, and 15 are called *terms*. A term can be a number, a variable, or a product of numbers and variables. Terms in an expression are separated by + and –.

$$\underbrace{7x}_{\text{term}} + \underbrace{5}_{\text{term}} - \underbrace{3y^2}_{\text{term}} + \underbrace{y}_{\text{term}} + \underbrace{\frac{x}{3}}_{\text{term}}$$



In the term $7x$, 7 is called the *coefficient*. A coefficient is a number that is multiplied by a variable in an algebraic expression. A variable by itself, like y, has a coefficient of 1. So $y = 1y$.

Like terms are terms with the same variable raised to the same power. The coefficients do not have to be the same. Constants, like 5, ½, and 3.2, are also like terms.

Like Terms	$3x$ and $2x$	w and $3w$	5 and 1.8
Unlike Terms	$5x^2$ and $2x$ *The exponents are different.*	$6a$ and $6b$ *The variables are different*	3.2 and n *Only one term contains a variable*

- **Terms that consist only of numbers are like terms.**

  5, 3, 0.4, and ½ are like terms

- **Terms that use the same variable to the same power are like terms.**

  $3z$, $6z$, and $\frac{1}{2}z$ are like terms.

- **A number and a variable are *unlike terms.***

  7 and x are unlike terms.

- **Terms that use different variables are unlike terms.**

  3*z*, b and 2x are unlike terms.

- **Terms that use the same variable but different powers are unlike terms.**

  5x, x^2, and $2x^3$

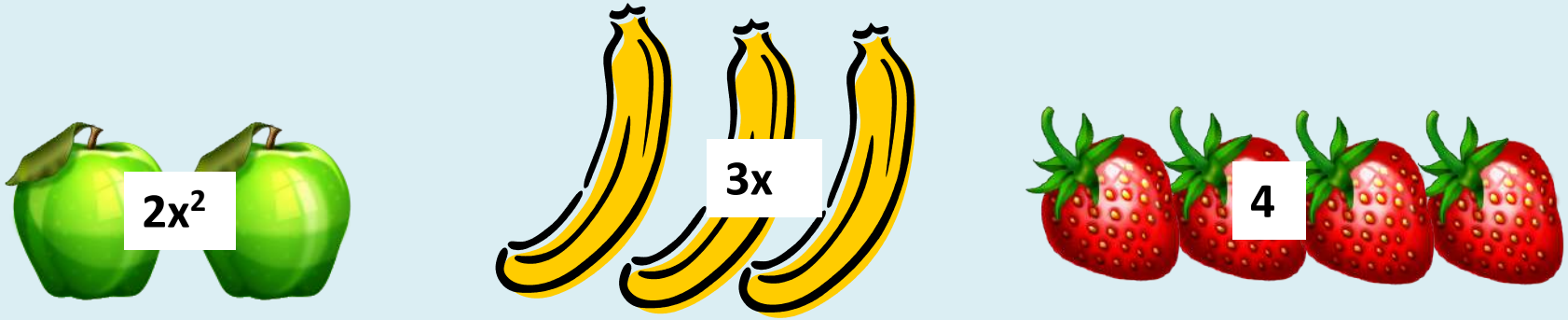
Jack put the fruit shown above in his grocery cart.
The cashier needs all of the same fruit together in piles.
Combine the fruit correctly and count the total for each fruit.

2 apples

3 bananas

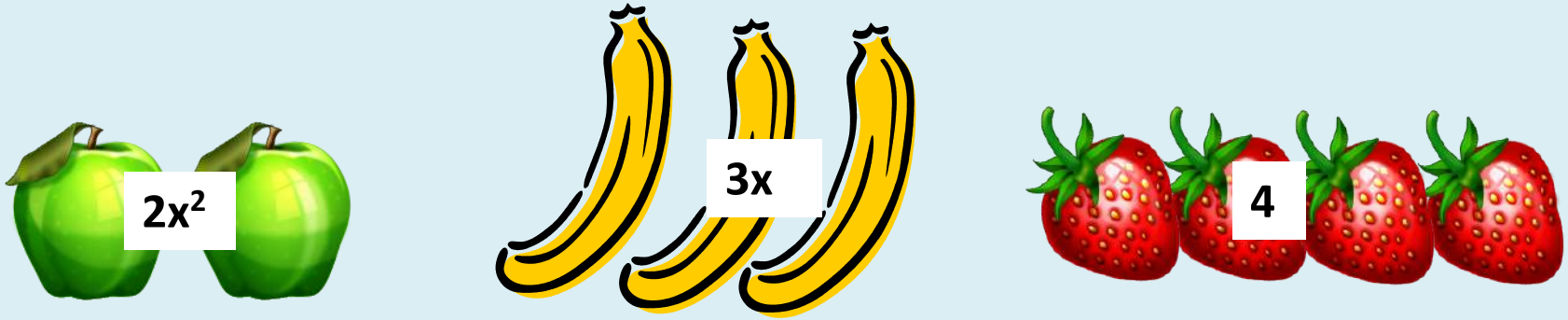
4 strawberries

Combining like terms in algebra is really the same idea, but instead of combining the same fruit, we combine like (same) terms.



$x^2 + x + 1 + 2x + 3 + x^2$

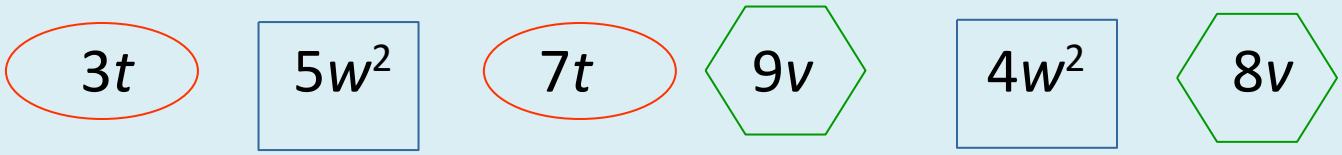
Combining like terms in algebra is really the same idea, but instead of combining the same fruit, we combine like terms.



$2x^2 + 3x + 4$

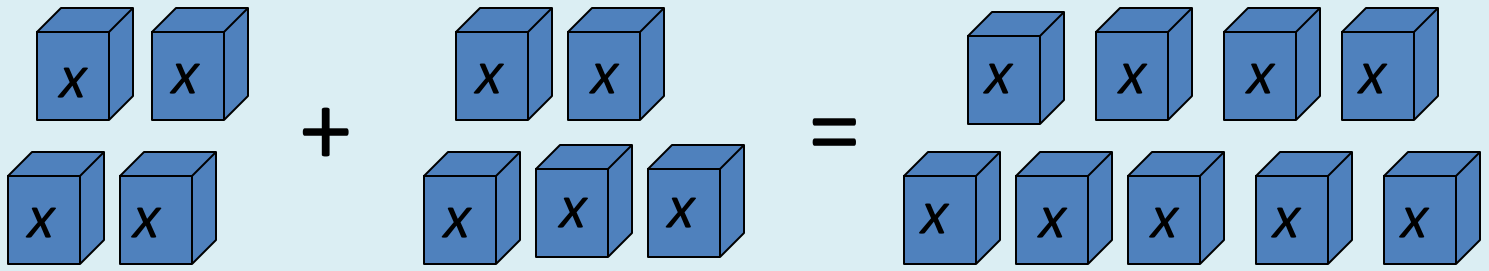
Identifying Like Terms

Identify like terms in the list. Look for like variables with like powers.



Identify like terms in the list.

Combining like terms is like grouping similar objects.



$4x + 5x = 9x$

To combine like terms that have variables, add or subtract the coefficients.

Simplify the Expressions

Combine like terms to simplify the expressions, if possible.

1. $6t - 4t$

   6t and 4t are like terms.

   $6t - 4t$

   Subtract the coefficients.

   $\mathbf{2t}$

2. $45x - 37y + 87$

   In this expression, there are no like terms to combine.

3. $3a^2 + 5b + 11b^2 - 4b + 2a^2 - 6$

   Identify like terms.

   $3a^2 + 5b + 11b^2 - 4b + 2a^2 - 6$

   Add or subtract the coefficients.

   $\mathbf{5a^2 + b + 11b^2 - 6}$

4. $5y + 3y$

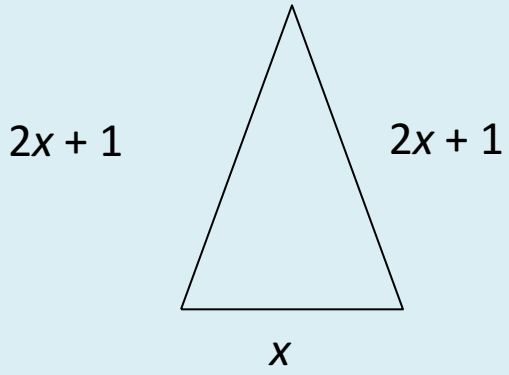
   5y and 3y are like terms.

   $5y + 3y$

   Add the coefficients.

   $\mathbf{8y}$

Write an expression for the perimeter of the triangle. Then simplify the expression.



$x + 2x + 1 + 2x + 1$

Write an expression using the side lengths.

$(x + 2x + 2x) + (1 + 1)$

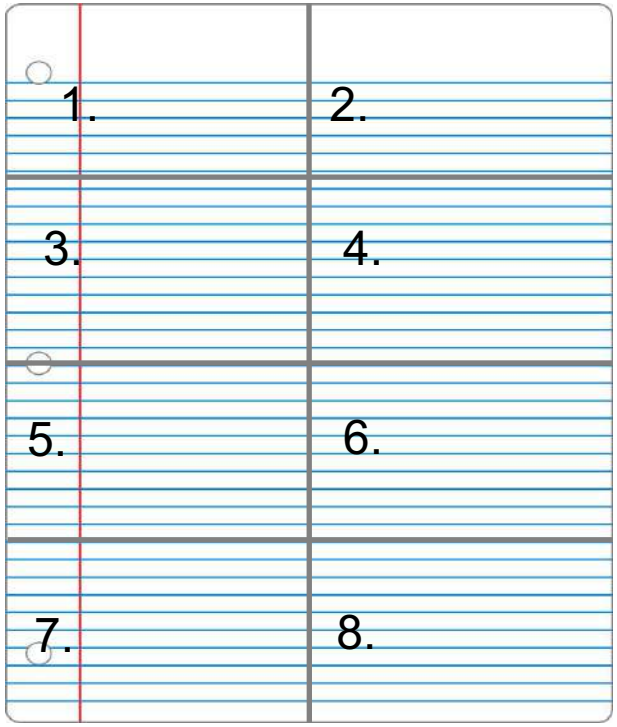
Identify and group like terms.

$5x + 2$

Add the coefficients.

Today

- Fold your paper three times to make your paper like this:



- For each slide, write the problem, show your work, and answer in the box. Then, explain how you know your answer is correct. (DOK 3)

Pick a Ride

Pick the ride you are most comfortable with…

"It's a Small World"
a gentle, easy ride

Pick a Ride

Pick the ride you are most comfortable with…

"Jungle Cruise"
A little more excitement--
seat belt not required

Pick a Ride

Pick the ride you are most comfortable with…

"Space Mountain"

Fast moving thrill ride…

pick a ride …

$5x + 3x$

$8x$

$6a^2 – a^2 + 16$

$5a^2 + 16$

$6a^2 + 7 – 5a^2 – 5$

$a^2 + 2$

pick a ride …

2(n + 5 + 12)

2n + 34

9(6 + x + 2)

9x + 72

x(x + 2)

$x^2 + 2x$

pick a ride …

3a + 2b + 5a

8a + 2b

y + 4 + 2x + 3y

2x + 4y + 4

$18 + 2d^3 + d + 3d$

$2d^3 + 4d + 18$

pick a ride …

(*c* + 25) + 17

c + 42

(*c* + 2 ½) + 8

c + 10 ½

(c + 25.3) + 17.9

c + 43.2

pick a ride …

$3(x + 11 + 4)$

$3x + 45$

$7(d + 6 - 2)$

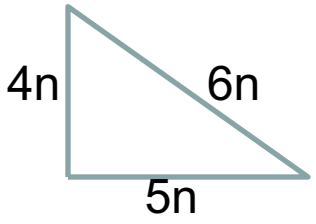
$7d + 28$

$x(x + 1)$

$x^2 + x$

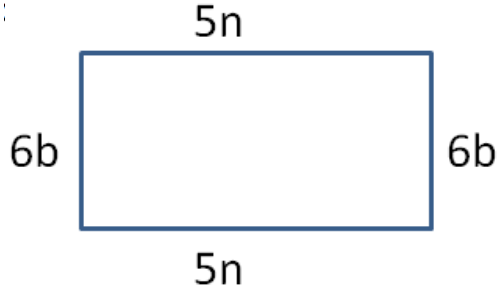
pick a ride …

Write an expression for the perimeter of the triangle.



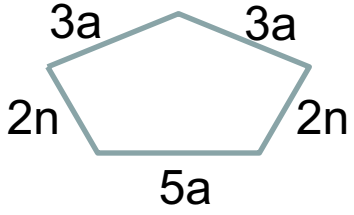
15n

Write an expression for the perimeter of the rectangle.



10n + 12b

Write an expression for the perimeter of the given figure.



11a + 4n

pick a ride …

$5(10 + z + 9)$

$5z + 95$

$2(x^2 + 13x) + 6$

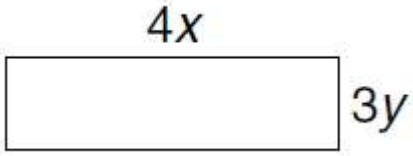
$2x^2 + 26x + 6$

$x(x^2 + 13x) + 6$

$x^3 + 13x^2 + 6$

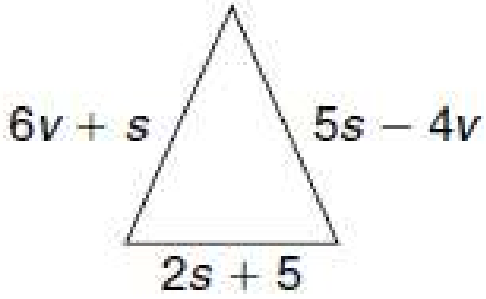
pick a ride …

Write an expression for the perimeter of rectangle. Simplify.



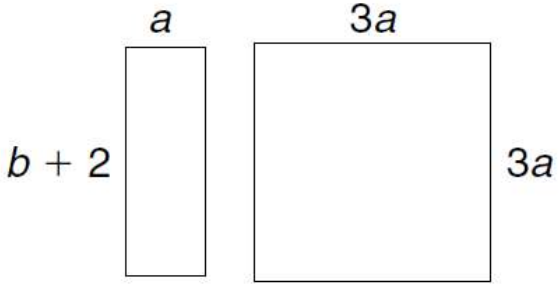
8x + 6y

Write an expression for the perimeter of the figure. Simplify.



8s + 2v + 5

Write an expression for the combined perimeters of the figures. Simplify.



14a + 2b + 4

pick a ride …

$15(x + y + 1)$

$15x + 15y + 15$

$8(x + y + z + 0)$

$8x + 8y + 8z$

$z(z + z + 0)$

$2z^2$

pick a ride …

$12 \cdot b \cdot 0$

0

$(4a^2 + a^2) \cdot 0$

0

$(2q - q) \cdot 0$

0

pick a ride …

$3a + 2b + 5a$

$8a + 2b$

$4a^2 + 14b + a^2 - b$

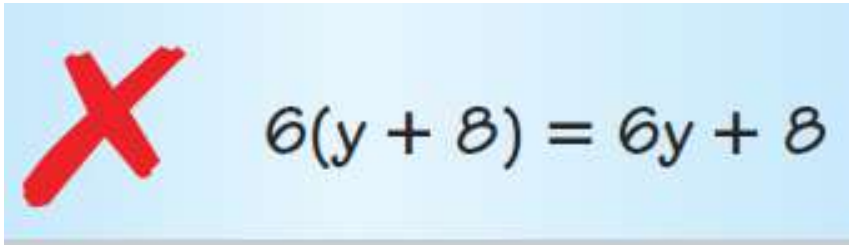
$5a^2 + 13b$

$2q^2 + 2q – q – 2q^2$

q

pick a ride …

Describe and correct the error made in simplifying the expression. (DOK 3)



They only distributed the 6 to the y, and not the 8. The simplified expression should be *6y + 48*

pick a ride …

$3x + 3y + x + y + z$

$4x + 4y + z$

$n^4 + n^3 + 3n - n - n^3$

$n^4 + 2n$

Write an expression that has four terms and simplifies to $5m^2 + 4n$.

(answers vary)

pick a ride …

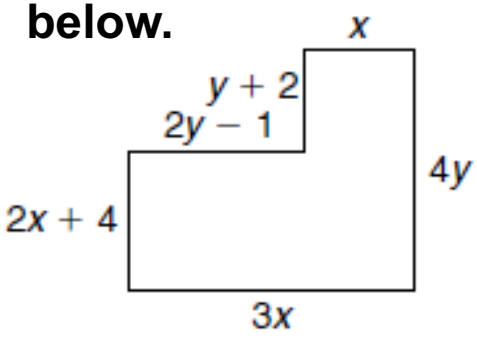
9b – 8b + *c*

b + c

$x^2 + 3x^2 + 4^2$

$4x^2 + 16$

Write & simplify an expression to find the perimeter of the figure below.



6x +7y +5

Lesson Quiz

Identify like terms in the list. (DOK 1)

1. $3n^2$ $5n$ $2n^3$ $8n$ $5n, 8n$

2. a^5 $2a^2$ a^3 $3a$ $4a^2$ $2a^2, 4a^2$

Simplify and combine like terms. (DOK 2)

3. $4a + 3b + 2a$ $6a + 3b$

4. $x^2 + 2y + 8x^2$ $9x^2 + 2y$

5. Write an expression for the perimeter of the given figure. Then, explain the steps you took to solve the expression. (DOK3)