## Unit 4 Lesson 8: Equal and Equivalent

### 1 Algebra Talk: Solving Equations by Seeing Structure (Warm up)

#### Student Task Statement

Find a solution to each equation mentally.

$3+x=8$

$10=12−x$

$x^{2}=49$

$\frac{1}{3}x=6$

### 2 Using Diagrams to Show That Expressions are Equivalent

#### Images for Launch



#### Student Task Statement

Here is a diagram of $x+2$ and $3x$ when $x$ is 4. Notice that the two diagrams are lined up on their left sides.



In each of your drawings below, line up the diagrams on one side.

1. Draw a diagram of $x+2$, and a separate diagram of $3x$, when $x$ is 3.
* 
1. Draw a diagram of $x+2$, and a separate diagram of $3x$, when $x$ is 2.
* 
1. Draw a diagram of $x+2$, and a separate diagram of $3x$, when $x$ is 1.
* 
1. Draw a diagram of $x+2$, and a separate diagram of $3x$, when $x$ is 0.
* 
1. When are $x+2$ and $3x$ equal? When are they not equal? Use your diagrams to explain.
2. Draw a diagram of $x+3$, and a separate diagram of $3+x$.
3. When are $x+3$ and $3+x$ equal? When are they not equal? Use your diagrams to explain.

### 3 Identifying Equivalent Expressions

#### Student Task Statement

Here is a list of expressions. Find any pairs of expressions that are equivalent. If you get stuck, try reasoning with diagrams.

$a+3$

$a+a+a$

$a÷\frac{1}{3}$

$a⋅3$

$\frac{1}{3}a$

$3a$

$\frac{a}{3}$

$1a$

$a$

$3+a$



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