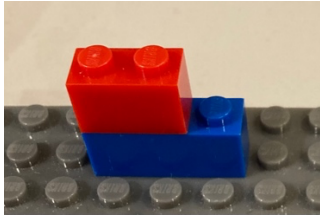


Brick Math *Fraction Multiplication*
Chapter Assessments Answer Key

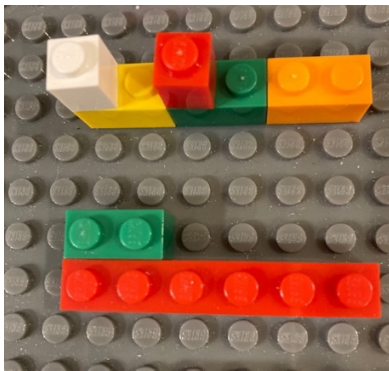
Chapter 1

1. $\frac{2}{3} \times \frac{1}{2}$

Model $\frac{2}{3}$:



Because $\frac{2}{3}$ is being multiplied by $\frac{1}{2}$, make 3 sets of two as the denominator. Place a one on top of two of those sets to show the numerator. To show the solution of the fraction multiplication, use a 1x2 brick as the numerator and a 1x6 brick as the denominator.



2. To simplify the fraction $\frac{2}{6}$, cover the model with 1x2 bricks to show 1 brick in the numerator and 3 bricks in the denominator, or $\frac{1}{3}$.



3. $\frac{6}{8} \times \frac{1}{2}$ means $\frac{6}{8}$ sets of $\frac{1}{2}$.

Move the numerator bricks to show 4 over one denominator brick that shows 2.



Add another 1x2 brick to make the top even with the bottom. This shows two 1x2 bricks, so the answer is 2. $4 \times \frac{1}{2} = 2$

3. Answers may vary. One possible solution:

$$\frac{2}{3} \times 6 = 4$$

←6

←6 in thirds
1/3 of 6 studs is 2 studs

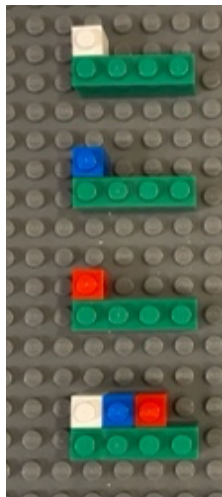
←2/3 is 4 studs

2/3 of 6 is 4 and $4 < 6$

Chapter 3

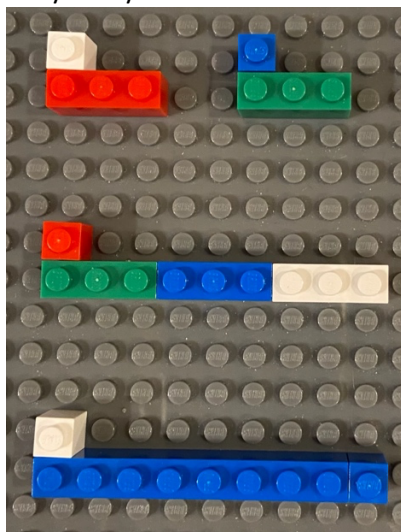
1. $\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$

Three sets of $\frac{1}{4}$ are the same as $\frac{3}{4}$, because you add the numerators and keep the same denominators. These are fractions with like denominators.



$\frac{1}{4}$
 $\frac{1}{4}$
 $\frac{1}{4}$
 $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4}$

2. $\frac{1}{3} \times \frac{1}{3}$



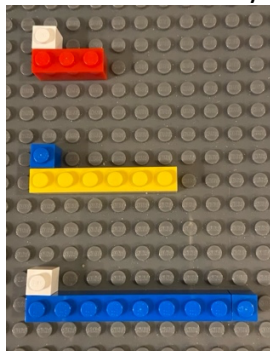
Two models of $\frac{1}{3}$

Multiply the numerators: $1 \times 1 = 1$
 Multiply the denominators: $3 \times 3 = 9$

Solution is $\frac{1}{9}$

3. A unit fraction is one part of the entire fraction. It is a fractional part that has 1 as the numerator.

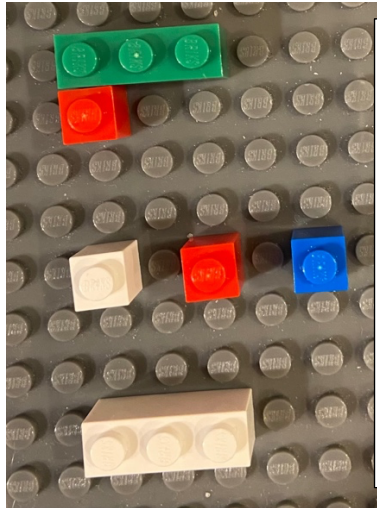
4. Answers will vary. Three possible models include:



$\frac{1}{3}$
 $\frac{1}{6}$
 $\frac{1}{9}$

Chapter 4

1. Models will vary. One example:

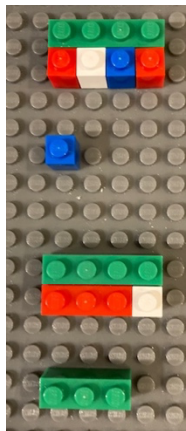


A LEGO model on a grey baseplate. It consists of a green 1x3 brick, a red 1x1 brick, a white 1x1 brick, a red 1x1 brick, a blue 1x1 brick, and a white 1x3 brick.

$1/3 \times 3$ means $1/3$ of 3 wholes, which is 1

$3 \times 1/3$ means 3 sets of $1/3$, which is $3/3$ or 1 whole.

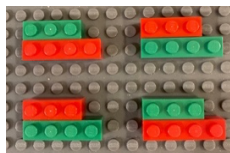
2. $1/4 \times 4 \times 3/4$



A LEGO model on a grey baseplate. It consists of a 1x4 brick with segments colored green, red, blue, and red; a blue 1x1 brick; a 1x4 brick with segments colored green, red, red, and white; and a green 1x3 brick.

Start with $4 \times 1/4$.
Model 4 with one 1x4 brick, then model each $1/4$ with a 1x1 brick. This shows $4 \times 1/4 = 1$
Now do the second part of the problem, $1 \times 3/4$.
Model 1 with a 1x4 brick. Use a 1x3 brick and a 1x1 brick to model $3/4$ and $1/4$. This shows the final solution as $1/4 \times 4 \times 3/4 = 3/4$

Now show $3/4 \times 4 \times 1/4$:



A LEGO model on a grey baseplate. It consists of four 1x3 bricks, each with segments colored green, red, and red.

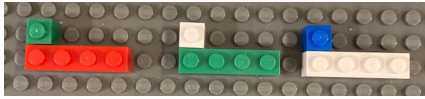
Model $3/4$ four times.



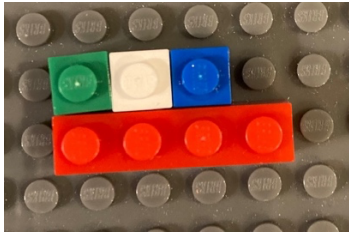
A LEGO model on a grey baseplate. It consists of a 1x4 brick with segments colored green, red, green, and red, and a red 1x3 brick.

Combine the four models to show $12/4$.

Show that $12/4$ is equivalent to 3. This shows $3/4 \times 4 = 3$

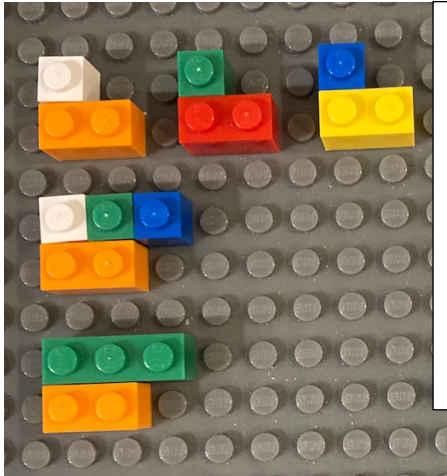


Now do the second part of the problem, $\frac{1}{4} \times 3$. This model shows $\frac{1}{4}$



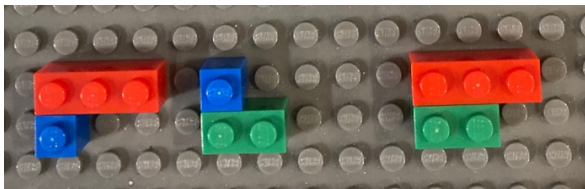
Bring the numerators together to show $\frac{3}{4}$. The solution to the problem is $\frac{3}{4} \times 4 \times \frac{1}{4} = \frac{3}{4}$

3. $\frac{1}{2} \times 3$ and $3 \times \frac{1}{2}$



$\frac{1}{2} \times 3$:
Model of 3 sets of $\frac{1}{2}$.

Bring the numerators together to get $\frac{3}{2}$, which is $1\frac{1}{2}$.

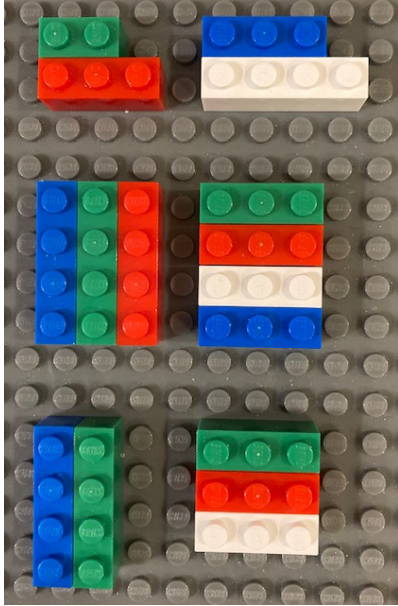


$3 \times \frac{1}{2}$:
Model $\frac{3}{1}$ and $\frac{1}{2}$. Multiply across:
 $3 \times 1 = 3$ and
 $1 \times 2 = 2$
The solution is $\frac{3}{2}$, which is $1\frac{1}{2}$.

Chapter 5

1. To find the area of a given space, multiply the length by the width.

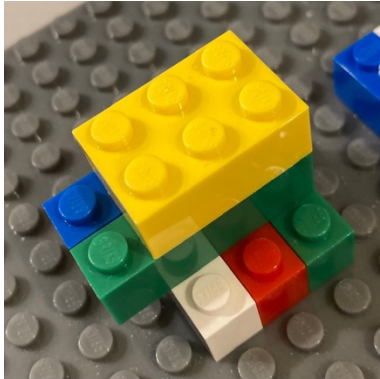
2. $\frac{2}{3} \times \frac{3}{4}$



Model $\frac{2}{3}$ and $\frac{3}{4}$

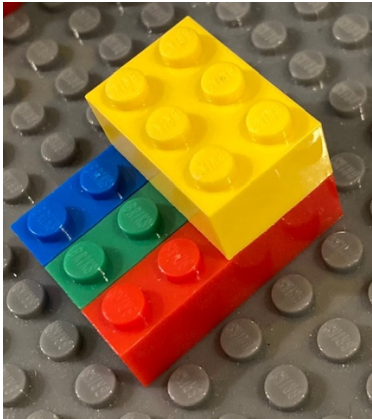
Model the multiplication of the denominators:
 3×4 and 4×3

Model $\frac{2}{3}$ of the first denominator of 12
 Model $\frac{3}{4}$ of the second denominator of 12

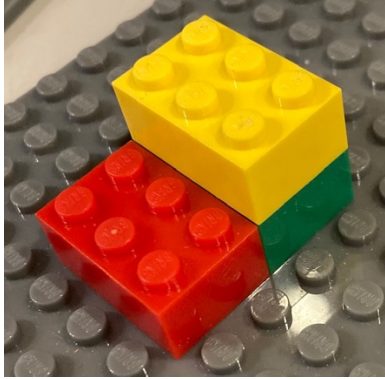


Place the $\frac{2}{3}$ of 12 over the $\frac{3}{4}$ of 12.
 Mark their intersection with a 2x3 brick that shows 6, which is the numerator.

Model the numerator of 6 over the denominator of 12, or $\frac{6}{12}$.



Simplify the fraction by modeling 1 brick over 2 bricks to show $\frac{1}{2}$.



3. Models will vary. They should be similar to the models used for problem #2.

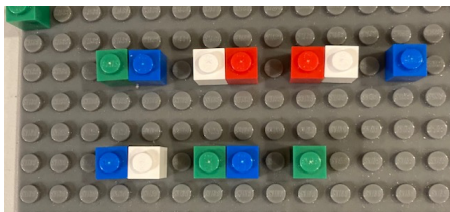
Chapter 6

1. Answers may vary. One solution: $2\frac{1}{2}$



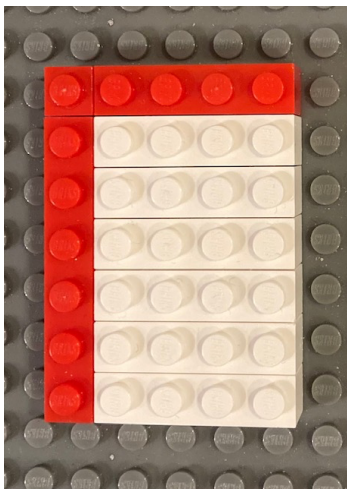
A 1x1 brick represents $\frac{1}{2}$.
The model shows
 $2/2 + 2/2 + \frac{1}{2} = 2\frac{1}{2}$

2. $3\frac{1}{2} \times 2\frac{1}{2}$:



A 1x1 brick represents $\frac{1}{2}$.
The top model shows $2/2 + 2/2 + 2/2 + \frac{1}{2} = 3\frac{1}{2}$

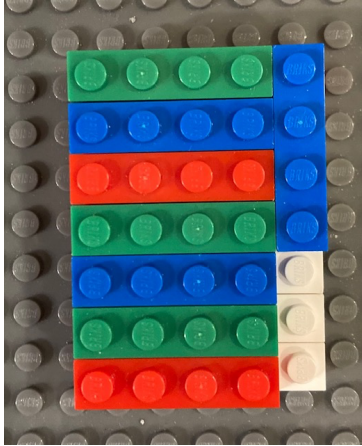
The bottom model shows $2/2 + 2/2 + \frac{1}{2} = 2\frac{1}{2}$



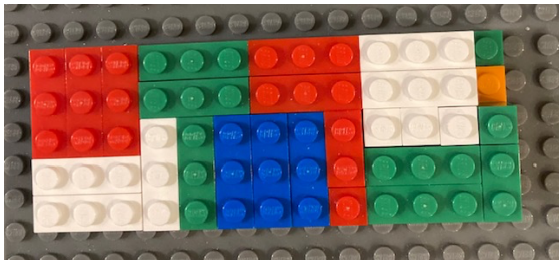
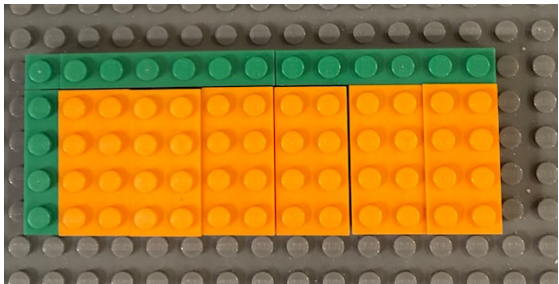
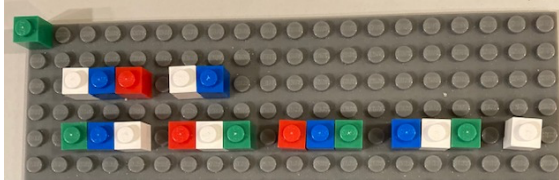
7 1x1 bricks model $3\frac{1}{2}$ vertically.
5 1x1 bricks model $2\frac{1}{2}$ horizontally.
The overlapped brick in the upper left corner belongs to both models.
Fill in the entire area with bricks.

Fit sets of 4 on top of the model, because the denominators multiplied together equal 4.
($2 \times 2 = 4$)

The model shows the solution of 8 sets of 4



3. $1\frac{2}{3} \times 4\frac{1}{3}$



A 1x1 brick represents $\frac{1}{3}$.

The top model shows $\frac{3}{3} + \frac{2}{3} = 1\frac{2}{3}$.

The bottom model shows $\frac{3}{3} + \frac{3}{3} + \frac{3}{3} + \frac{3}{3} + \frac{1}{3} = 4\frac{1}{3}$.

5 1x1 bricks model $1\frac{2}{3}$ vertically.

13 1x1 bricks model $4\frac{1}{3}$ horizontally.

The overlapped brick in the upper left corner belongs to both models.

Fill in the entire area with bricks.

Fit sets of 9 studs on top of the model, because the denominators multiplied together equal 9. ($3 \times 3 = 9$)

The model shows the solution of 7 sets of 9 studs with 2 studs left over, or $7\frac{2}{9}$.

$$1\frac{2}{3} \times 4\frac{1}{3} = 7\frac{2}{9}$$