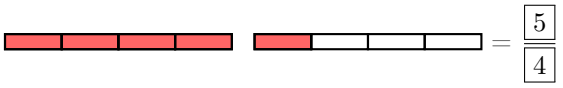
FRACTIONS

A DEFINITIONS

A.1 FINDING FRACTIONS

Ex 1: A bar represents 1. Find the fraction that represents the shaded part:



$= \frac{5}{4}$

Answer:

- A bar (1) is divided into 4 equal parts:
- 5 parts are shaded.
- So, $\frac{5}{4} =$

Ex 2: A bar represents 1. Find the fraction that represents the shaded part:

$= \frac{5}{3}$

Answer:

- A bar (1) is divided into 3 equal parts:
- 5 parts are shaded.
- So, $\frac{5}{3} =$

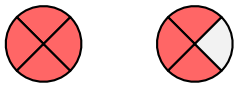
Ex 3: A bar represents 1. Find the fraction that represents the shaded part:

$= \frac{8}{3}$

Answer:

- A bar (1) is divided into 3 equal parts:
- 8 parts are shaded.
- So, $\frac{8}{3} =$

Ex 4: A circle represents 1. Find the fraction that represents the shaded part:

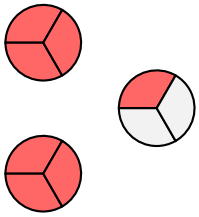


$= \frac{7}{4}$

Answer:

- A circle (1) is divided into 4 equal parts.
- 7 parts are shaded.
- So, $\frac{7}{4} =$

Ex 5: A circle represents 1. Find the fraction that represents the shaded part:



$= \frac{7}{3}$

Answer:

- A circle (1) is divided into 3 equal parts.
- 7 parts are shaded.
- So, $\frac{7}{3} =$

A.2 FINDING FRACTIONS IN WORD PROBLEMS

Ex 6: Hugo eats 3 parts of a cake that is divided into 4 equal parts. What fraction of the cake does Hugo eat?

$\frac{3}{4}$ of the cake

Answer:

- Hugo eats 3 of the 4 equal parts.
- So, Hugo eats $\frac{3}{4}$ of the cake.

Ex 7: Liam reads 5 chapters of a book that has 8 chapters. What fraction of the book does Liam read?

$\frac{5}{8}$ of the book

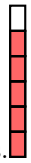
Answer:

- Liam reads 5 out of the 8 chapters.
- So, Liam reads $\frac{5}{8}$ of the book.

Ex 8: Vanessa paints 5 squares on a window that has 6 equal squares. What fraction of the window did she paint?

$\frac{5}{6}$ of the window

Answer:



- Vanessa paints 5 out of the 6 equal parts.
- So, Vanessa paints $\frac{5}{6}$ of the window.

Ex 9: Sophia cuts her loaf of bread into 8 equal slices. She uses 2 slices to make sandwiches. What fraction of the bread did Sophia use to make the sandwiches?

$\boxed{\frac{2}{8}}$ of the bread

Answer:

- Sophia used 2 out of the 8 equal slices of bread.
- So, Sophia used $\frac{2}{8}$ of the bread to make sandwiches.

A.3 WRITING FRACTIONS FROM WORDS

Ex 10: Write as fraction:

one over four$=\boxed{\frac{1}{4}}$

Answer:

- one over four $= \frac{1}{4} =$

Ex 11: Write as fraction:

three over five $=\boxed{\frac{3}{5}}$

Answer:

- three over five $= \frac{3}{5} =$

Ex 12: Write as fraction:

three quarters $= \boxed{\frac{3}{4}}$

Answer:

- three quarters $= \frac{3}{4} =$

Ex 13: Write as fraction:

six over hundred $=\boxed{\frac{6}{100}}$

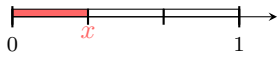
Answer:

- six over hundred (six thousandths) $= \frac{6}{100}$

B ON THE NUMBER LINE

B.1 FINDING FRACTIONS WITH BAR FRACTION MODEL

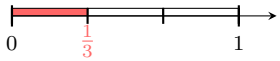
Ex 14: Find the value of x



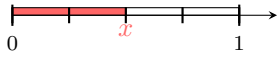
$x = \boxed{\frac{1}{3}}$

Answer:

- 1 is divided in 3 equals parts.
- x is located at 1 part.
- So, $x = \frac{1}{3}$.



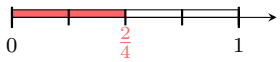
Ex 15: Find the value of x



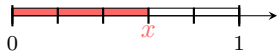
$x = \boxed{\frac{2}{4}}$

Answer:

- 1 is divided in 4 equals parts.
- x is located at 2 parts.
- So, $x = \frac{2}{4}$.



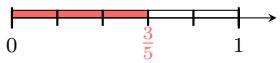
Ex 16: Find the value of x



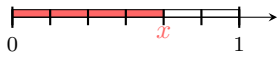
$x = \boxed{\frac{3}{5}}$

Answer:

- 1 is divided in 5 equals parts.
- x is located at 3 parts.
- So, $x = \frac{3}{5}$.



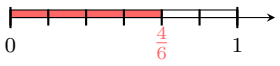
Ex 17: Find the value of x



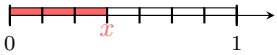
$x = \boxed{\frac{4}{6}}$

Answer:

- 1 is divided in 6 equals parts.
- x is located at 4 parts.
- So, $x = \dfrac{4}{6}$.



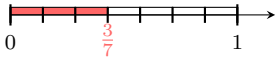
Ex 18: Find the value of x



$$x = \boxed{\frac{3}{7}}$$

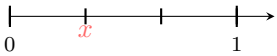
Answer:

- 1 is divided in 7 equals parts.
- x is located at 3 parts.
- So, $x = \dfrac{3}{7}$.



B.2 FINDING FRACTIONS

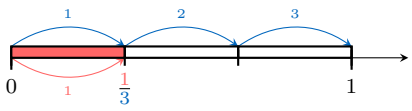
Ex 19: Find the value of x



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

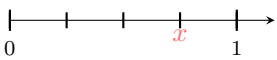
Answer:

- 1 is divided in 3 equals parts.
- x is located at 1 part from 0.



- So, $x = \dfrac{1}{3}$.

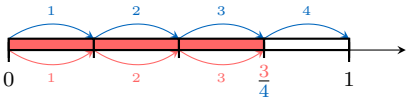
Ex 20: Find the value of x



$$x = \boxed{\frac{3}{4}}$$

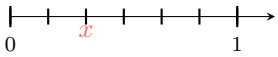
Answer:

- 1 is divided in 4 equals parts.
- x is located at 3 parts from 0.



- So, $x = \dfrac{3}{4}$.

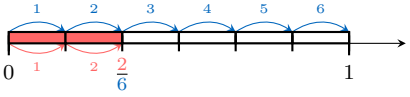
Ex 21: Find the value of x



$$x = \boxed{\frac{2}{6}}$$

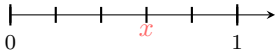
Answer:

- 1 is divided in 6 equals parts.
- x is located at 2 parts from 0.



- So, $x = \dfrac{2}{6}$.

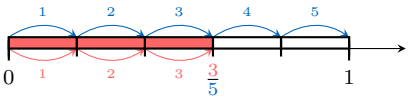
Ex 22: Find the value of x



$$x = \boxed{\frac{3}{5}}$$

Answer:

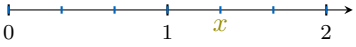
- 1 is divided in 5 equals parts.
- x is located at 3 parts from 0.



- So, $x = \dfrac{3}{5}$.

B.3 FINDING FRACTIONS GREATER THAN 1

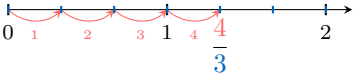
Ex 23: Find the value of x



$$x = \boxed{\frac{4}{3}}$$

Answer:

- 1 is divided in 3 equals parts.
- x is located at 4 parts from 0.



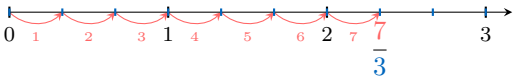
- So, $x = \dfrac{4}{3}$.

Ex 24: Find the value of x

$$x = \boxed{\frac{7}{3}}$$

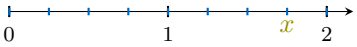
Answer:

- 1 is divided in 3 equal parts.
- x is located at 7 parts from 0.



- So, $x = \frac{7}{3}$.

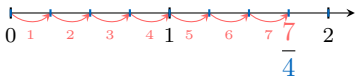
Ex 25: Find the value of x



$$x = \boxed{\frac{7}{4}}$$

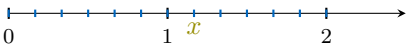
Answer:

- 1 is divided in 4 equal parts.
- x is located at 7 parts from 0.



- So, $x = \frac{7}{4}$.

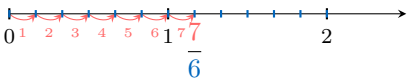
Ex 26: Find the value of x



$$x = \boxed{\frac{7}{6}}$$

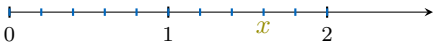
Answer:

- 1 is divided into 6 equal parts.
- x is located at 7 parts from 0.



- So, $x = \frac{7}{6}$.

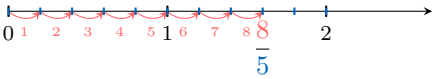
Ex 27: Find the value of x



$$x = \boxed{\frac{8}{5}}$$

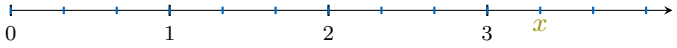
Answer:

- 1 is divided into 5 equal parts.
- x is located at 8 parts from 0.



- So, $x = \frac{8}{5}$.

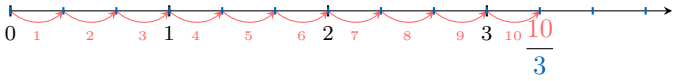
Ex 28: Find the value of x



$$x = \boxed{\frac{10}{3}}$$

Answer:

- 1 is divided into 3 equal parts.
- x is located at 10 parts from 0.



- So, $x = \frac{10}{3}$.

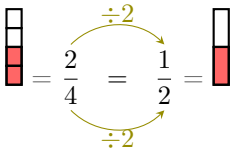
C EQUIVALENT FRACTIONS

C.1 FINDING THE MISSING NUMERATOR

Ex 29:

$$\frac{2}{4} = \boxed{\frac{1}{2}}$$

Answer:

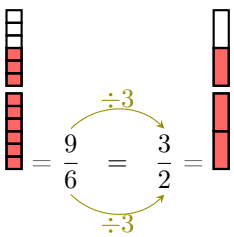
- 

- The second denominator 2 is the first denominator 4 divided by 2 : $4 \times 2 = 2$.
- To keep the fractions equivalent, the numerator must also be divided by 2.
- This means: $2 \div 2 = 1$, so the missing numerator is 1.

Ex 30:

$$\frac{9}{6} = \boxed{\frac{3}{2}}$$

Answer:

- 

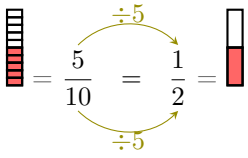
- The second denominator 2 is the first denominator 6 divided by 3 : $6 \div 3 = 2$.

- To keep the fractions equivalent, the numerator must also be divided by 3.
- This means: $9 \div 3 = 3$, so the missing numerator is 3.

Ex 31:

$$\frac{5}{10} = \frac{\boxed{1}}{2}$$

Answer:

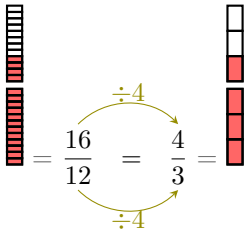
- 

- The second denominator 2 is the first denominator 10 divided by 5 : $10 \div 5 = 2$.
- To keep the fractions equivalent, the numerator must also be divided by 5.
- This means: $5 \div 5 = 1$, so the missing numerator is 1.

Ex 32:

$$\frac{16}{12} = \frac{\boxed{4}}{3}$$

Answer:

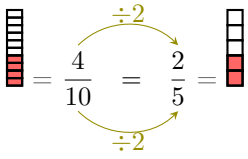
- 

- The second denominator 3 is the first denominator 12 divided by 4 : $12 \div 4 = 3$.
- To keep the fractions equivalent, the numerator must also be divided by 4.
- This means: $16 \div 4 = 4$, so the missing numerator is 4.

Ex 33:

$$\frac{4}{10} = \frac{\boxed{2}}{5}$$

Answer:

- 

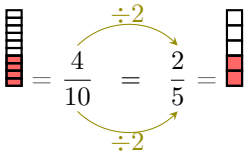
- The second denominator 5 is the first denominator 10 divided by 2 : $10 \div 2 = 5$.
- To keep the fractions equivalent, the numerator must also be divided by 2.
- This means: $4 \div 2 = 2$, so the missing numerator is 2.

C.2 FINDING THE MISSING DENOMINATOR

Ex 34:

$$\frac{4}{10} = \frac{2}{\boxed{5}}$$

Answer:

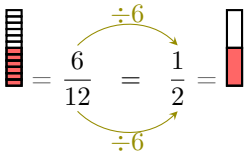
- 

- The second numerator 2 is the first numerator 4 divided by 2 : $4 \div 2 = 2$.
- To keep the fractions equivalent, the denominator must also be divided by 2.
- This means: $10 \div 2 = 5$, so the missing denominator is 5.

Ex 35:

$$\frac{6}{12} = \frac{1}{\boxed{2}}$$

Answer:

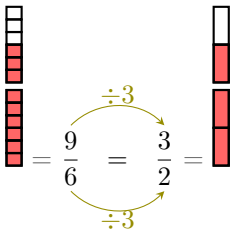
- 

- The second numerator 1 is the first numerator 6 divided by 6 : $6 \div 6 = 1$.
- To keep the fractions equivalent, the denominator must also be divided by 6.
- This means: $12 \div 6 = 2$, so the missing denominator is 2.

Ex 36:

$$\frac{9}{6} = \frac{3}{\boxed{2}}$$

Answer:

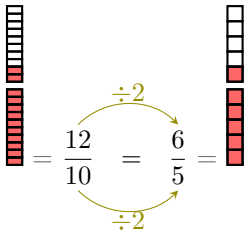
- 

- The second numerator 3 is the first numerator 9 divided by 3 : $9 \div 3 = 3$.
- To keep the fractions equivalent, the denominator must also be divided by 3.
- This means: $6 \div 3 = 2$, so the missing denominator is 2.

Ex 37:

$$\frac{12}{10} = \frac{6}{\boxed{5}}$$

Answer:

- 

- The second numerator 6 is the first numerator 12 divided by 2 : $12 \div 2 = 6$.
- To keep the fractions equivalent, the denominator must also be divided by 2.
- This means: $10 \div 2 = 5$, so the missing denominator is 5.

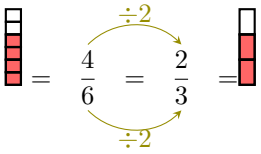
D SIMPLIFICATION

D.1 SIMPLIFYING FRACTIONS

Ex 38: Simplify:

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

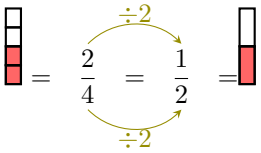
Answer:



Ex 39: Simplify:

$$\frac{2}{4} = \frac{\boxed{1}}{\boxed{2}}$$

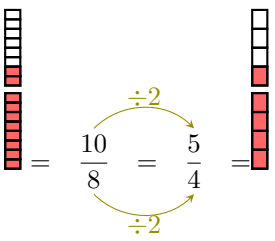
Answer:



Ex 40: Simplify:

$$\frac{10}{8} = \frac{\boxed{5}}{\boxed{4}}$$

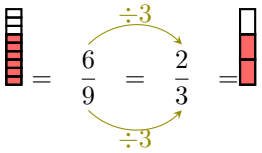
Answer:



Ex 41: Simplify:

$$\frac{6}{9} = \frac{\boxed{2}}{\boxed{3}}$$

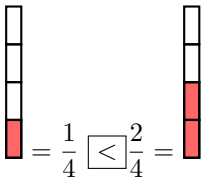
Answer:



E ORDERING FRACTIONS

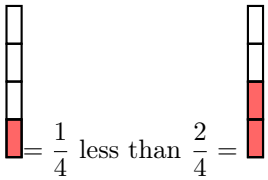
E.1 COMPARING WITH SAME DENOMINATOR WITH BAR MODELS

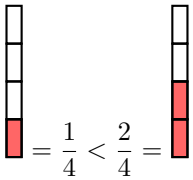
Ex 42: Compare using $>, <, =$:



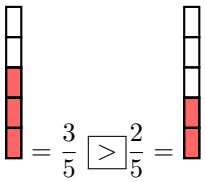
Answer:

- $>$ means *greater than.*
  $<$ means *less than.*
  $=$ means *equal to.*

- 

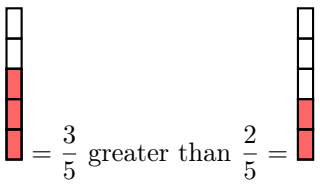
- 

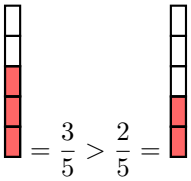
Ex 43: Compare using $>, <, =$:



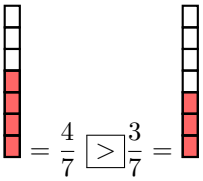
Answer:

- $>$ means *greater than.*
  $<$ means *less than.*
  $=$ means *equal to.*

- 

-  $= \frac{3}{5} > \frac{2}{5} =$

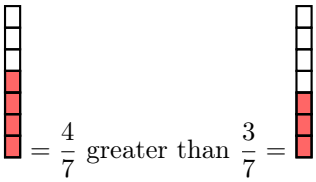
Ex 44: Compare using $>, <, =$:



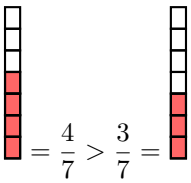
$= \frac{4}{7} \boxed{>} \frac{3}{7} =$

Answer:

- $>$ means *greater than.*
  $<$ means *less than.*
  $=$ means *equal to.*

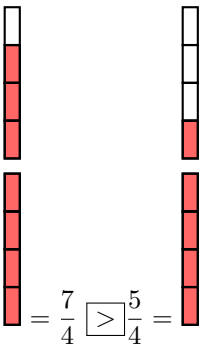
- 

$= \frac{4}{7}$ greater than $\frac{3}{7} =$

- 

$= \frac{4}{7} > \frac{3}{7} =$

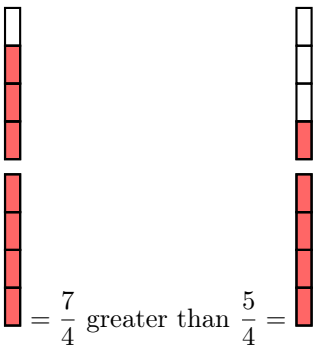
Ex 45: Compare using $>, <, =$:



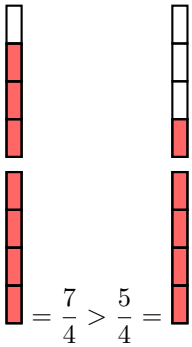
$= \frac{7}{4} \boxed{>} \frac{5}{4} =$

Answer:

- $>$ means *greater than.*
  $<$ means *less than.*
  $=$ means *equal to.*

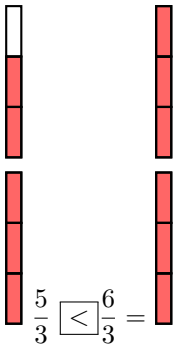
- 

$= \frac{7}{4}$ greater than $\frac{5}{4} =$

- 

$= \frac{7}{4} > \frac{5}{4} =$

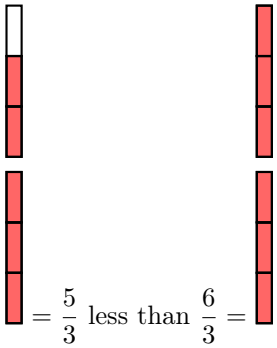
Ex 46: Compare using $>, <, =$:



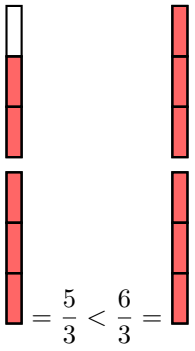
$\frac{5}{3} \boxed{<} \frac{6}{3} =$

Answer:

- $>$ means *greater than.*
  $<$ means *less than.*
  $=$ means *equal to.*

- 

$= \frac{5}{3}$ less than $\frac{6}{3} =$

- 

$= \frac{5}{3} < \frac{6}{3} =$

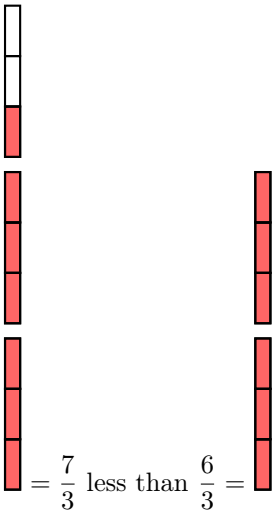
E.2 COMPARING WITH SAME DENOMINATOR

Ex 47: Compare using $>, <, =$:

$$\frac{7}{3} \boxed{>} \frac{6}{3}$$

Answer:

- $>$ means *greater than.*
  $<$ means *less than.*
  $=$ means *equal to.*



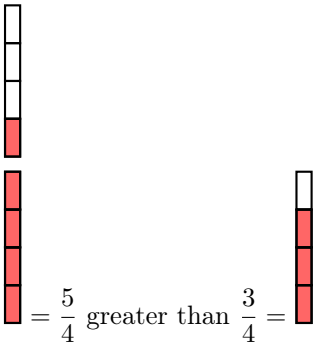
- $= \frac{7}{3}$ less than $\frac{6}{3} =$
- So $\frac{7}{3} > \frac{6}{3}$

Ex 48: Compare using $>, <, =$:

$$\frac{5}{4} \boxed{>} \frac{3}{4}$$

Answer:

- $>$ means *greater than.*
  $<$ means *less than.*
  $=$ means *equal to.*



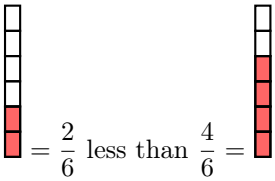
- $= \frac{5}{4}$ greater than $\frac{3}{4} =$
- So $\frac{5}{4} > \frac{3}{4}$

Ex 49: Compare using $>, <, =$:

$$\frac{2}{6} \boxed{<} \frac{4}{6}$$

Answer:

- $>$ means *greater than.*
  $<$ means *less than.*
  $=$ means *equal to.*



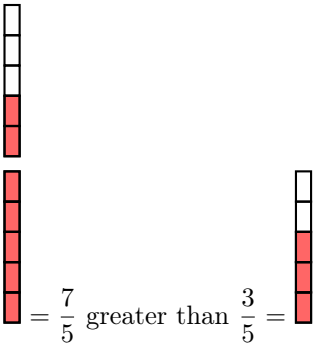
- $= \frac{2}{6}$ less than $\frac{4}{6} =$
- So $\frac{2}{6} < \frac{4}{6}$

Ex 50: Compare using $>, <, =$:

$$\frac{7}{5} \boxed{>} \frac{3}{5}$$

Answer:

- $>$ means *greater than.*
  $<$ means *less than.*
  $=$ means *equal to.*



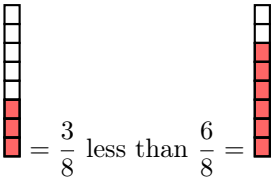
- $= \frac{7}{5}$ greater than $\frac{3}{5} =$
- So $\frac{7}{5} > \frac{3}{5}$

Ex 51: Compare using $>, <, =$:

$$\frac{3}{8} \boxed{<} \frac{6}{8}$$

Answer:

- $>$ means *greater than.*
  $<$ means *less than.*
  $=$ means *equal to.*



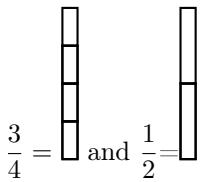
- $= \frac{3}{8}$ less than $\frac{6}{8} =$
- So $\frac{3}{8} < \frac{6}{8}$

E.3 COMPARING FRACTIONS WITH DIFFERENT DENOMINATORS

Ex 52: Compare using $>, <, =$:

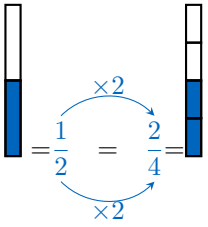
$$\frac{3}{4} \boxed{>} \frac{1}{2}$$

Hint: color the bars below to help you compare the fractions.

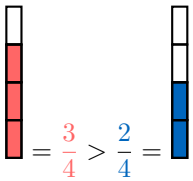


Answer:

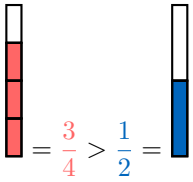
- Find equivalent fractions with the same denominator:



- Compare with same denominator:



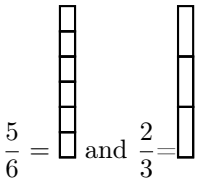
- So



Ex 53: Compare using $>, <, =$:

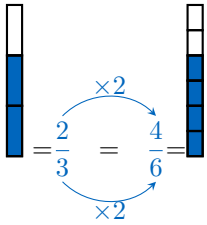
$$\frac{5}{6} \boxed{>} \frac{2}{3}$$

Hint: color the bars below to help you compare the fractions.

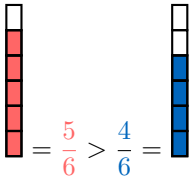


Answer:

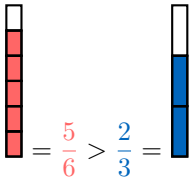
- Find equivalent fractions with the same denominator:



- Compare with same denominator:



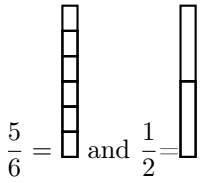
- So



Ex 54: Compare using $>, <, =$:

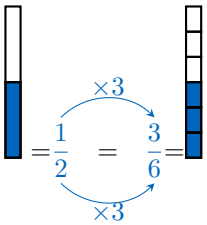
$$\frac{5}{6} \boxed{>} \frac{1}{2}$$

Hint: color the bars below to help you compare the fractions.

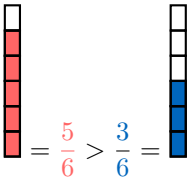


Answer:

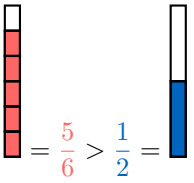
- Find equivalent fractions with the same denominator:



- Compare with same denominator:



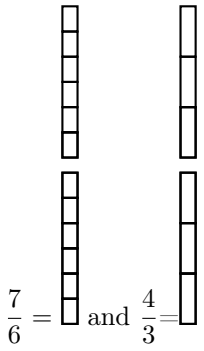
- So



Ex 55: Compare using $>, <, =$:

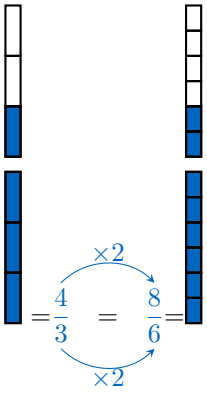
$$\frac{7}{6} \boxed{<} \frac{4}{3}$$

Hint: color the bars below to help you compare the fractions.

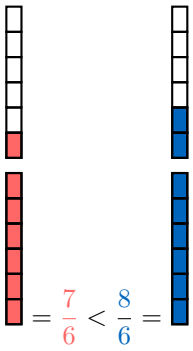


Answer:

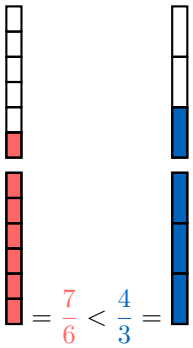
- Find equivalent fractions with the same denominator:



- Compare with same denominator:



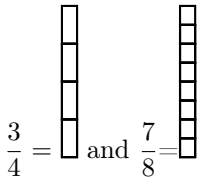
- So



Ex 56: Compare using $>, <, =$:

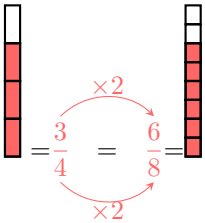
$$\frac{3}{4} \boxed{<} \frac{7}{8}$$

Hint: color the bars below to help you compare the fractions.

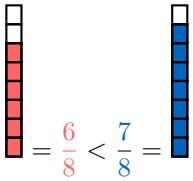


Answer:

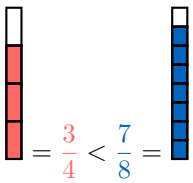
- Find equivalent fractions with the same denominator:



- Compare with same denominator:



- So



E.4 COMPARING FRACTIONS TO REAL-WORLD PROBLEMS

MCQ 57: Hugo spends $\frac{3}{8}$ of his money on Pokemon cards and $\frac{1}{4}$ of his money to buy a tennis racket. On which does he spend more money?

☒ Pokemon cards

☐ Tennis racquet

Answer:

- Convert to a common denominator: $\frac{1}{4} \overset{\times 2}{=} \frac{2}{8}$
- Since $\frac{2}{8} < \frac{3}{8}$, $\frac{1}{4} < \frac{3}{8}$
- So, Hugo spends more money on Pokemon cards than on a tennis racquet.

MCQ 58: Sophie spends $\frac{1}{2}$ of her money on clothes and $\frac{3}{8}$ of her money on books. On which does she spend more money?

☒ Clothes

☐ Books

Answer:

- Convert to a common denominator: $\frac{1}{2} \overset{\times 4}{=} \frac{4}{8}$
- Since $\frac{4}{8} > \frac{3}{8}$, $\frac{1}{2} > \frac{3}{8}$
- So, Sophie spends more money on clothes than on books.

MCQ 59: For her cake recipe, Sarah uses $\frac{2}{5}$ of a cup of butter and $\frac{3}{10}$ of a cup of sugar. Which ingredient does she use more of?

☒ Butter

☐ Sugar

Answer:

- Convert to a common denominator: $\frac{2}{5} \overset{\times 2}{=} \frac{4}{10}$
- Since $\frac{4}{10} > \frac{3}{10}$, Sarah uses more butter than sugar.

MCQ 60: In Class A, $\frac{6}{10}$ of the students are girls, and in Class B, $\frac{13}{20}$ of the students are girls. In which class is the proportion of girls higher?

☐ Class A

☒ Class B

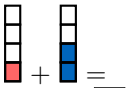
Answer:

- Convert to a common denominator: $\frac{6}{10} = \frac{12}{20}$ ($\times 2$ above, $\times 2$ below)
- Since $\frac{12}{20} < \frac{13}{20}$, the proportion of girls is higher in Class B.

F ADDITION AND SUBTRACTION WITH COMMON DENOMINATORS

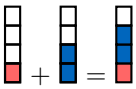
F.1 ADDING FRACTIONS WITH COMMON DENOMINATORS

Ex 61:



$$\frac{1}{4} + \frac{2}{4} = \boxed{\frac{3}{4}}$$

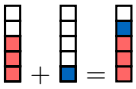
Answer:

- 
- $\frac{1}{4} + \frac{2}{4} = \frac{1+2}{4} = \frac{3}{4}$

Ex 62:

$$\frac{3}{5} + \frac{1}{5} = \boxed{\frac{4}{5}}$$

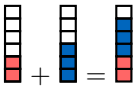
Answer:

- 
- $\frac{3}{5} + \frac{1}{5} = \frac{3+1}{5} = \frac{4}{5}$

Ex 63:

$$\frac{2}{6} + \frac{3}{6} = \boxed{\frac{5}{6}}$$

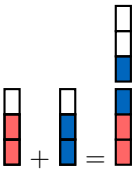
Answer:

- 
- $\frac{2}{6} + \frac{3}{6} = \frac{2+3}{6} = \frac{5}{6}$

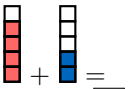
Ex 64:

$$\frac{2}{3} + \frac{2}{3} = \boxed{\frac{4}{3}}$$

Answer:

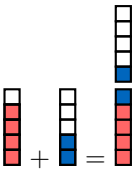
- 
- $\frac{2}{3} + \frac{2}{3} = \frac{2+2}{3} = \frac{4}{3}$

Ex 65:



$$\frac{4}{5} + \frac{2}{5} = \boxed{\frac{6}{5}}$$

Answer:

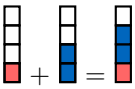
- 
- $\frac{4}{5} + \frac{2}{5} = \frac{4+2}{5} = \frac{6}{5}$

F.2 ADDING FRACTIONS WITH COMMON DENOMINATORS

Ex 66:

$$\frac{1}{4} + \frac{2}{4} = \boxed{\frac{3}{4}}$$

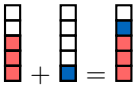
Answer:

- 
- $\frac{1}{4} + \frac{2}{4} = \frac{1+2}{4} = \frac{3}{4}$

Ex 67:

$$\frac{3}{5}+\frac{1}{5}=\boxed{\frac{4}{5}}$$

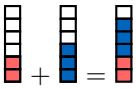
Answer:

- 
- $\frac{3}{5}+\frac{1}{5}=\frac{3+1}{5}$
  $=\frac{4}{5}$

Ex 68:

$$\frac{2}{6}+\frac{3}{6}=\boxed{\frac{5}{6}}$$

Answer:

- 
- $\frac{2}{6}+\frac{3}{6}=\frac{2+3}{6}$
  $=\frac{5}{6}$

Ex 69:

$$\frac{2}{3}+\frac{2}{3}=\boxed{\frac{4}{3}}$$

Answer:

- 
- $\frac{2}{3}+\frac{2}{3}=\frac{2+2}{3}$
  $=\frac{4}{3}$

Ex 70:

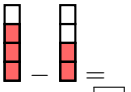
$$\frac{4}{5}+\frac{2}{5}=\boxed{\frac{6}{5}}$$

Answer:

- 
- $\frac{4}{5}+\frac{2}{5}=\frac{4+2}{5}$
  $=\frac{6}{5}$

F.3 SUBTRACTING FRACTIONS WITH COMMON DENOMINATORS

Ex 71:



$$\frac{3}{4}-\frac{2}{4}=\boxed{\frac{1}{4}}$$

Answer:

- 
- $\frac{3}{4}-\frac{2}{4}=\frac{3-2}{4}$
  $=\frac{1}{4}$

Ex 72:

$$\frac{4}{5}-\frac{3}{5}=\boxed{\frac{1}{5}}$$

Answer:

- 
- $\frac{4}{5}-\frac{3}{5}=\frac{4-3}{5}$
  $=\frac{1}{5}$

Ex 73:

$$\frac{3}{4}-\frac{1}{4}=\boxed{\frac{3}{4}}$$

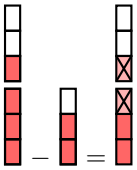
Answer:

- 
- $\frac{3}{4}-\frac{1}{4}=\frac{3-1}{4}$
  $=\frac{2}{4}$

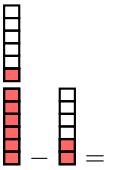
Ex 74:

$$\frac{4}{3}-\frac{2}{3}=\boxed{\frac{2}{3}}$$

Answer:

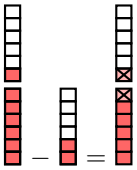
- 
- $\frac{4}{3} - \frac{2}{3} = \frac{4-2}{3} = \frac{2}{3}$

Ex 75:



$\frac{7}{6} - \frac{2}{6} = \boxed{\frac{5}{6}}$

Answer:

- 
- $\frac{7}{6} - \frac{2}{6} = \frac{7-2}{6} = \frac{5}{6}$

F.4 SUBTRACTING FRACTIONS WITH COMMON DENOMINATORS

Ex 76:

$$\frac{3}{4} - \frac{2}{4} = \boxed{\frac{1}{4}}$$

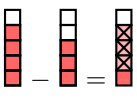
Answer:

- 
- $\frac{3}{4} - \frac{2}{4} = \frac{3-2}{4} = \frac{1}{4}$

Ex 77:

$$\frac{4}{5} - \frac{3}{5} = \boxed{\frac{1}{5}}$$

Answer:

- 
- $\frac{4}{5} - \frac{3}{5} = \frac{4-3}{5} = \frac{1}{5}$

Ex 78:

$$\frac{3}{4} - \frac{1}{4} = \boxed{\frac{3}{4}}$$

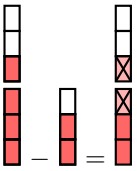
Answer:

- 
- $\frac{3}{4} - \frac{1}{4} = \frac{3-1}{4} = \frac{2}{4}$

Ex 79:

$$\frac{4}{3} - \frac{2}{3} = \boxed{\frac{2}{3}}$$

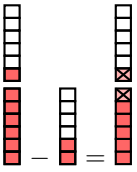
Answer:

- 
- $\frac{4}{3} - \frac{2}{3} = \frac{4-2}{3} = \frac{2}{3}$

Ex 80:

$$\frac{7}{6} - \frac{2}{6} = \boxed{\frac{5}{6}}$$

Answer:

- 
- $\frac{7}{6} - \frac{2}{6} = \frac{7-2}{6} = \frac{5}{6}$

G ADDITION AND SUBTRACTION WITH DIFFERENT DENOMINATORS

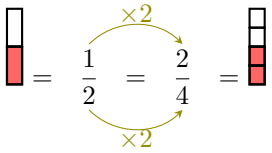
G.1 FINDING A COMMON DENOMINATOR

Ex 81:

$$\frac{1}{2} + \frac{1}{4} = \boxed{\frac{2}{4}} + \frac{1}{4}$$

Answer:

- Since $\frac{1}{2}$ and $\frac{1}{4}$ have different denominators, rewrite $\frac{1}{2}$ with the denominator 4:



This ensures the fractions have the same denominator.

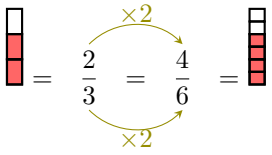
- $$\frac{1}{2}+\frac{1}{4}=\frac{2}{4}+\frac{1}{4}$$
- 

Ex 82:

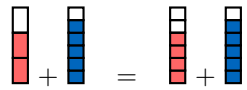
$$\frac{2}{3}+\frac{5}{6}=\frac{\boxed{4}}{6}+\frac{5}{6}$$

Answer:

- Since $\frac{2}{3}$ and $\frac{5}{6}$ have different denominators, rewrite $\frac{2}{3}$ with the denominator 6:



This ensures the fractions have the same denominator.

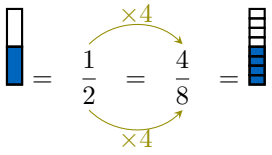
- $$\frac{2}{3}+\frac{5}{6}=\frac{4}{6}+\frac{5}{6}$$
- 

Ex 83:

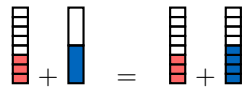
$$\frac{3}{8}+\frac{1}{2}=\frac{3}{8}+\frac{\boxed{4}}{8}$$

Answer:

- Since $\frac{3}{8}$ and $\frac{1}{2}$ have different denominators, rewrite $\frac{1}{2}$ with the denominator 8:



This ensures the fractions have the same denominator.

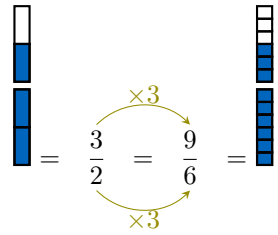
- $$\frac{3}{8}+\frac{1}{2}=\frac{3}{8}+\frac{4}{8}$$
- 

Ex 84:

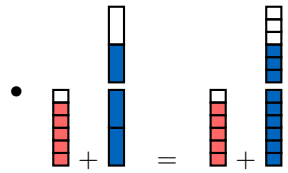
$$\frac{5}{6}+\frac{3}{2}=\frac{5}{6}+\frac{\boxed{9}}{6}$$

Answer:

- Since $\frac{5}{6}$ and $\frac{3}{2}$ have different denominators, rewrite $\frac{3}{2}$ with the denominator 6:



This ensures the fractions have the same denominator.

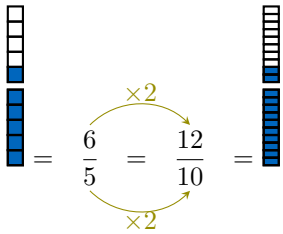
- $$\frac{5}{6}+\frac{3}{2}=\frac{5}{6}+\frac{9}{6}$$
- 

Ex 85:

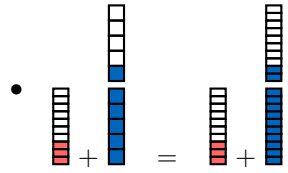
$$\frac{3}{10}+\frac{6}{5}=\frac{3}{10}+\frac{\boxed{12}}{10}$$

Answer:

- Since $\frac{3}{10}$ and $\frac{6}{5}$ have different denominators, rewrite $\frac{6}{5}$ with the denominator 10:



This ensures the fractions have the same denominator.

- $$\frac{3}{10}+\frac{6}{5}=\frac{3}{10}+\frac{12}{10}$$
- 

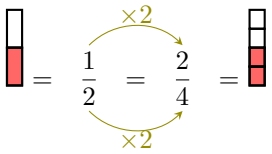
G.2 ADDING FRACTIONS STEP BY STEP

Ex 86:

$$\frac{1}{2}+\frac{1}{4} = \frac{\boxed{2}}{4}+\frac{\boxed{1}}{4} = \frac{\boxed{3}}{4}$$

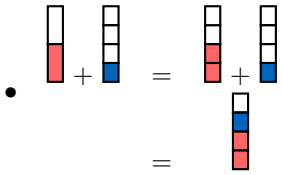
Answer:

- Since $\frac{1}{2}$ and $\frac{1}{4}$ have different denominators, rewrite $\frac{1}{2}$ with the denominator 4:



  This ensures the fractions have the same denominator.

- $$\frac{1}{2}+\frac{1}{4} = \frac{2}{4}+\frac{1}{4} = \frac{3}{4}$$

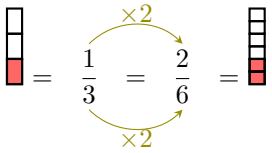
- 

Ex 87:

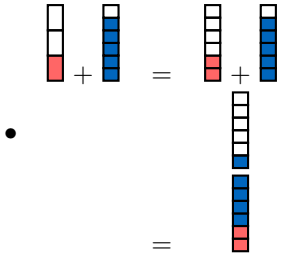
$$\frac{1}{3}+\frac{5}{6} = \frac{\boxed{2}}{6}+\frac{\boxed{5}}{6} = \frac{\boxed{7}}{6}$$

Answer:

- Since $\frac{1}{3}$ and $\frac{5}{6}$ have different denominators, rewrite $\frac{1}{3}$ with the denominator 6:



- $$\frac{1}{3}+\frac{5}{6} = \frac{2}{6}+\frac{5}{6} = \frac{7}{6}$$

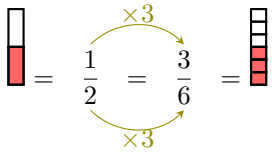
- 

Ex 88:

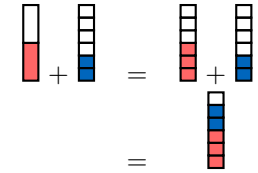
$$\frac{1}{2}+\frac{2}{6} = \frac{\boxed{3}}{6}+\frac{\boxed{2}}{6} = \frac{\boxed{5}}{6}$$

Answer:

- Since $\frac{1}{2}$ and $\frac{2}{6}$ have different denominators, rewrite $\frac{1}{2}$ with the denominator 6:



- $$\frac{1}{2}+\frac{2}{6} = \frac{3}{6}+\frac{2}{6} = \frac{5}{6}$$

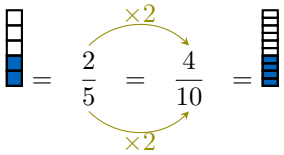
- 

Ex 89:

$$\frac{3}{10}+\frac{2}{5} = \frac{\boxed{3}}{10}+\frac{\boxed{4}}{10} = \frac{\boxed{7}}{10}$$

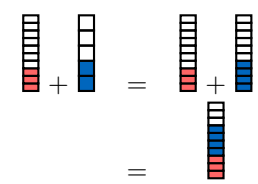
Answer:

- Since $\frac{3}{10}$ and $\frac{2}{5}$ have different denominators, rewrite $\frac{2}{5}$ with the denominator 10:



  This ensures the fractions have the same denominator.

- $$\frac{3}{10}+\frac{2}{5} = \frac{3}{10}+\frac{4}{10} = \frac{7}{10}$$

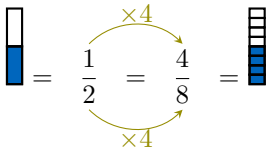
- 

Ex 90:

$$\frac{3}{8}+\frac{1}{2} = \frac{\boxed{3}}{8}+\frac{\boxed{4}}{8} = \frac{\boxed{7}}{8}$$

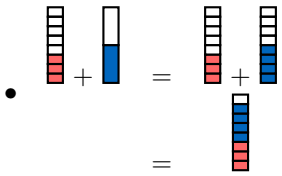
Answer:

- Since $\frac{3}{8}$ and $\frac{1}{2}$ have different denominators, rewrite $\frac{1}{2}$ with the denominator 8:



  This ensures the fractions have the same denominator.

- $$\frac{3}{8}+\frac{1}{2}=\frac{3}{8}+\frac{4}{8}$$
$$=\frac{7}{8}$$

- 

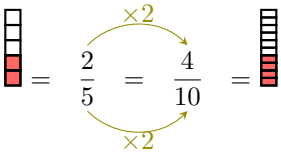
G.3 ADDING FRACTIONS

Ex 91:

$$\frac{2}{5}+\frac{3}{10} = \frac{\boxed{4}}{\boxed{10}}+\frac{\boxed{3}}{\boxed{10}} = \frac{\boxed{7}}{\boxed{10}}$$

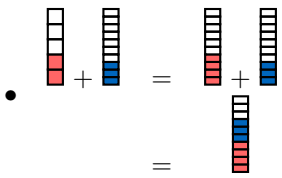
Answer:

- Since $\frac{2}{5}$ and $\frac{3}{10}$ have different denominators, rewrite $\frac{2}{5}$ with the denominator 10:



  This ensures the fractions have the same denominator.

- $$\frac{2}{5}+\frac{3}{10}=\frac{4}{10}+\frac{3}{10}$$
$$=\frac{7}{10}$$

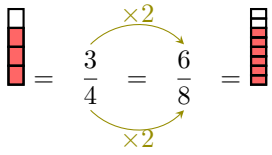
- 

Ex 92:

$$\frac{3}{4}+\frac{1}{8} = \frac{\boxed{6}}{\boxed{8}}+\frac{\boxed{1}}{\boxed{8}} = \frac{\boxed{7}}{\boxed{8}}$$

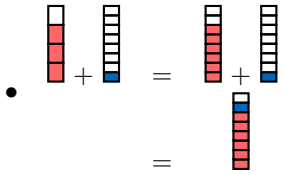
Answer:

- Since $\frac{3}{4}$ and $\frac{1}{8}$ have different denominators, rewrite $\frac{3}{4}$ with the denominator 8:



  This ensures the fractions have the same denominator.

- $$\frac{3}{4}+\frac{1}{8}=\frac{6}{8}+\frac{1}{8}$$
$$=\frac{7}{8}$$

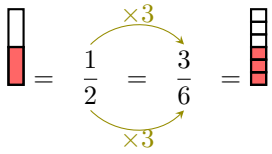
- 

Ex 93:

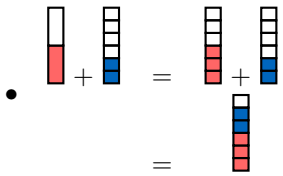
$$\frac{1}{2}+\frac{2}{6} = \frac{\boxed{3}}{\boxed{6}}+\frac{\boxed{2}}{\boxed{6}} = \frac{\boxed{5}}{\boxed{6}}$$

Answer:

- Since $\frac{1}{2}$ and $\frac{2}{6}$ have different denominators, rewrite $\frac{1}{2}$ with the denominator 6:



- $$\frac{1}{2}+\frac{2}{6}=\frac{3}{6}+\frac{2}{6}$$
$$=\frac{5}{6}$$

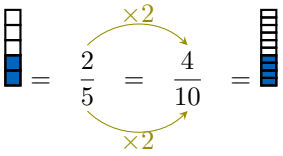
- 

Ex 94:

$$\frac{3}{10}+\frac{2}{5} = \frac{\boxed{3}}{\boxed{10}}+\frac{\boxed{4}}{\boxed{10}} = \frac{\boxed{7}}{\boxed{10}}$$

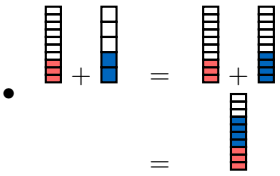
Answer:

- Since $\frac{3}{10}$ and $\frac{2}{5}$ have different denominators, rewrite $\frac{2}{5}$ with the denominator 10:



This ensures the fractions have the same denominator.

- $$\frac{3}{10}+\frac{2}{5}=\frac{3}{10}+\frac{4}{10}$$
$$=\frac{7}{10}$$

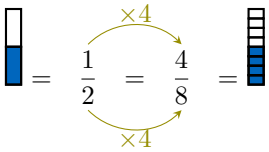
- 

Ex 95:

$$\frac{3}{8}+\frac{1}{2} = \frac{\boxed{3}}{\boxed{8}}+\frac{\boxed{4}}{\boxed{8}}$$
$$= \frac{\boxed{7}}{\boxed{8}}$$

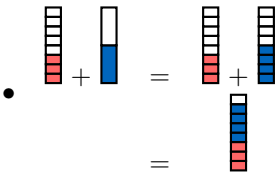
Answer:

- Since $\frac{3}{8}$ and $\frac{1}{2}$ have different denominators, rewrite $\frac{1}{2}$ with the denominator 8:



This ensures the fractions have the same denominator.

- $$\frac{3}{8}+\frac{1}{2}=\frac{3}{8}+\frac{4}{8}$$
$$=\frac{7}{8}$$

- 

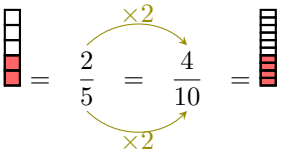
G.4 ADDING FRACTIONS

Ex 96:

$$\frac{2}{5}+\frac{3}{10}=\frac{\boxed{7}}{\boxed{10}}$$

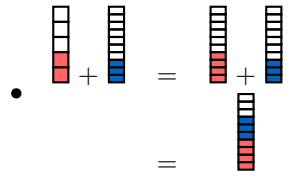
Answer:

- Since $\frac{2}{5}$ and $\frac{3}{10}$ have different denominators, rewrite $\frac{2}{5}$ with the denominator 10:



This ensures the fractions have the same denominator.

- $$\frac{2}{5}+\frac{3}{10}=\frac{4}{10}+\frac{3}{10}$$
$$=\frac{7}{10}$$

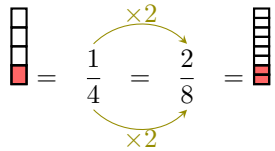
- 

Ex 97:

$$\frac{1}{4}+\frac{3}{8}=\frac{\boxed{5}}{\boxed{8}}$$

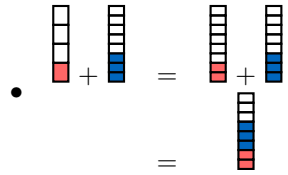
Answer:

- Since $\frac{1}{4}$ and $\frac{3}{8}$ have different denominators, rewrite $\frac{1}{4}$ with the denominator 8:



This ensures the fractions have the same denominator.

- $$\frac{1}{4}+\frac{3}{8}=\frac{2}{8}+\frac{3}{8}$$
$$=\frac{5}{8}$$

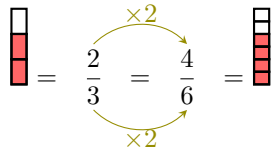
- 

Ex 98:

$$\frac{2}{3}+\frac{1}{6}=\frac{\boxed{5}}{\boxed{6}}$$

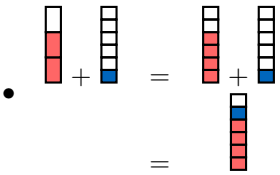
Answer:

- Since $\frac{2}{3}$ and $\frac{1}{6}$ have different denominators, rewrite $\frac{2}{3}$ with the denominator 6:



This ensures the fractions have the same denominator.

- $$\frac{2}{3}+\frac{1}{6}=\frac{4}{6}+\frac{1}{6}$$
$$=\frac{5}{6}$$

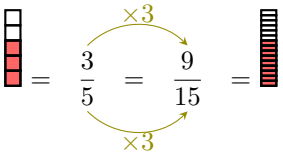
- 

Ex 99:

$$\frac{3}{5}+\frac{2}{15}=\boxed{\frac{11}{15}}$$

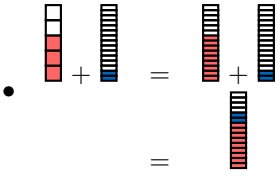
Answer:

- Since $\frac{3}{5}$ and $\frac{2}{15}$ have different denominators, rewrite $\frac{3}{5}$ with the denominator 15:



This ensures the fractions have the same denominator.

- $$\frac{3}{5}+\frac{2}{15}=\frac{9}{15}+\frac{2}{15}$$
$$=\frac{11}{15}$$

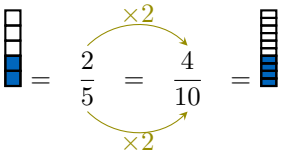
- 

Ex 100:

$$\frac{3}{10}+\frac{2}{5}=\boxed{\frac{7}{10}}$$

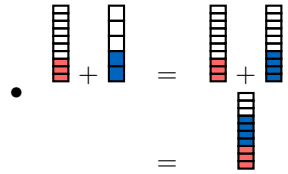
Answer:

- Since $\frac{3}{10}$ and $\frac{2}{5}$ have different denominators, rewrite $\frac{2}{5}$ with the denominator 10:



This ensures the fractions have the same denominator.

- $$\frac{3}{10}+\frac{2}{5}=\frac{3}{10}+\frac{4}{10}$$
$$=\frac{7}{10}$$

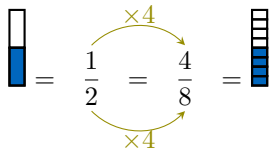
- 

Ex 101:

$$\frac{3}{8}+\frac{1}{2}=\boxed{\frac{7}{8}}$$

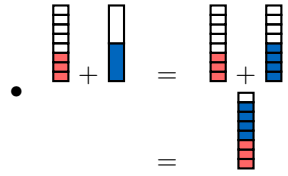
Answer:

- Since $\frac{3}{8}$ and $\frac{1}{2}$ have different denominators, rewrite $\frac{1}{2}$ with the denominator 8:



This ensures the fractions have the same denominator.

- $$\frac{3}{8}+\frac{1}{2}=\frac{3}{8}+\frac{4}{8}$$
$$=\frac{7}{8}$$

- 

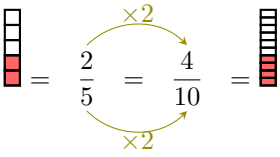
G.5 SUBTRACTING FRACTIONS

Ex 102:

$$\frac{2}{5}-\frac{3}{10}=\frac{\boxed{4}}{\boxed{10}}-\frac{\boxed{3}}{\boxed{10}}$$
$$=\frac{\boxed{1}}{\boxed{10}}$$

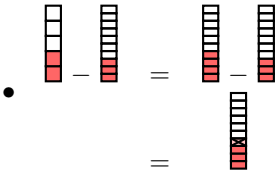
Answer:

- Since $\frac{2}{5}$ and $\frac{3}{10}$ have different denominators, rewrite $\frac{2}{5}$ with the denominator 10:



This ensures the fractions have the same denominator.

- $$\frac{2}{5}-\frac{3}{10}=\frac{4}{10}-\frac{3}{10}$$
$$=\frac{4-3}{10}$$
$$=\frac{1}{10}$$

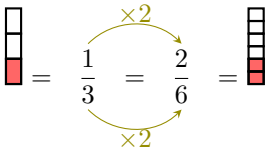
- 

Ex 103:

$$\frac{7}{6} - \frac{1}{3} = \frac{\boxed{7}}{\boxed{6}} - \frac{\boxed{2}}{\boxed{6}} = \frac{\boxed{5}}{\boxed{6}}$$

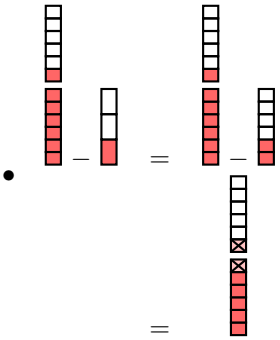
Answer:

- Since $\frac{7}{6}$ and $\frac{1}{3}$ have different denominators, rewrite $\frac{1}{3}$ with the denominator 6:



This ensures the fractions have the same denominator.

- $$\frac{7}{6} - \frac{1}{3} = \frac{7}{6} - \frac{2}{6} = \frac{7-2}{6} = \frac{5}{6}$$

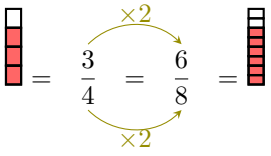
- 

Ex 104:

$$\frac{7}{8} - \frac{3}{4} = \frac{\boxed{7}}{\boxed{8}} - \frac{\boxed{6}}{\boxed{8}} = \frac{\boxed{1}}{\boxed{8}}$$

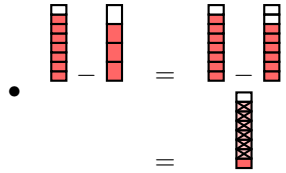
Answer:

- Since $\frac{7}{8}$ and $\frac{3}{4}$ have different denominators, rewrite $\frac{3}{4}$ with the denominator 8:



This ensures the fractions have the same denominator.

- $$\frac{7}{8} - \frac{3}{4} = \frac{7}{8} - \frac{6}{8} = \frac{7-6}{8} = \frac{1}{8}$$

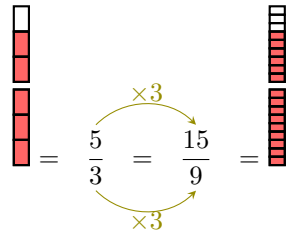
- 

Ex 105:

$$\frac{5}{3} - \frac{5}{9} = \frac{\boxed{5}}{\boxed{3}} - \frac{\boxed{5}}{\boxed{9}} = \frac{\boxed{10}}{\boxed{9}}$$

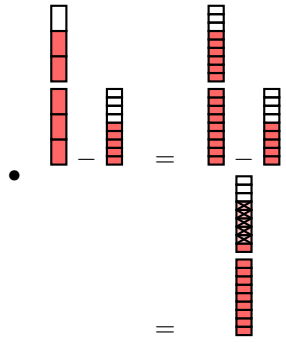
Answer:

- Since $\frac{5}{3}$ and $\frac{5}{9}$ have different denominators, rewrite $\frac{5}{3}$ with the denominator 9:



This ensures the fractions have the same denominator.

- $$\frac{5}{3} - \frac{5}{9} = \frac{15}{9} - \frac{5}{9} = \frac{15-5}{9} = \frac{10}{9}$$

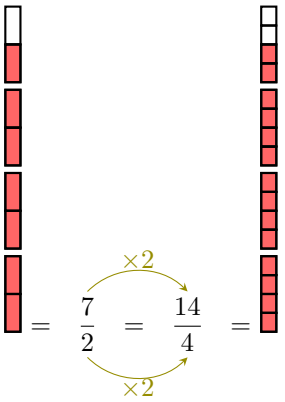
- 

Ex 106:

$$\frac{7}{2} - \frac{7}{4} = \frac{\boxed{7}}{\boxed{2}} - \frac{\boxed{7}}{\boxed{4}} = \frac{\boxed{7}}{\boxed{4}}$$

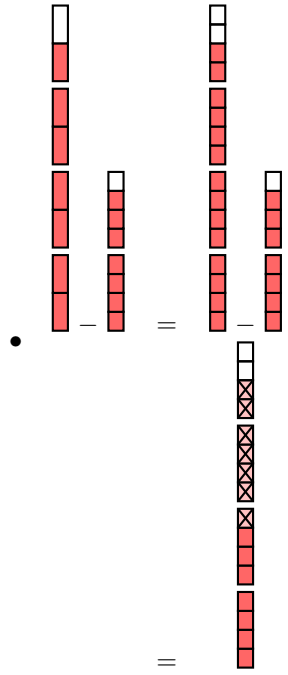
Answer:

- Since $\frac{7}{2}$ and $\frac{7}{4}$ have different denominators, rewrite $\frac{7}{2}$ with the denominator 4:



This ensures the fractions have the same denominator.

- $$\frac{7}{2} - \frac{7}{4} = \frac{14}{4} - \frac{7}{4} = \frac{14-7}{4} = \frac{7}{4}$$

- 

G.6 SOLVING REAL-WORLD PROBLEMS

Ex 107: Louis has a whole cake. He cuts it into 8 equal slices and eats 3 slices. What fraction of the whole cake remains?

$\boxed{\frac{5}{8}}$ of the cake

Answer:

- **Represent the cake as a fraction**
  The whole cake is divided into 8 slices, so the whole cake is $\frac{8}{8}$.

- **Subtract the slices eaten by Louis**
  Louis eats 3 slices, which is $\frac{3}{8}$ of the cake. Remaining cake after Louis eats:
  $$\frac{8}{8} - \frac{3}{8} = \frac{5}{8}.$$

- **Final Answer:**
  The fraction of the cake that remains is $\frac{5}{8}$.

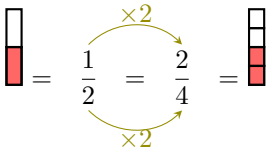
Ex 108: Today, Louis eats $\frac{1}{2}$ of a croissant. Then, Louis eats $\frac{1}{4}$ of another croissant. How much croissant did Louis eat in total?

$\boxed{\frac{3}{4}}$ of a croissant

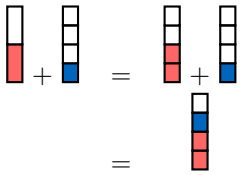
Answer:

- **Represent the croissants as fractions**
  Louis eats $\frac{1}{2}$ of the first croissant and $\frac{1}{4}$ of the second croissant. To find the total, add the two fractions:
  $$\frac{1}{2} + \frac{1}{4}.$$

- **Find a common denominator**
  The denominators are 2 and 4. The least common denominator is 4. Convert $\frac{1}{2}$ to a fraction with denominator 4:



- **Add the fractions**
  $$\frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$$



- **Final Answer:**
  Louis ate a total of $\frac{3}{4}$ of a croissant.

Ex 109: At the beginning, there are $\frac{5}{6}$ of a cake. After eating, there are $\frac{2}{3}$ of the cake. What quantity of cake did Louis eat?

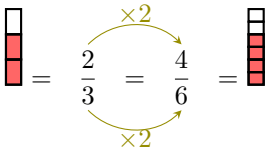
$\boxed{\frac{1}{6}}$ of the cake

Answer:

- **Represent the cake as fractions**
  At the beginning, there is $\frac{5}{6}$ of the cake. After eating, $\frac{2}{3}$ of the cake remains. To find the quantity Louis ate, subtract the remaining cake from the initial amount:

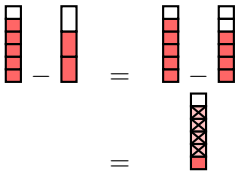
$$\frac{5}{6} - \frac{2}{3}.$$

- **Find a common denominator**
  The denominators are 6 and 3. The least common denominator is 6. Convert $\frac{2}{3}$ to a fraction with denominator 6:



- **Subtract the fractions**

$$\frac{5}{6} - \frac{2}{3} = \frac{5}{6} - \frac{4}{6}$$
$$= \frac{1}{6}$$



- **Final Answer:**
  Louis ate $\frac{1}{6}$ of the cake.

Ex 110: At the beginning, there are $\frac{7}{8}$ of a pizza. After eating, there are $\frac{3}{4}$ of the pizza. What quantity of pizza did Louis eat?

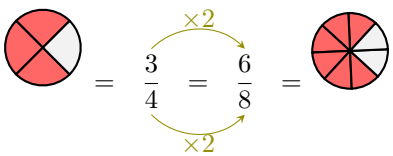
$$\frac{\boxed{1}}{\boxed{8}} \text{ of the pizza}$$

Answer:

- **Represent the pizza as fractions**
  At the beginning, there is $\frac{7}{8}$ of the pizza. After eating, $\frac{3}{4}$ of the pizza remains. To find the quantity Louis ate, subtract the remaining pizza from the initial amount:

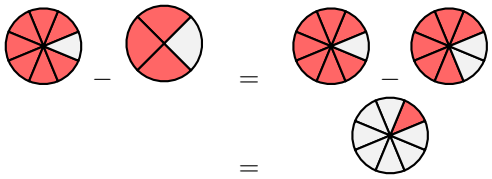
$$\frac{7}{8} - \frac{3}{4}.$$

- **Find a common denominator**
  The denominators are 8 and 4. The least common denominator is 8. Convert $\frac{3}{4}$ to a fraction with denominator 8:



- **Subtract the fractions**

$$\frac{7}{8} - \frac{3}{4} = \frac{7}{8} - \frac{6}{8}$$
$$= \frac{1}{8}$$



- **Final Answer:**
  Louis ate $\frac{1}{8}$ of the pizza.

Ex 111: Louis read $\frac{2}{5}$ of his book on Saturday and $\frac{3}{10}$ of his book on Sunday. How much of his book did Louis read in total?

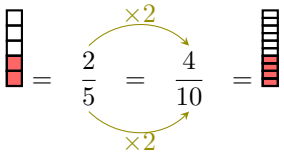
$$\frac{\boxed{7}}{\boxed{10}} \text{ of the book}$$

Answer:

- **Represent the book as fractions**
  Louis read $\frac{2}{5}$ of the book on Saturday and $\frac{3}{10}$ of the book on Sunday. To find the total, add the two fractions:

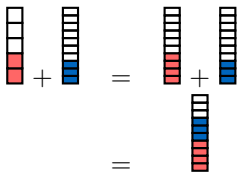
$$\frac{2}{5} + \frac{3}{10}.$$

- **Find a common denominator**
  The denominators are 5 and 10. The least common denominator is 10. Convert $\frac{2}{5}$ to a fraction with denominator 10:



- **Add the fractions**

$$\frac{2}{5} + \frac{3}{10} = \frac{4}{10} + \frac{3}{10}$$
$$= \frac{7}{10}$$



- **Final Answer:**
  Louis read a total of $\frac{7}{10}$ of his book.