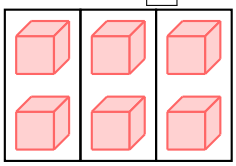
MULTIPLICATION

A WHAT IS MULTIPLICATION?

A.1 CALCULATING MULTIPLICATIONS USING CUBES

Ex 1:

$3 \times 2 = \boxed{6}$

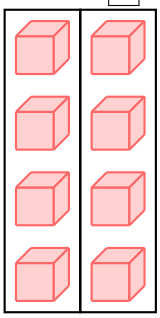


Answer:

$$3 \times 2 = 2 + 2 + 2$$
$$= 6$$

Ex 2:

$2 \times 4 = \boxed{8}$

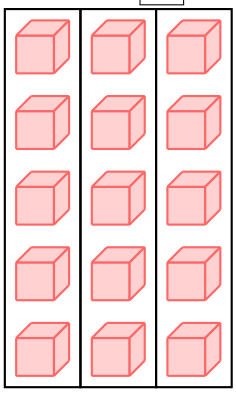


Answer:

$$2 \times 4 = 4 + 4$$
$$= 8$$

Ex 3:

$3 \times 5 = \boxed{15}$

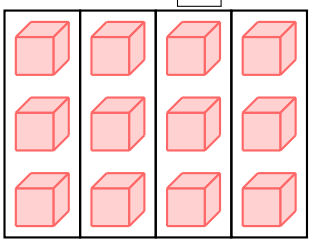


Answer:

$$3 \times 5 = 5 + 5 + 5$$
$$= 15$$

Ex 4:

$4 \times 3 = \boxed{12}$

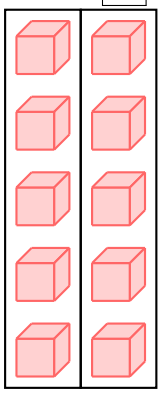


Answer:

$$4 \times 3 = 3 + 3 + 3 + 3$$
$$= 12$$

Ex 5:

$2 \times 5 = \boxed{10}$

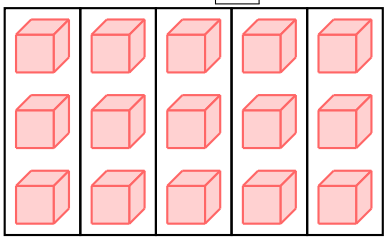


Answer:

$$2 \times 5 = 5 + 5$$
$$= 10$$

Ex 6:

$5 \times 3 = \boxed{15}$

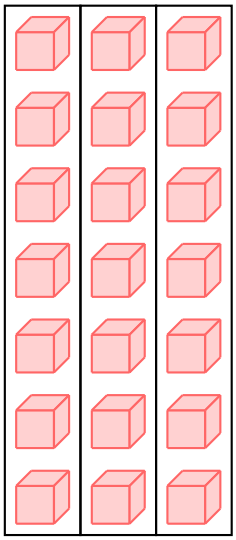


Answer:

$$5 \times 3 = 3 + 3 + 3 + 3 + 3$$
$$= 15$$

Ex 7:

$3 \times 7 = \boxed{21}$



Answer:

$$\begin{aligned} 3 \times 7 &= 7 + 7 + 7 \\ &= 14 + 7 \\ &= 21 \end{aligned}$$

A.2 FINDING THE REPEATED ADDITIONS

Ex 8:

$$5 + 5 + 5 = \boxed{3} \times 5$$

Answer:

- Count the number of 5s:

$$\overset{1}{5} + \overset{2}{5} + \overset{3}{5}$$

- $5 + 5 + 5 = 3 \times 5$

Ex 9:

$$2 + 2 + 2 + 2 = \boxed{4} \times 2$$

Answer:

- Count the number of 2s:

$$\overset{1}{2} + \overset{2}{2} + \overset{3}{2} + \overset{4}{2}$$

- $2 + 2 + 2 + 2 = 4 \times 2$

Ex 10:

$$3 + 3 + 3 = \boxed{3} \times 3$$

Answer:

- Count the number of 3s:

$$\overset{1}{3} + \overset{2}{3} + \overset{3}{3}$$

- $3 + 3 + 3 = 3 \times 3$

Ex 11:

$$9 + 9 + 9 + 9 + 9 = \boxed{5} \times 9$$

Answer:

- Count the number of 9s:

$$\overset{1}{9} + \overset{2}{9} + \overset{3}{9} + \overset{4}{9} + \overset{5}{9}$$

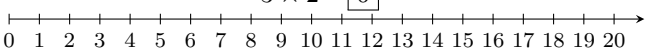
- $9 + 9 + 9 + 9 + 9 = 5 \times 9$

B ON THE NUMBER LINE

B.1 CALCULATING MULTIPLICATIONS USING NUMBER LINE

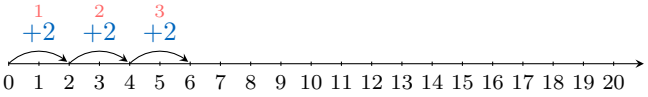
Ex 12:

$3 \times 2 = \boxed{6}$



Answer:

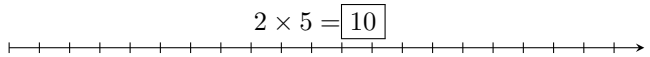
- Start from 0 and jump 2 steps to the right, 3 times.



- $3 \times 2 = 6$

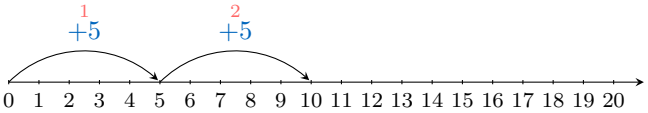
Ex 13:

$2 \times 5 = \boxed{10}$



Answer:

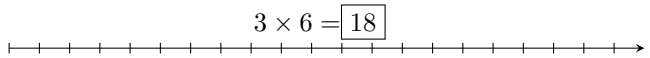
- Start from 0 and jump 5 steps to the right, 2 times.



- $2 \times 5 = 10$

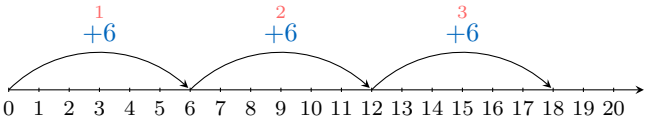
Ex 14:

$3 \times 6 = \boxed{18}$



Answer:

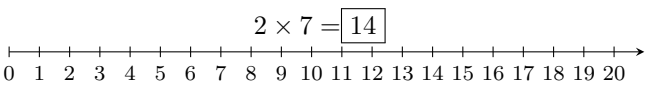
- Start from 0 and jump 6 steps to the right, 3 times.



- $3 \times 6 = 18$

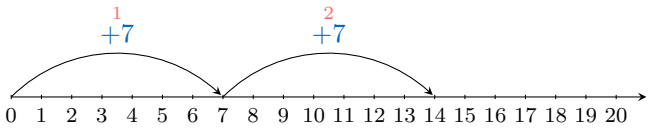
Ex 15:

$2 \times 7 = \boxed{14}$



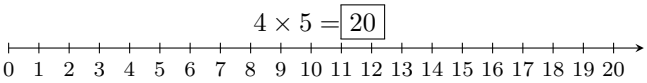
Answer:

- Start from 0 and jump 7 steps to the right, 2 times.



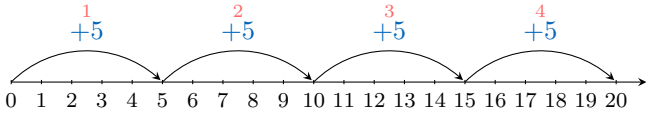
- $2 \times 7 = 14$

Ex 16:



Answer:

- Start from 0 and jump 5 steps to the right, 4 times.

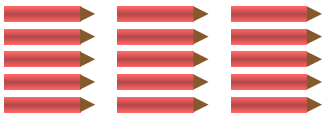


- $4 \times 5 = 20$

C MULTIPLICATION IN WORD PROBLEMS

C.1 SOLVING REAL-WORLD PROBLEMS WITH DRAWING

Ex 17: Hugo has three boxes of pencils. Each box has 5 pencils.

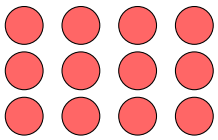


Hugo has $\boxed{15}$ pencils in total.

Answer:

- Hugo has 3 groups of 5 pencils.
- Adding groups: $5 + 5 + 5 = 15$ pencils.
- Hugo has 15 pencils in total.

Ex 18: Su has four boxes of marbles. Each box has 3 marbles.

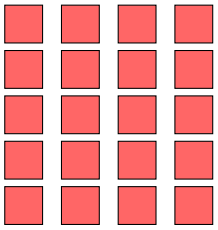


Su has $\boxed{12}$ marbles in total.

Answer:

- Su has 4 groups of 3 marbles.
- Adding groups: $3 + 3 + 3 + 3 = 12$ marbles.
- Su has 12 marbles in total.

Ex 19: Louis has four containers of Lego bricks. Each container has 5 Lego bricks.

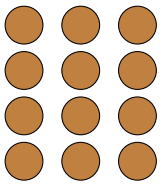


Louis has $\boxed{20}$ Lego bricks in total.

Answer:

- Louis has 4 groups of 5 Lego bricks.
- Adding groups: $5 + 5 + 5 + 5 = 20$ Lego bricks.
- Louis has 20 Lego bricks in total.

Ex 20: Alice has three jars of cookies. Each jar has 4 cookies.



Alice has $\boxed{12}$ cookies in total.

Answer:

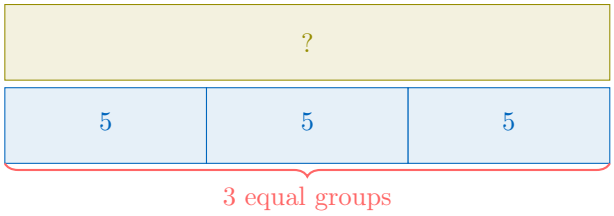
- Alice has 3 groups of 4 cookies.
- Adding groups: $4 + 4 + 4 = 12$ cookies.
- Alice has 12 cookies in total.

C.2 SOLVING REAL-WORLD PROBLEMS

Ex 21: Larbi is building toy cars for a school project. He can build 5 toy cars each day. If he works for 3 days, how many toy cars will he have in total?
Larbi will have $\boxed{15}$ toy cars.

Answer:

- Visualize the groups:

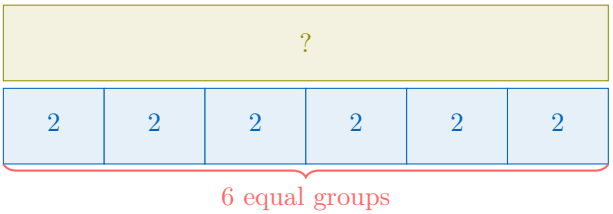


- Larbi has 3 groups of 5 toy cars.
- Calculation: $3 \times 5 = 15$
- Total: Larbi has 15 toy cars.

Ex 22: A school is buying notebooks for its students. Each student needs 2 notebooks. If there are 6 students, how many notebooks does the school need to buy?
The school needs to buy $\boxed{12}$ notebooks.

Answer:

- Visualize the groups:

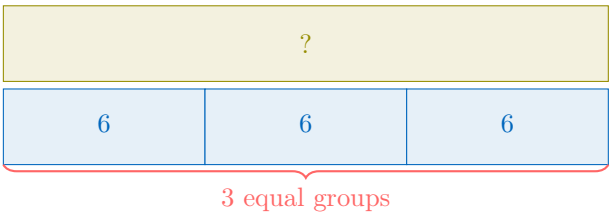


- There are 6 groups of 2 notebooks.
- Calculation: $6 \times 2 = 12$
- Total: The school needs to buy 12 notebooks.

Ex 23: Emma has 3 boxes of eggs. Each box contains 6 eggs. How many eggs does Emma have in total?
Emma has $\boxed{18}$ eggs.

Answer:

- Visualize the groups:

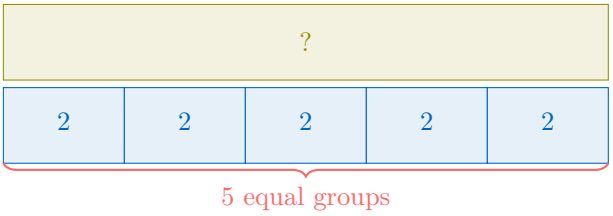


- Emma has 3 groups of 6 eggs.
- Calculation: $3 \times 6 = 18$
- Total: Emma has 18 eggs.

Ex 24: There are 5 people. Each person has 2 eyes. How many eyes are there in total?
There are $\boxed{10}$ eyes.

Answer:

- Visualize the groups:



- Calculate the multiplication: $5 \times 2 = 10$
- There are 10 eyes in total.

D DOES THE ORDER MATTER?

D.1 PLAYING WITH THE ORDER OF MULTIPLICATION

Ex 25:

$$10 \times 2 = \boxed{20}$$

Answer:

- We can think of 10×2 as adding 10 two times:
- $10 \times 2 = 2 \times 10$
  $= 10 + 10$
  $= 20$
- So, $10 \times 2 = 20$

Ex 26:

$$10 \times 3 = \boxed{30}$$

Answer:

- We can think of 10×3 as adding 10 three times:
- $10 \times 3 = 3 \times 10$
  $= 10 + 10 + 10$
  $= 30$
- So, $10 \times 3 = 30$

Ex 27:

$$15 \times 2 = \boxed{30}$$

Answer:

- We can think of 15×2 as adding 15 two times:
- $15 \times 2 = 2 \times 15$
  $= 15 + 15$
  $= 30$
- So, $15 \times 2 = 30$

Ex 28:

$$100 \times 2 = \boxed{200}$$

Answer:

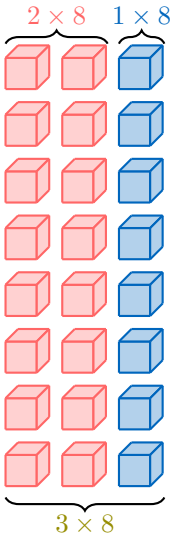
- We can think of 100×2 as adding 100 two times:
- $100 \times 2 = 2 \times 100$
  $= 100 + 100$
  $= 200$
- So, $100 \times 2 = 200$

E DECOMPOSE WITH ADDITION

E.1 BREAKING DOWN AT LEFT

Ex 29:

$$\begin{aligned} 3 \times 8 &= 2 \times 8 + 1 \times 8 \\ &= \boxed{16} + \boxed{8} \end{aligned}$$

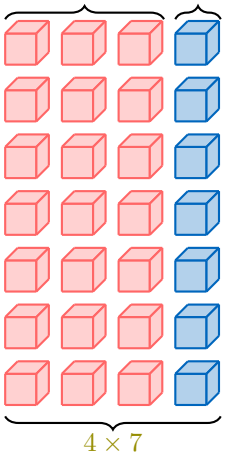


Answer:

$$3 \times 8 = 2 \times 8 + 1 \times 8$$
$$= 16 + 8$$

Ex 30:

$$4 \times 7 = 3 \times 7 + 1 \times 7$$
$$= \boxed{21} + \boxed{7}$$

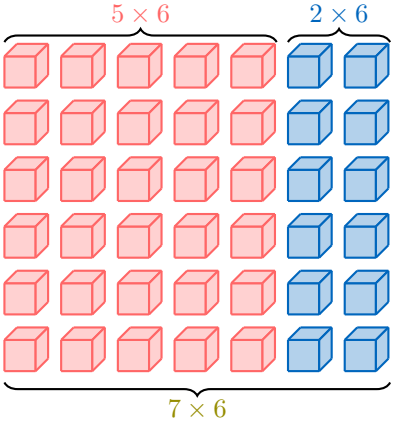


Answer:

$$4 \times 7 = 3 \times 7 + 1 \times 7$$
$$= 21 + 7$$

Ex 31:

$$7 \times 6 = 5 \times 6 + 2 \times 6$$
$$= \boxed{30} + \boxed{12}$$

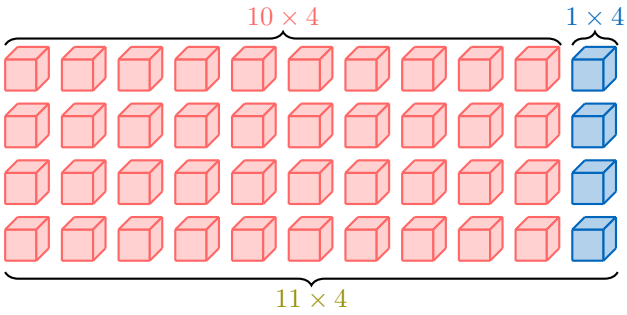


Answer:

$$7 \times 6 = 5 \times 6 + 2 \times 6$$
$$= 30 + 12$$

Ex 32:

$$11 \times 4 = 10 \times 4 + 1 \times 4$$
$$= \boxed{40} + \boxed{4}$$

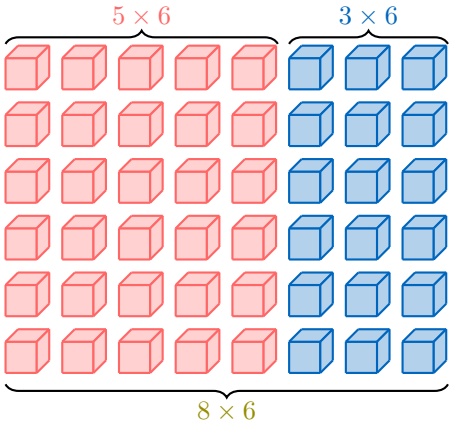


Answer:

$$11 \times 4 = 10 \times 4 + 1 \times 4$$
$$= 40 + 4$$

Ex 33:

$$8 \times 6 = 5 \times 6 + 3 \times 6$$
$$= \boxed{30} + \boxed{18}$$

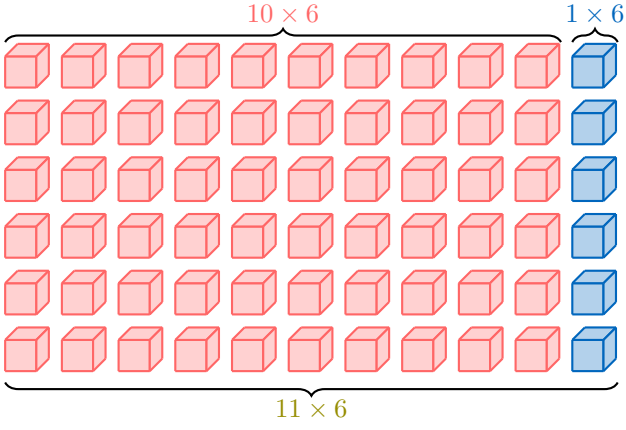


Answer:

$$8 \times 6 = 5 \times 6 + 3 \times 6$$
$$= 30 + 18$$

Ex 34:

$$11 \times 6 = 10 \times 6 + 1 \times 6$$
$$= \boxed{60} + \boxed{6}$$



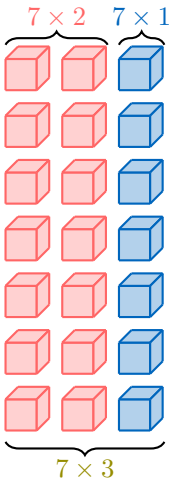
Answer:

$$11 \times 6 = 10 \times 6 + 1 \times 6$$
$$= 60 + 6$$

E.2 BREAKING DOWN AT RIGHT

Ex 35:

$$7 \times 3 = 7 \times 2 + 7 \times 1$$
$$= \boxed{14} + \boxed{7}$$

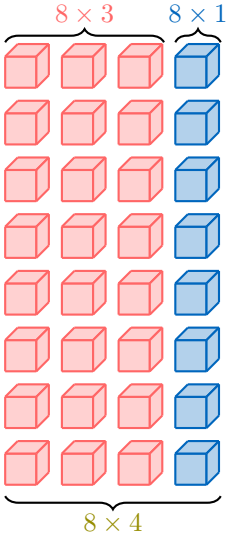


Answer:

$$7 \times 3 = 7 \times 2 + 7 \times 1$$
$$= 14 + 7$$

Ex 36:

$$8 \times 4 = 8 \times 3 + 8 \times 1$$
$$= \boxed{24} + \boxed{8}$$

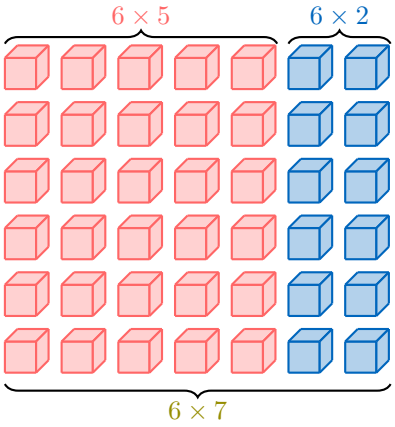


Answer:

$$8 \times 4 = 8 \times 3 + 8 \times 1$$
$$= 24 + 8$$

Ex 37:

$$6 \times 7 = 6 \times 5 + 6 \times 2$$
$$= \boxed{30} + \boxed{12}$$

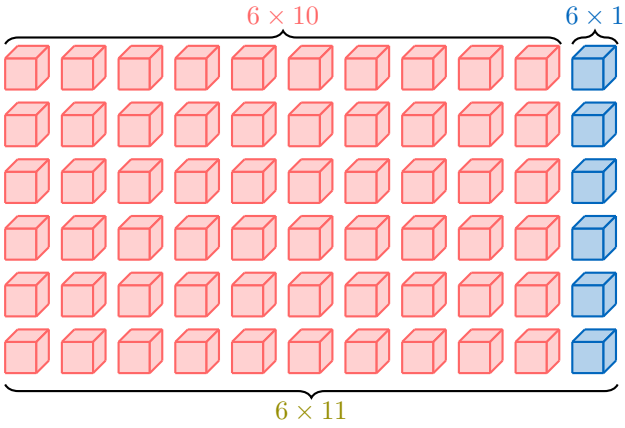


Answer:

$$6 \times 7 = 6 \times 5 + 6 \times 2$$
$$= 30 + 12$$

Ex 38:

$$6 \times 11 = 6 \times 10 + 6 \times 1$$
$$= \boxed{60} + \boxed{6}$$

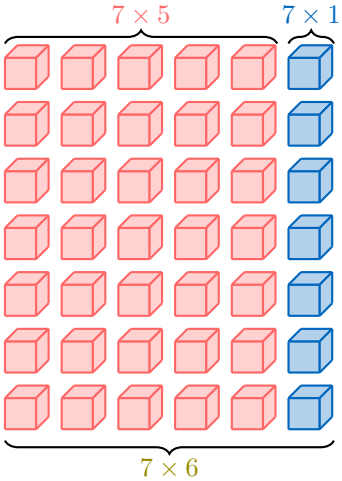


Answer:

$$6 \times 11 = 6 \times 10 + 6 \times 1$$
$$= 60 + 6$$

Ex 39:

$$7 \times 6 = 7 \times 5 + 7 \times 1$$
$$= \boxed{35} + \boxed{7}$$

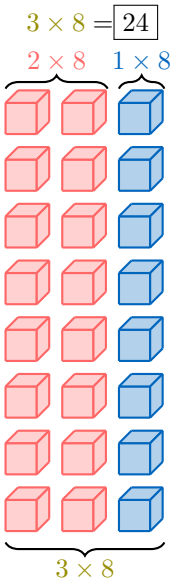


Answer:

$$7 \times 6 = 7 \times 5 + 7 \times 1$$
$$= 35 + 7$$

E.3 BREAKING DOWN AT LEFT

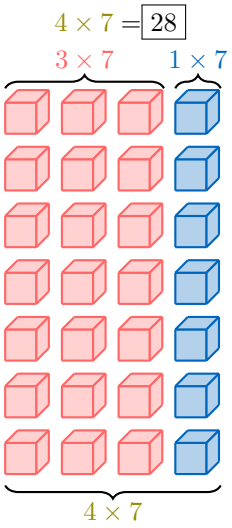
Ex 40:



Answer:

$$\begin{aligned} 3 \times 8 &= 2 \times 8 + 1 \times 8 \\ &= 16 + 8 \\ &= 24 \end{aligned}$$

Ex 41:

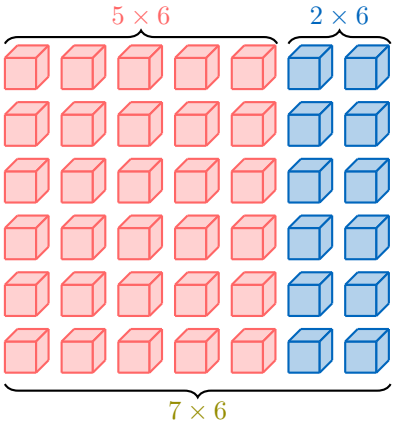


Answer:

$$\begin{aligned} 4 \times 7 &= 3 \times 7 + 1 \times 7 \\ &= 21 + 7 \\ &= 28 \end{aligned}$$

Ex 42:

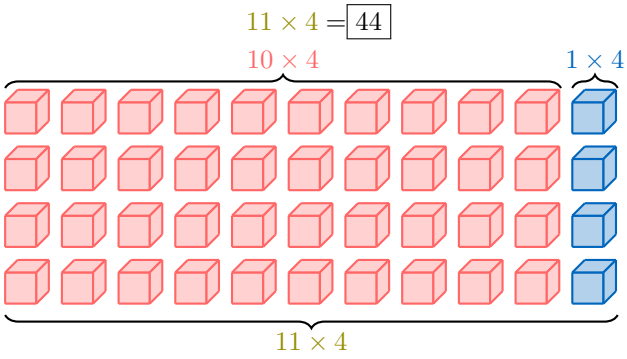
$$7 \times 6 = \boxed{42}$$



Answer:

$$\begin{aligned} 7 \times 6 &= 5 \times 6 + 2 \times 6 \\ &= 30 + 12 \\ &= 42 \end{aligned}$$

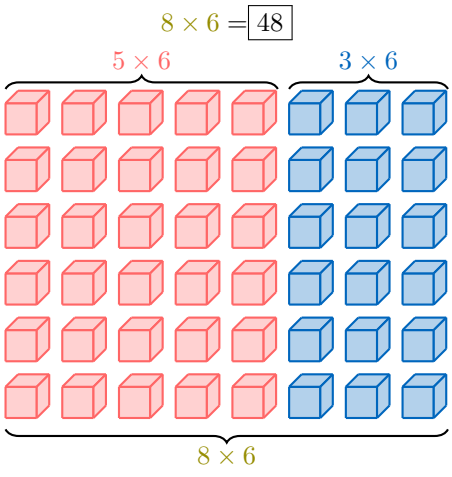
Ex 43:



Answer:

$$\begin{aligned} 11 \times 4 &= 10 \times 4 + 1 \times 4 \\ &= 40 + 4 \\ &= 44 \end{aligned}$$

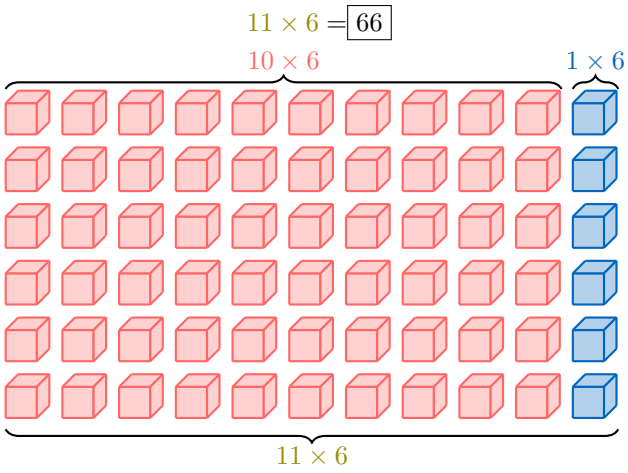
Ex 44:



Answer:

$$\begin{aligned} 8 \times 6 &= 5 \times 6 + 3 \times 6 \\ &= 30 + 18 \\ &= 48 \end{aligned}$$

Ex 45:

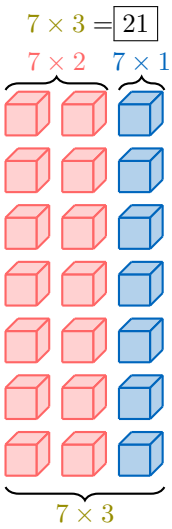


Answer:

$$\begin{aligned} 11 \times 6 &= 10 \times 6 + 1 \times 6 \\ &= 60 + 6 \\ &= 66 \end{aligned}$$

E.4 BREAKING DOWN AT RIGHT

Ex 46:

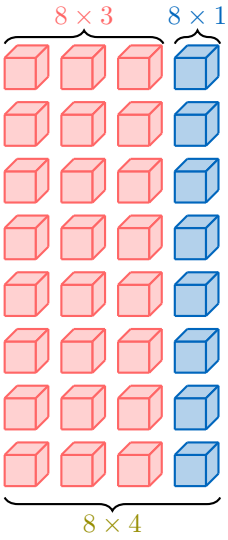


Answer:

$$\begin{aligned} 7 \times 3 &= 7 \times 2 + 7 \times 1 \\ &= 14 + 7 \\ &= 21 \end{aligned}$$

Ex 47:

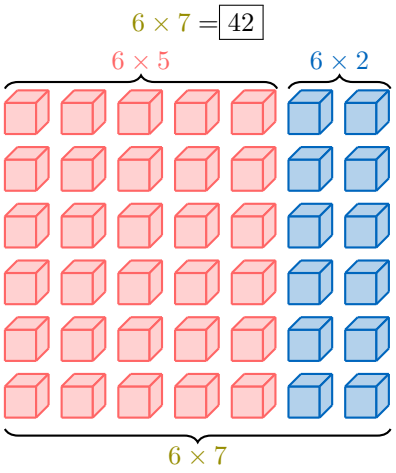
$$8 \times 4 = \boxed{32}$$



Answer:

$$\begin{aligned} 8 \times 4 &= 8 \times 3 + 8 \times 1 \\ &= 24 + 8 \\ &= 32 \end{aligned}$$

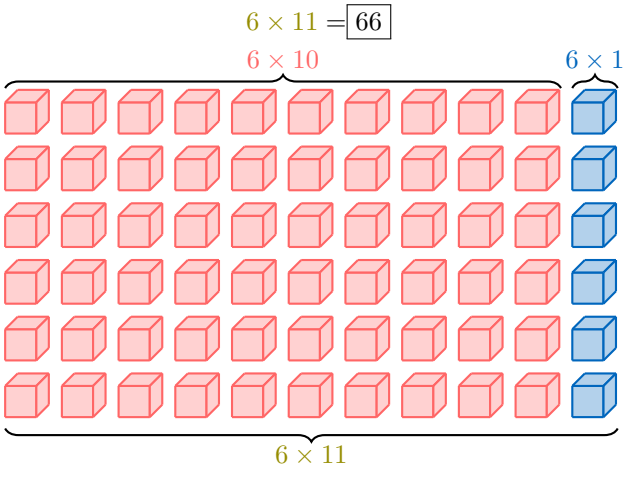
Ex 48:



Answer:

$$\begin{aligned} 6 \times 7 &= 6 \times 5 + 6 \times 2 \\ &= 30 + 12 \\ &= 42 \end{aligned}$$

Ex 49:

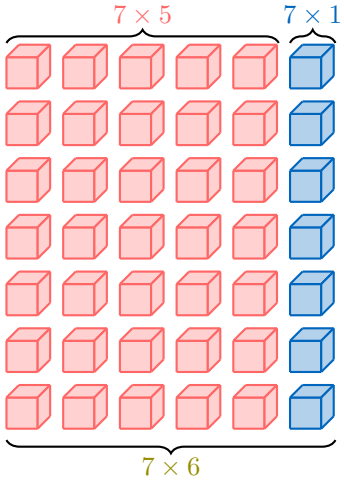


Answer:

$$\begin{aligned} 6 \times 11 &= 6 \times 10 + 6 \times 1 \\ &= 60 + 6 \\ &= 66 \end{aligned}$$

Ex 50:

$7 \times 6 = \boxed{42}$



Answer:

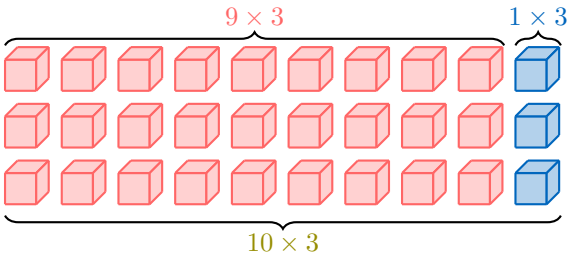
$$\begin{aligned} 7 \times 6 &= 7 \times 5 + 7 \times 1 \\ &= 35 + 7 \\ &= 42 \end{aligned}$$

F DECOMPOSE WITH SUBTRACTION

F.1 BREAKING DOWN AT LEFT

Ex 51:

$$\begin{aligned} 9 \times 3 &= 10 \times 3 - 1 \times 3 \\ &= \boxed{30} - \boxed{3} \end{aligned}$$

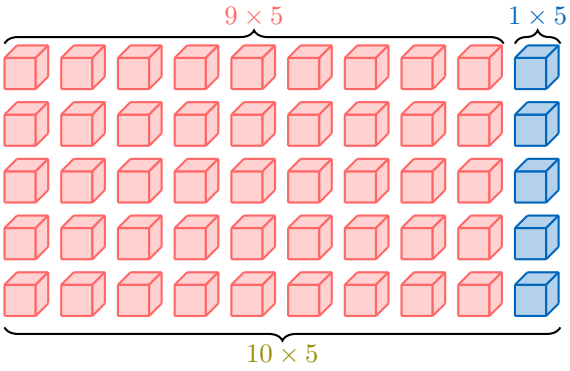


Answer:

$$\begin{aligned} 9 \times 3 &= 10 \times 3 - 1 \times 3 \\ &= 30 - 3 \end{aligned}$$

Ex 52:

$$\begin{aligned} 9 \times 5 &= 10 \times 5 - 1 \times 5 \\ &= \boxed{50} - \boxed{5} \end{aligned}$$

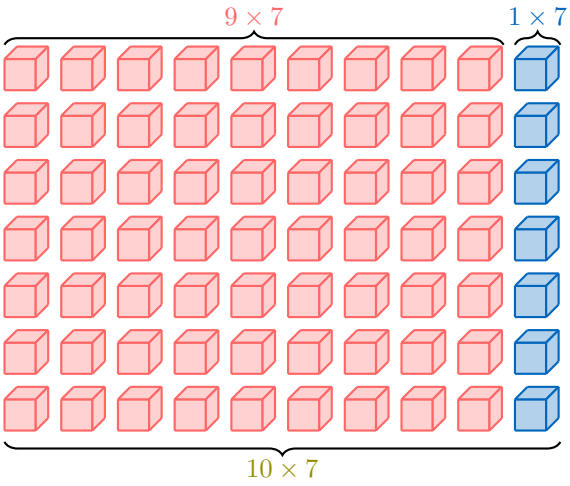


Answer:

$$\begin{aligned} 9 \times 5 &= 10 \times 5 - 1 \times 5 \\ &= 50 - 5 \end{aligned}$$

Ex 53:

$$\begin{aligned} 9 \times 7 &= 10 \times 7 - 1 \times 7 \\ &= \boxed{70} - \boxed{7} \end{aligned}$$

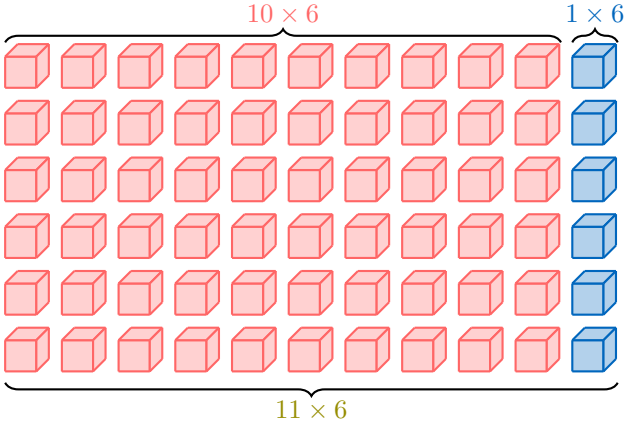


Answer:

$$\begin{aligned} 9 \times 7 &= 10 \times 7 - 1 \times 7 \\ &= 70 - 7 \end{aligned}$$

Ex 54:

$$\begin{aligned} 9 \times 6 &= 10 \times 6 - 1 \times 6 \\ &= \boxed{60} - \boxed{6} \end{aligned}$$



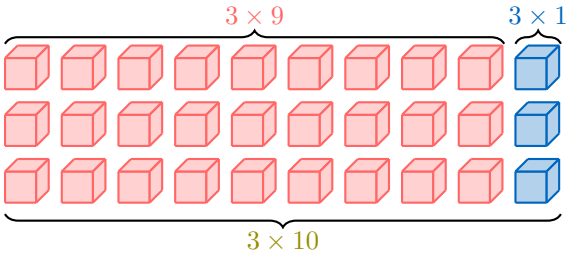
Answer:

$$\begin{aligned} 9 \times 6 &= 10 \times 6 - 1 \times 6 \\ &= 60 - 6 \end{aligned}$$

F.2 BREAKING DOWN AT RIGHT

Ex 55:

$$\begin{aligned} 3 \times 9 &= 3 \times 10 - 3 \times 1 \\ &= \boxed{30} - \boxed{3} \end{aligned}$$

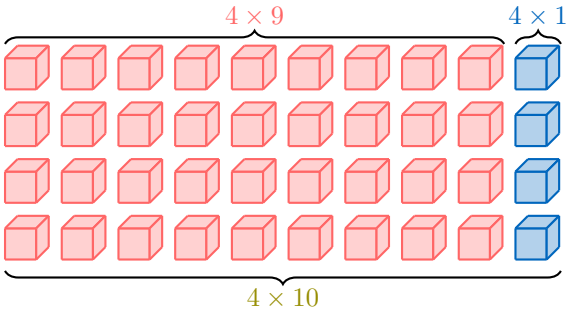


Answer:

$$\begin{aligned} 3 \times 9 &= 3 \times 10 - 3 \times 1 \\ &= 30 - 3 \end{aligned}$$

Ex 56:

$$\begin{aligned} 4 \times 9 &= 4 \times 10 - 4 \times 1 \\ &= \boxed{40} - \boxed{4} \end{aligned}$$

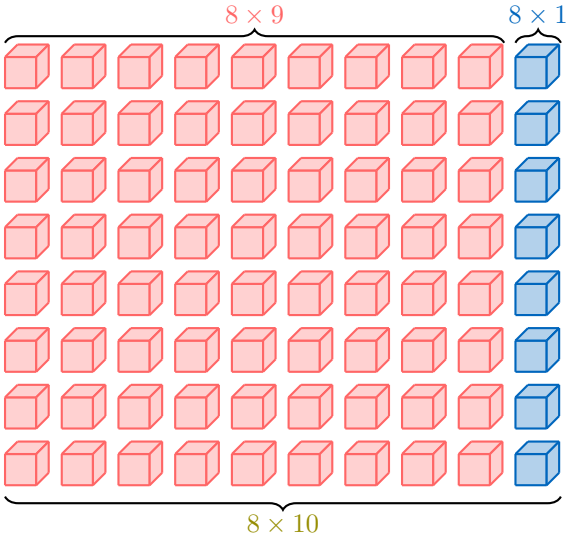


Answer:

$$\begin{aligned} 4 \times 9 &= 4 \times 10 - 4 \times 1 \\ &= 40 - 4 \end{aligned}$$

Ex 57:

$$\begin{aligned} 8 \times 9 &= 8 \times 10 - 8 \times 1 \\ &= \boxed{80} - \boxed{8} \end{aligned}$$



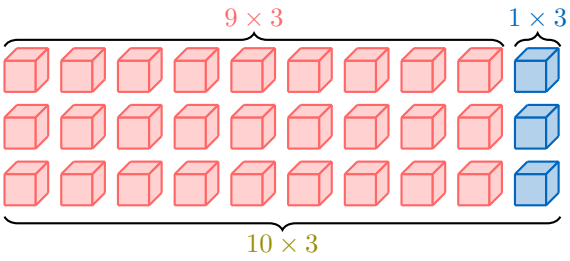
Answer:

$$\begin{aligned} 8 \times 9 &= 8 \times 10 - 8 \times 1 \\ &= 80 - 8 \end{aligned}$$

F.3 BREAKING DOWN AT LEFT

Ex 58:

$$9 \times 3 = \boxed{27}$$

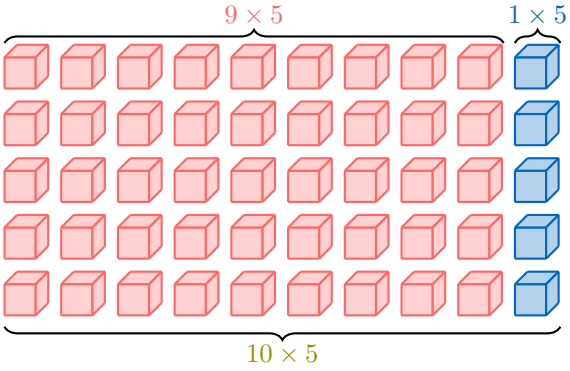


Answer:

$$\begin{aligned} 9 \times 3 &= 10 \times 3 - 1 \times 3 \\ &= 30 - 3 \\ &= 27 \end{aligned}$$

Ex 59:

$$9 \times 5 = \boxed{45}$$

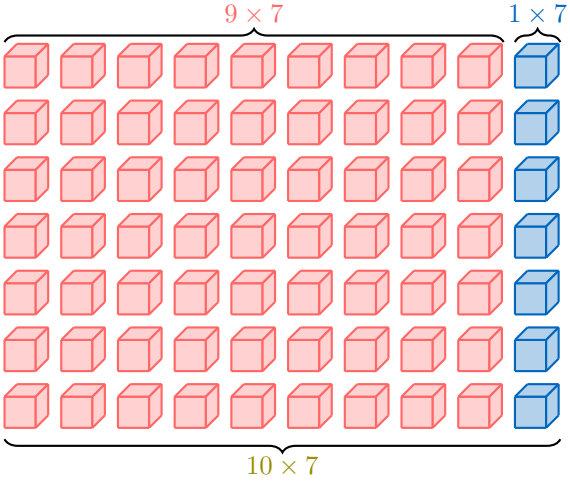


Answer:

$$\begin{aligned} 9 \times 5 &= 10 \times 5 - 1 \times 5 \\ &= 50 - 5 \\ &= 45 \end{aligned}$$

Ex 60:

$$9 \times 7 = \boxed{63}$$

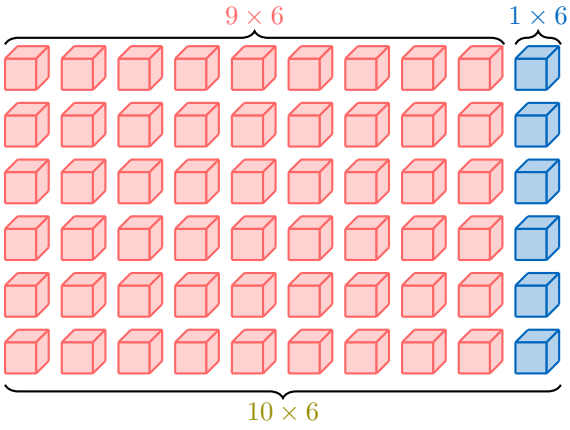


Answer:

$$\begin{aligned} 9 \times 7 &= 10 \times 7 - 1 \times 7 \\ &= 70 - 7 \\ &= 63 \end{aligned}$$

Ex 61:

$9 \times 6 = \boxed{54}$



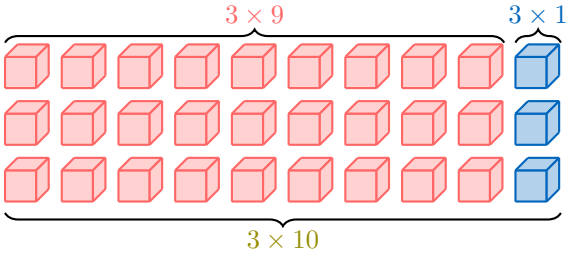
Answer:

$$\begin{aligned} 9 \times 6 &= 10 \times 6 - 1 \times 6 \\ &= 60 - 6 \\ &= 54 \end{aligned}$$

F.4 BREAKING DOWN AT RIGHT

Ex 62:

$3 \times 9 = \boxed{27}$

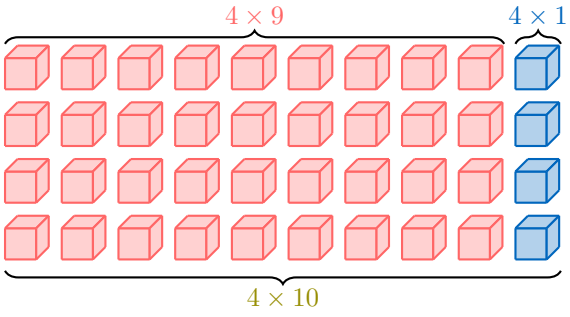


Answer:

$$\begin{aligned} 3 \times 9 &= 3 \times 10 - 3 \times 1 \\ &= 30 - 3 \\ &= 27 \end{aligned}$$

Ex 63:

$4 \times 9 = \boxed{36}$

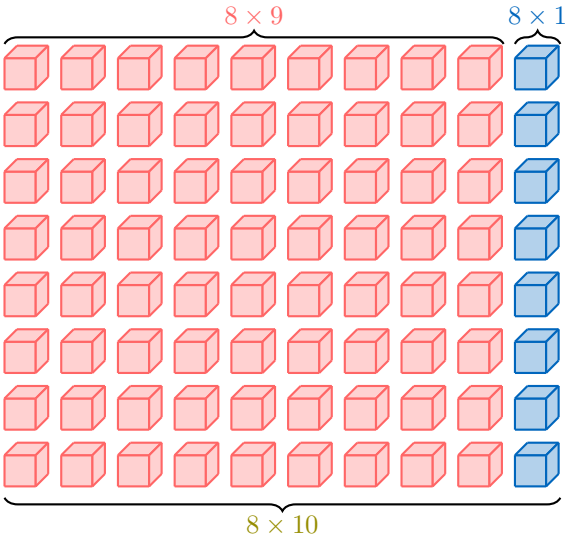


Answer:

$$\begin{aligned} 4 \times 9 &= 4 \times 10 - 4 \times 1 \\ &= 40 - 4 \\ &= 36 \end{aligned}$$

Ex 64:

$8 \times 9 = \boxed{72}$



Answer:

$$\begin{aligned} 8 \times 9 &= 8 \times 10 - 8 \times 1 \\ &= 80 - 8 \\ &= 72 \end{aligned}$$