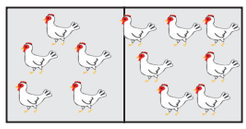
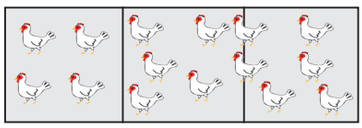
10 - 1 Amount per Unit

Amount per Unit (1)

Example 1 We keep chickens in two chicken coops (a), (b). (a) is 2 m^2 and has 12 chickens, (b) is 3 m^2 and 15 chickens.

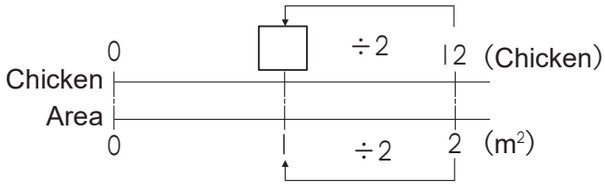
(a) 

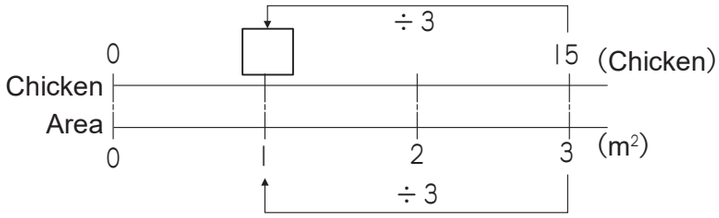
(b) 

	m^2	Chicken
(a)	2	12
(b)	3	15

Which is more crowded? Let's compare the number of chickens per 1 m^2.

Let's compare the average of number of chicken per m^2! A quantity express in this way is called amount per unit.





Math sentence

(a) 12 ÷ 2 = 6

No. of chickens | m^2 | Amount per unit

Answer (Chicken per m^2)

6 chicken per m^2

Math sentence

(b) 15 ÷ 3 = 5

Answer (Chicken per m^2)

5 chicken per m^2

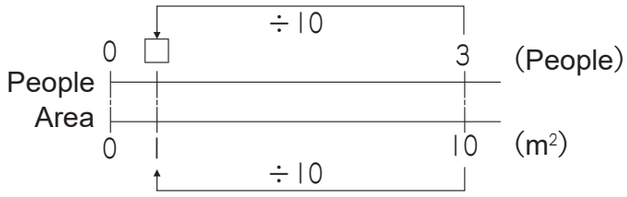
Answer (a)

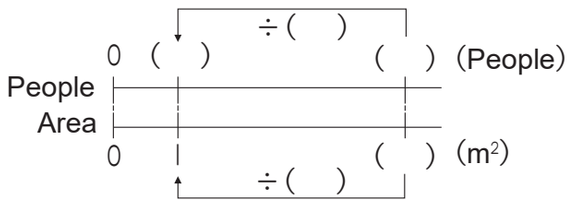
The youth group went on a trip. Which room is most crowded? (a) is 10 m^2 and fits 3 people, (b) is 8 m^2 and fits 4 people.

	Room (a)	Room (b)
Size (m^2)	10	8
Number of people	3	2

The Number of people per area is called **population density**.

Which is more crowded, (a) or (b)? Let's compare the number of youths per m^2.





Math sentence

(a)

Answer (people per m^2)

Math sentence

(b)

Answer (people per m^2)

Answer

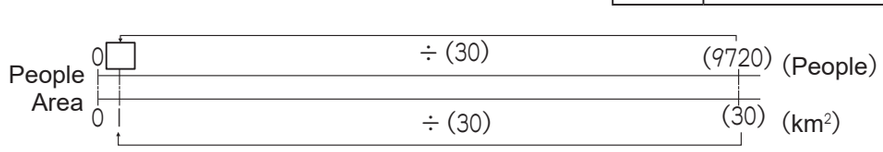
10 - 2 Amount per Unit

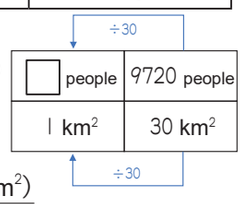
Amount per Unit (2)

Example There are East town and West town. We want to know which town is crowded.

1 What is the number of people per 1 km^2 (population density) in East town?

	Population	Area (km^2)
East	9720	30
West	8920	20





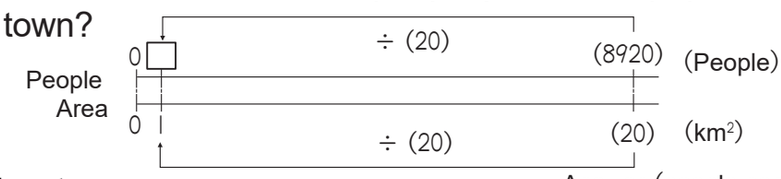
Math sentence

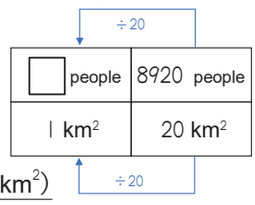
East town $9720 \div 30 = 324$

Answer (people per 1 km^2)

324 people per km^2

2 What is the number of people per 1 km^2 (population density) in West town?





Math sentence

West town $8920 \div 20 = 446$

Answer (people per 1 km^2)

446 people per km^2

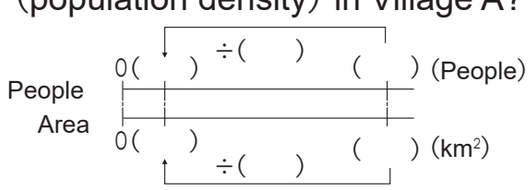
3 Which town is more crowed?

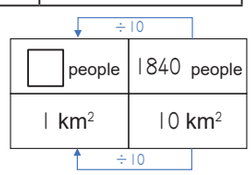
Answer West town

The table on the right shows the population and area of Village A and B.

1 What is the number of people per km^2 (population density) in Village A?

	Population	Area (km^2)
A	1840	10
B	2780	20



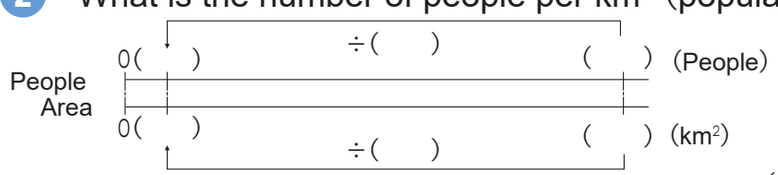


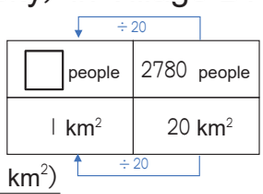
Math sentence

Village A

Answer (people per 1 km^2)

2 What is the number of people per km^2 (population density) in Village B?





Math sentence

Village A

Answer (people per 1 km^2)

3 Which village is more crowed?

Answer

10 - 3 Amount per Unit

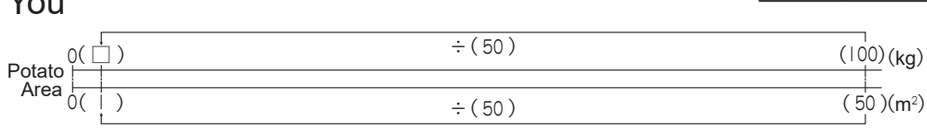
Amount per Unit (3)

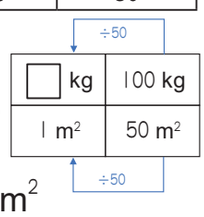
Example You and your friend harvested potatoes at each house.

1 Which field had a better harvest? Calculate the amount of potatoes per m^2 for each field.

	Potato (kg)	Area (m^2)
You	100	50
Friend	200	80

You





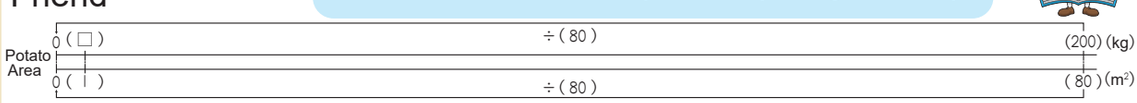
Math sentence $100 \div 50 = 2$

Weight of potatoes | Area (m^2) | Amount per unit

Answer (kg per m^2) 2 kg per m^2

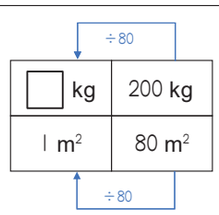
Friend

We can calculate amount per unit by using same way!



Math sentence $200 \div 80 = 2.5$

Answer (kg per m^2) 2.5 kg per m^2



2 Which field had a better harvest?

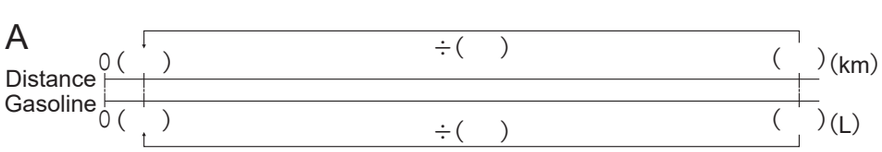
Answer Friend

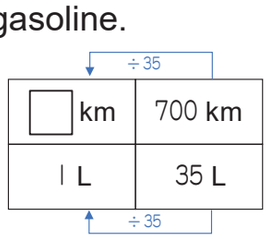
There are 2 cars, A and B. Compare A and B in terms of the amount of gasoline they used and the distance they can travel.

	Distance (km)	Gasoline (L)
A	700	35
B	800	50

1 Calculate the distance each car can travel on | L of gasoline.

A

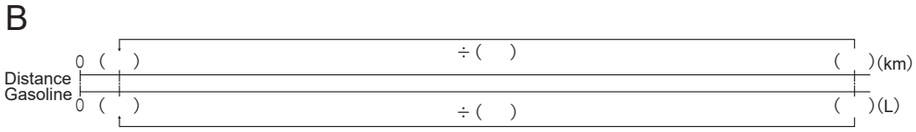


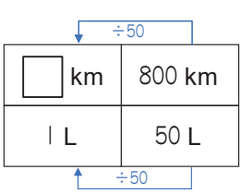


Math sentence

Answer (km per L) _____

B





Math sentence

Answer (kg per m^2) _____

2 Which car travel longer?

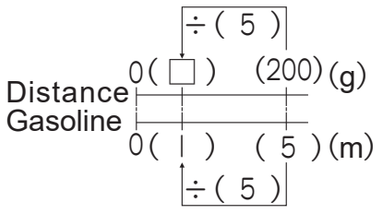
Answer _____

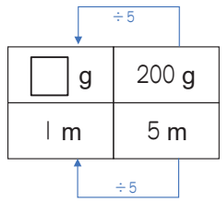
10 - 4 Amount per Unit

Amount per Unit (4)

Example Find the weight per m for piece of wire with a weight of 200 g for 5 m.

1 What is the weight per m of this wire?





Math sentence

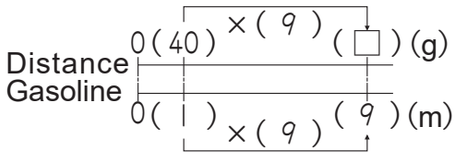
$200 \div 5 = 40$

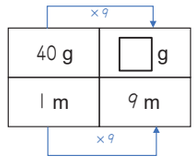
Answer (Weight per 1 m)

40 g per m

2 What is the weight of 9 m of this wire?

Now that we know the weight per m, we can use multiplication to find out the weight of the length we need.





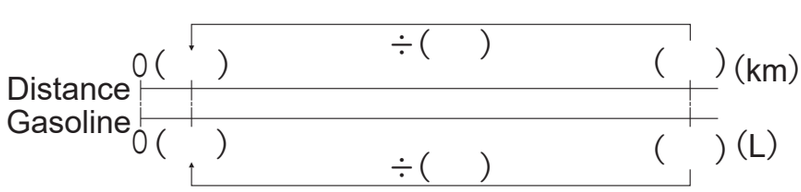
Math sentence

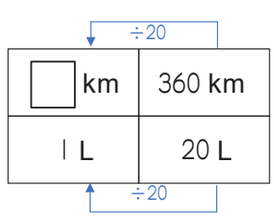
$40 \times 9 = 360$

Answer 360 g

There is a car that runs 360 km on 20 L of gasoline.

1 What is the distance traveled per L of gasoline?

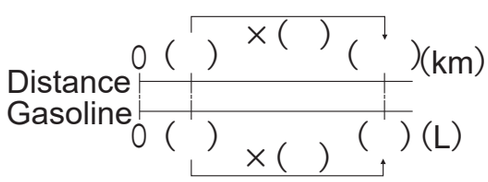


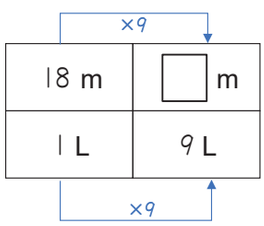


Math sentence

Answer (km per L)

2 How far does this car go with 9 L of gasoline?





Math sentence

Answer

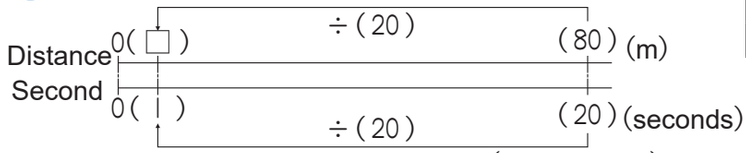
10 - 5 Amount per Unit

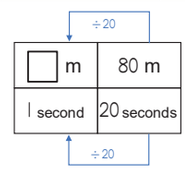
Speed

Example Here is a table of the times that you and your friends ran.

	Distance (m)	Seconds
You	80	20
Friend	100	16

1 How many m per second did you run?





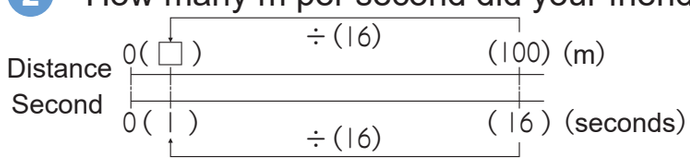
Math sentence

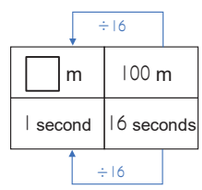
$80 \div 20 = 4$

Answer (m per second)

4 m per second

2 How many m per second did your friend run?





Math sentence

$100 \div 16 = 6.25$

Answer (m per second)

6.25 m per second

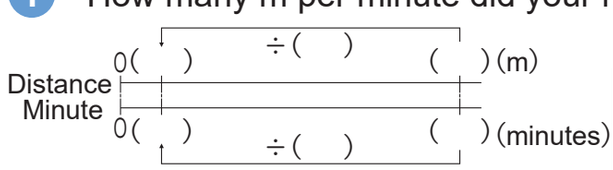
3 Who's faster, you or your friend? Answer friend

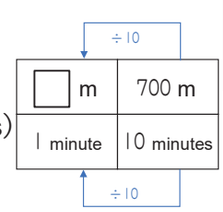
The travel distance per unit of time is called the **speed**.
The math sentence to find speed is (**Speed**) = (**Distance**) ÷ (**Time**)

Here is a table of the times that your sister and your brother walked.

Distance (m)	Minutes
700	10
900	15

1 How many m per minute did your run?



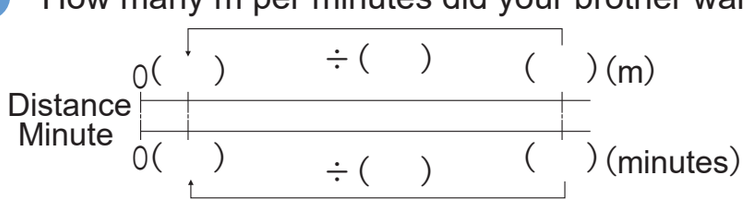


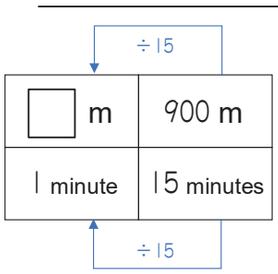
Math sentence

Speed = _____

Answer (m per minutes)

2 How many m per minutes did your brother walk?





Math sentence

Speed = _____

Answer (m per minutes)

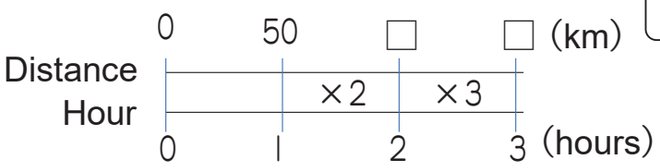
3 Who's faster, your sister or your brother?

Answer _____

10 - 6 Amount per Unit

Distance

Example There is a car that runs at 50 km per hour (speed). How many km can it travel in 2 hours? How many km can it travel in 3 hours?



Speed	Distance	Distance
40 km/hours	□ km	□ km
1 hour	2 hours	3 hours
	Time	Time

Math sentence

Distance = 50 × 2 = 100

Answer 100 km

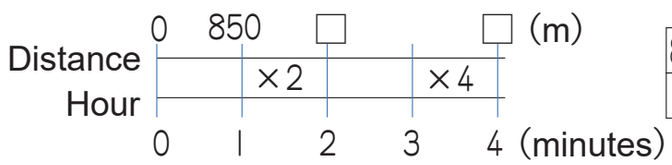
Math sentence

Distance = 50 × 3 = 150

Answer 150 km

The math sentence to find speed is (**Distance**) = (**Speed**) × (**Time**)

A bird can fly at 850 m per minute. How many m can it travel in 2 minutes? How many m can it travel in 4 minutes?



Speed	Distance	Distance
850 m/minutes	□ m	□ m
1 minute	2 minutes	4 minutes
	Time	Time

Math sentence

Distance =

Answer

Math sentence

Distance =

Answer

A child walks 70 m per minute. How many m can he travel in 50 minutes. How many m can he travel in 90 minutes.

Speed	Distance	Distance
70 km/minutes	□ m	□ m
1 minute	50 minutes	90 minutes
	Time	Time

Math sentence

Distance =

Answer

Math sentence

Distance =

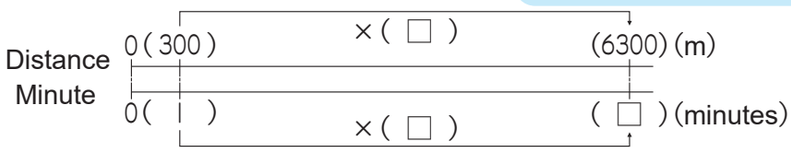
Answer

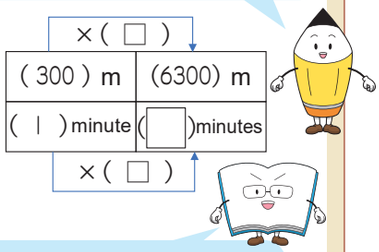
10 - 7 Amount per Unit

Time

Example A cyclist travels at 300 m per minutes. How many minutes does it take the cyclist to go 6300 m?

How many times is 6300 m as many as 300 m?

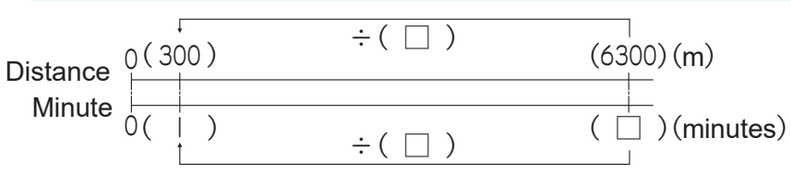


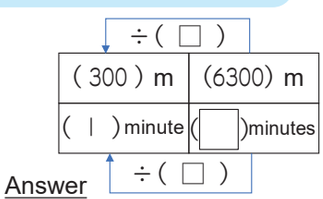


Math sentence

$300 \times \square = 6300$

If you consider the relationship between the overall distance and the unit distance, you can see the corresponding relationship between the journey times.





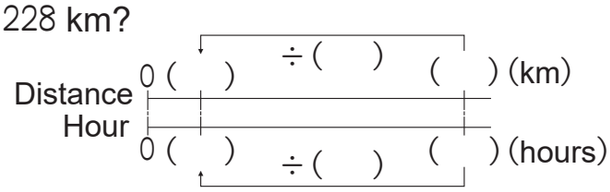
Math sentence

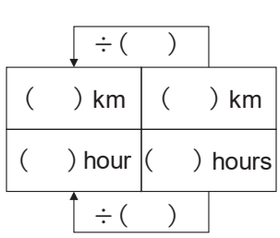
$\square = 6300 \div 300 = 21$

Answer 21 minutes

The math sentence to find time is (**Time**) = (**Distance**) ÷ (**Speed**)

1 A ship travels at 38 km per hour. How many hours does it take to travel 228 km?

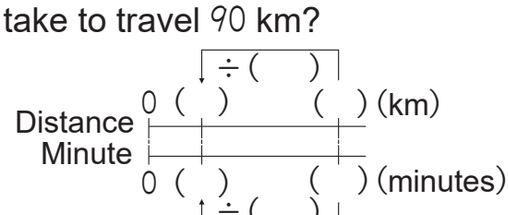


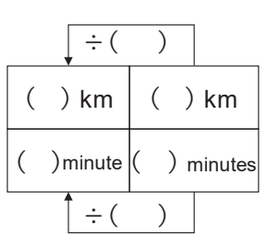


Math sentence

Answer _____

2 An airplane travels at 18 km per minute. How many minutes does it take to travel 90 km?





Math sentence

Answer _____

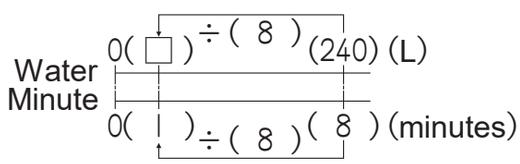
10 - 8 Amount per Unit

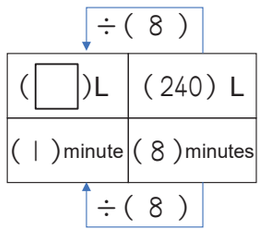
Speed of work

Example There are two machines, A and B. A pumps out 240 L of water in 8 minutes. B pumps out 300 L of water in 12 minutes. Which machine pumps out more water per minutes?

1 Find the each machine.

A:





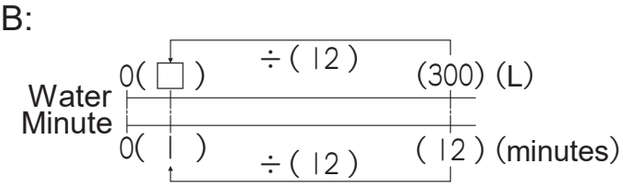
Math sentence

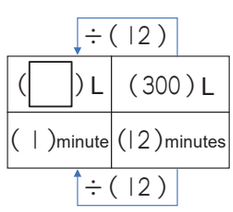
240 ÷ 8 = 30

Answer

30 L per minute

B:





Math sentence

300 ÷ 12 = 25

Answer

25 m

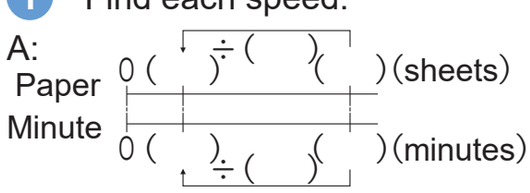
2 Which machine is faster?

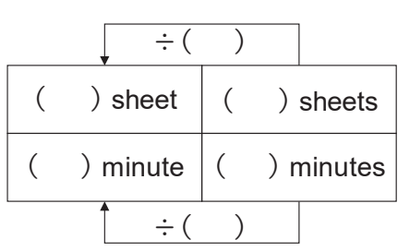
Answer A

There are two printer, A and B. A prints out 300 sheets of paper in 4 minutes. B prints out 360 sheets of paper in 12 minutes. Which printer prints faster?

1 Find each speed.

A:

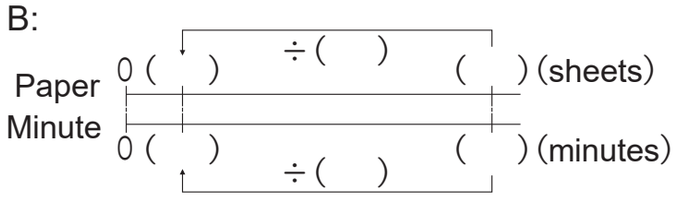


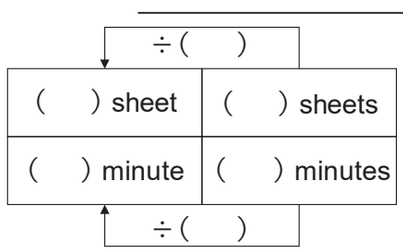


Math sentence

Answer (sheet per minute)

B:





Math sentence

Answer (sheet per minute)

2 Which printer print faster?

Answer

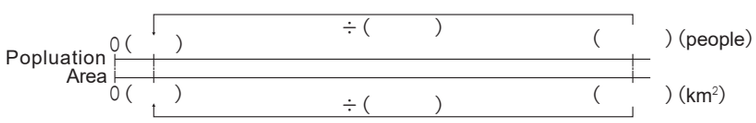
10 - 9 Amount per Unit

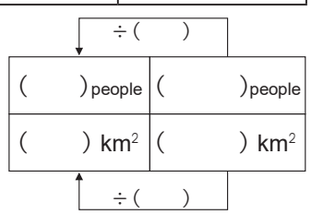
Review

1 The table on the right shows the population and area of State A and State B.

	Population	Area (km^2)
A	810000	3000
B	850000	5000

1 What is the number of people per 1 km^2 (population density) in State A?

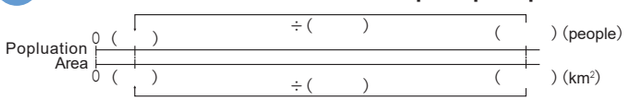


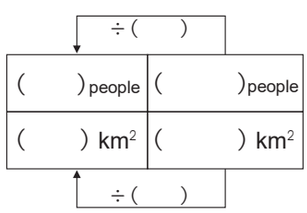


Math sentence

Answer (people per km^2)

2 What is the number of people per 1 km^2 (population density) in State B?





Math sentence

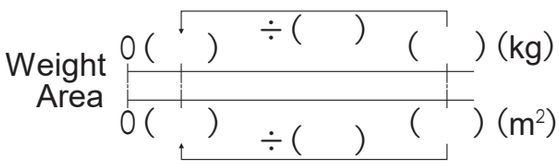
Answer (people per km^2)

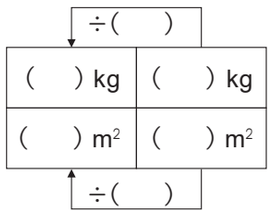
3 Which state is more crowed?

Answer

2 Potatoes were harvested. A total weight of 43.2 kg was harvested from 6 m^2 field A, and 62.1 kg were harvested from 9 m^2 field B.

1 What is the weight per m^2 of field A?

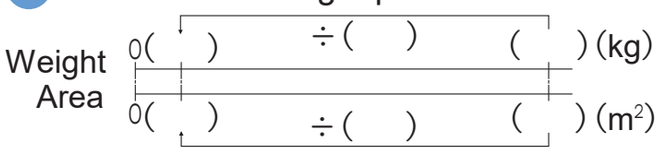


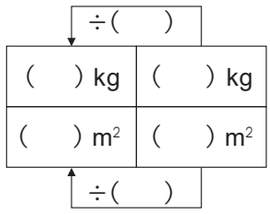


Math sentence

Answer (kg per m^2)

2 What is the weight per m^2 of this field B?





Math sentence

Answer (kg per m^2)

3 Which field harvested more potatoes?

Answer

3 It took you 7 minutes to ride your bicycle to the school which is 1400 m away. What was your speed you rode at?

÷ ( )	
( ) m	( ) m
( ) minute	( ) minutes
÷ ( )	

Math sentence

Answer

4 A elephant runs 13 km per hour. How many km can it travel in 4 hours?

× ( )	
( ) km	( ) km
( ) hour	( ) hours
× ( )	

Math sentence

Answer

5 How many minutes does it take a person running at 300 m per minute to run 5600 m?

÷ ( )	
( ) m	( ) m
( ) minute	( ) minutes
÷ ( )	

Math sentence

Answer

6 It took 3 minutes for a car traveling at 30 km per hour to cross the bridge.

1 How many m per minute is 30 km per hour?

1 km = 1000 m. So, firstly, calculate the km per minutes.

30 km is ☐ m, so 30 km per hour means ☐ m per hour.

1 hour is 60 minutes, so divide the distance by 60.

Math sentence

Answer

2 What is the length of this bridge?

× ( )	
( ) m	( ) m
( ) minute	( ) minutes
× ( )	

Math sentence

Answer