

ORIGO STEPPING STONES

STUDENT JOURNAL SAMPLE

Engaging student pages accompany each lesson within *ORIGO Stepping Stones*. In the Student Journal for this year level, there are two pages for each lesson.

For more information on program content
for *ORIGO Stepping Stones* Year 6 visit
origoeducation.com/stepping-stones.

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6.1 Subtracting Decimal Fractions (Tenths or Hundredths)

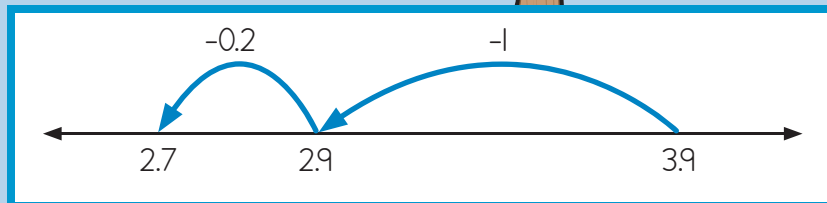
Layla is planning a bush walk. How much farther is Springwood Falls than Hard Rock Valley?



Springwood Falls is more than double the distance.



Damon drew jumps on this number line to work out the exact difference.



What steps did he follow? What is another way to find the difference?

Layla decides to buy some supplies.

How would you work out the difference in cost between these two items?

Janice worked it out like this.



$$\$7.99 - \$2.45$$

$$\$7.99 - \$2 = \$5.99$$

$$\$5.99 - 40\text{¢} = \$5.59$$

$$\$5.59 - 5\text{¢} = \$5.54$$



What steps did Janice follow? What is another way to find the difference?

Step Up

I. Draw jumps on the number line to work out each difference.

a.

$$6.5 - 2.3 = \underline{\hspace{2cm}}$$



b.

$$7.8 - 4.1 = \underline{\hspace{2cm}}$$



2. Work out the difference between these prices. Show your thinking.

a.



\$ _____

b.



\$ _____

c.



\$ _____

d.



\$ _____

e.



\$ _____

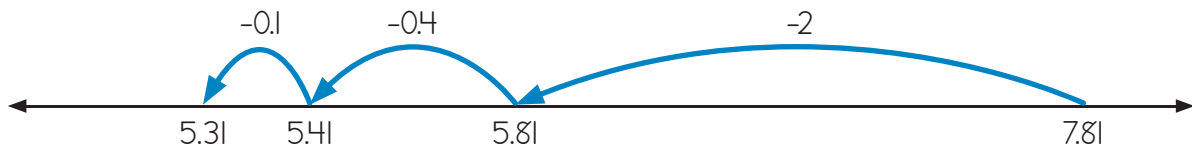
f.



\$ _____

Step Ahead

A student used this number line to work out $7.81 - 2.41$. Write the correct difference. Then explain the mistake that was made.



6.2

Subtracting Decimal Fractions (Tenths and Hundredths)

Look at these performance scores.

How could you work out the difference between Liam's score and Nina's score?



I know that 12.4 is the same as 12.40.

TALENT QUEST

LEADER BOARD

Liam	12.4
Nina	15.92
Jacob	18.51
Mary	7.2

Lilly used this written method to work out the difference. What steps did she follow?

$$\begin{array}{r}
 15.92 \\
 - 0.40 \\
 \hline
 15.52 \\
 - 12.00 \\
 \hline
 3.52
 \end{array}$$

What are some other differences that you can work out? Record your thinking in the working space.

Working Space

Step Up

1. Work out these differences. Show your thinking.

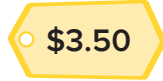
a. $8.60 - 5.1 =$ _____

b. $13.6 - 10.02 =$ _____

c. $14.9 - 10.35 =$ _____

2. Work out the amount that is left in the wallet after each purchase.

a.



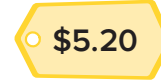
\$ _____

b.



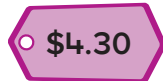
\$ _____

c.



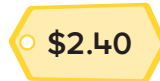
\$ _____

d.



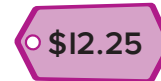
\$ _____

e.



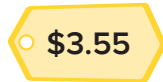
\$ _____

f.



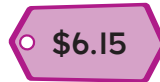
\$ _____

g.



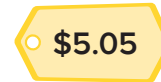
\$ _____

h.



\$ _____

i.



\$ _____

Step Ahead

James has \$20 in his wallet. He buys two of these meal deals. How much money does he have left over?

\$ _____

Working Space



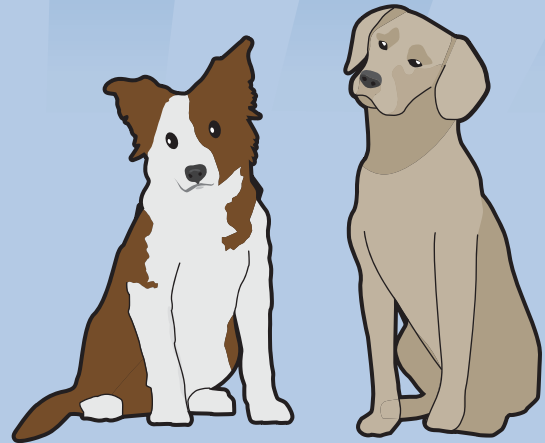
6.3

Using Written Methods to Subtract Decimal Fractions

How could you work out the difference in mass between these two dogs?



It must be about 3 kg because $17 - 14 = 3$.



14.2 kg

17.65 kg

These students worked it out like this.

Kylie

$$\begin{array}{r} 17.65 \\ - 0.20 \\ \hline 17.45 \\ - 14.00 \\ \hline 3.45 \end{array}$$

Juan

$$\begin{array}{r} 17.65 - 14.2 \\ 17 - 14 = 3 \\ \frac{65}{100} - \frac{20}{100} = \frac{45}{100} \\ \text{Difference is } 3 \frac{45}{100} \end{array}$$

Megan

$$\begin{array}{r} 17.65 \\ - 14.2 \\ \hline 3.45 \end{array}$$

What are the steps in each method? Whose method do you prefer? Why?

What other way could you calculate the difference?

How could you work out the difference in cost between these two items?



The numbers are a bit "messy" so I would use a written method.



Step Up

1. Use Megan's method to work out each difference.

a.

T	O	t	h
	7	8	6
-		3	0

b.

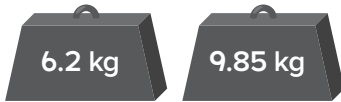
T	O	t	h
	1	8	9
-		6	5

c.

T	O	t	h
	2	4	0
-		1	2

2. Choose and use a written method to work out the difference between each pair of weights.

a.



_____ kg

b.



_____ kg

c.



_____ kg

d.



_____ kg

e.



_____ kg

f.



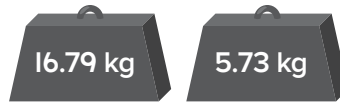
_____ kg

g.



_____ kg

h.



_____ kg

i.



_____ kg

Step Ahead

A student used the standard subtraction algorithm to work out $16.45 - 3.9$. Write the correct answer. Then explain the mistake that was made.

$$\begin{array}{r} 16.45 \\ - 3.9 \\ \hline 16.06 \end{array}$$

Subtracting Decimal Fractions Involving Tenths (Decomposing Ones)

What do you know about tides? Do tides occur at the same time each day? Look at this table.

Tide Chart				
Day	1st high	2nd high	1st low	2nd low
Monday	2.3 m	1.9 m	0.9 m	0.5 m
Wednesday	2.4 m	2.1 m	0.8 m	0.6 m

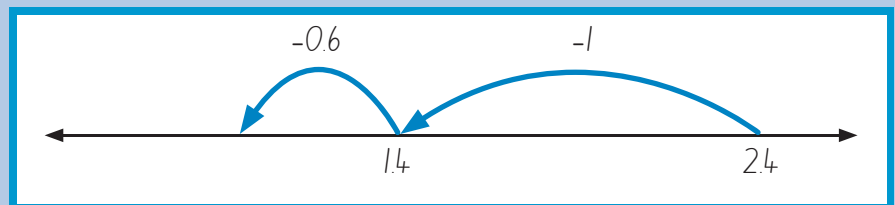
How could you work out the difference between the first and second high tides on Monday?

The difference is small so I will count on from 1.9 m.



What is the difference between the first high and low tides on Wednesday?

Koda used a number line to find the difference like this.



What steps did Koda follow?

What is the difference between the two tide levels?

Kana used the standard subtraction algorithm to work out the difference between the second high tide and the second low tides on Wednesday.

$$\begin{array}{r} \overset{1}{\cancel{2}} \overset{11}{.} \cancel{8} \\ - 0.6 \\ \hline 1.5 \end{array}$$

What steps did he follow? What does each red digit represent?

Step Up

I. Draw jumps on the number line to work out each difference.

a.

$7.2 - 5.7 = \underline{\quad}$



b.

$8.3 - 1.5 = \underline{\quad}$



2. Work out each difference. Draw jumps on the number line to show your thinking.

a.

$9.1 - 7.8 =$



b.

$5.4 - 0.9 =$



3. Choose and use a written method to work out the difference between the tides.

a.	High tide 3.4 m	Low tide 1.6 m
_____ m		

b.	High tide 2.5 m	Low tide 1.9 m
_____ m		

Step Ahead

High tide on Monday was 0.4 m more than on Tuesday. Thursday's tide was 3.1 m. This was 0.3 m more than on Monday but 0.2 m less than on Sunday.

Work out the height of the tide on each day.

Monday m

Tuesday m

Thursday m

Sunday m

Working Space

Subtracting Decimal Fractions Involving Hundredths (Decomposing Tenths)

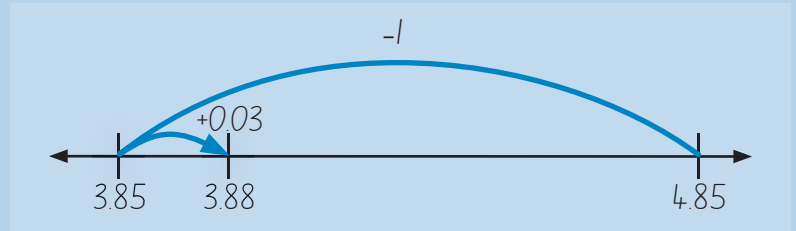
Kimie jumped 4.85 metres in the long jump event at school.

Logan jumped 0.97 metres less than Kimie. Mia jumped 0.29 metres less than Kimie.

How could you work out the length of Logan's jump?



I would count back and adjust my answer like this.



Draw jumps on this number line to show how you could work out the length of Mia's jump.



These three written methods were used to work out the length of Mia's jump.

What are the steps for each method? Complete the calculations.

$4.85 - 0.09 = 4.76$

$4.76 - 0.20 =$

Difference is

$4.85 - 0.29$

$4 - 0 = 4$

$\frac{85}{100} - \frac{\quad}{100} = \frac{\quad}{100}$

Difference is

$$\begin{array}{r} 4.85 \\ - 0.29 \\ \hline \end{array}$$

Which method do you prefer? Why?

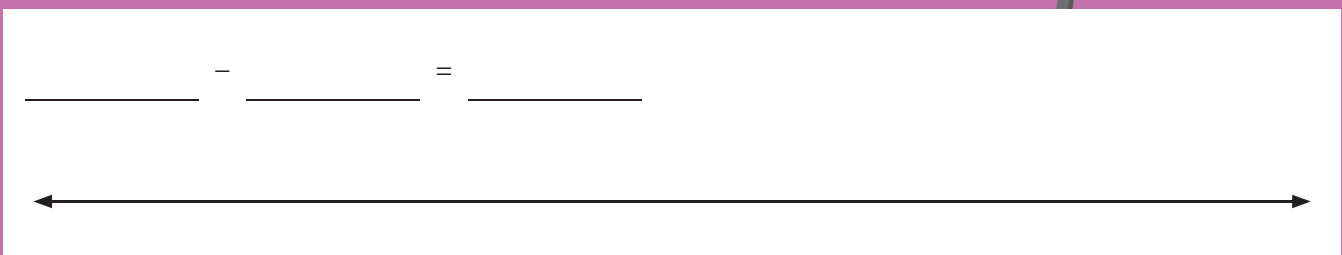
Step Up

1. Paige jumped 1.80 metres short of this long-jump record.

Record
5.54 m

Write a number sentence to show how far Paige jumped.

Then draw jumps on the number line to show how you worked it out.



2. Draw jumps on the number line to work out each difference.

a.

$$7.26 - 3.65 = \underline{\hspace{2cm}}$$



b.

$$9.20 - 7.85 = \underline{\hspace{2cm}}$$



3. Choose and use a written method to work out each difference.

a.

$$8.46 - 3.18 = \underline{\hspace{2cm}}$$

b.

$$9.35 - 5.72 = \underline{\hspace{2cm}}$$

c.

$$15.82 - 12.09 = \underline{\hspace{2cm}}$$

d.

$$18.03 - 10.85 = \underline{\hspace{2cm}}$$

e.

$$10.72 - 4.97 = \underline{\hspace{2cm}}$$

f.

$$21.58 - 17.53 = \underline{\hspace{2cm}}$$

Step Ahead

Imagine you have this money and you buy both items.
How much money will you have left?

\$



\$8.75



\$17.95

6.6

Subtracting Decimal Fractions (Decomposing Multiple Places)

This thermometer shows the temperature at different times in one morning.

How does the temperature change?

What are some temperature changes that you could work out in your head?



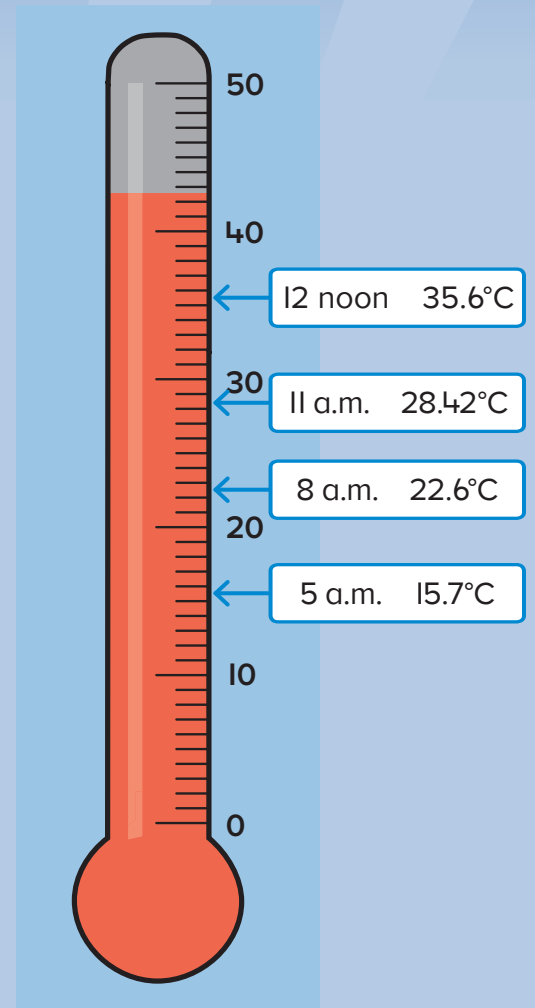
I can easily work out the difference between 35.6 and 22.6.

What was the change in temperature between 11 a.m. and 8 a.m.? How do you know?

Noah decided to use the standard subtraction algorithm to calculate the difference. Complete his calculation below.

2	8	.	4	2
-	2		2	6
		.		2

Does it change the answer if you show 22.6 as 22.60?



Step Up

- I. Use the thermometer above to work out the temperature change between these times.

a. 11 a.m. to 12 noon

b. 5 a.m. to 11 a.m.

_____ °C

_____ °C

2. Work out each difference. Show your thinking.

a. $32.30 - 19.8 =$ _____

b. $18.37 - 12.9 =$ _____

c. $25.02 - 10.4 =$ _____

d. $14.5 - 9.07 =$ _____

e. $28.3 - 15.72 =$ _____

f. $16.04 - 0.9 =$ _____

g. $24.3 - 17.24 =$ _____

h. $16.79 - 5.73 =$ _____

i. $12.88 - 10.99 =$ _____

Step Ahead

Solve these word problems.

- a. It is 34.05°C in Moree, NSW.
The temperature in Dalby is 0.9°C less.
What is the temperature in Dalby?

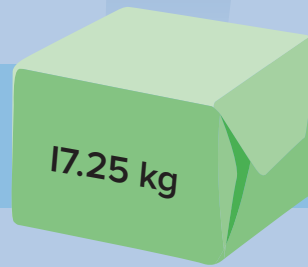
_____ $^{\circ}\text{C}$

- b. It was 24.50°C outside. The temperature
dropped 1.8°C over the next hour.
What is the new temperature?

_____ $^{\circ}\text{C}$

Which package is heavier? How do you know?

About how much is the difference?



The difference between 17 and 5 is 12, so the first package is about 12 kg heavier.

How could you work out the exact difference?

Deon followed these steps.



What steps did he follow?

	T	O	t	h
		6	12	
	1	7	2	5
-		5	6	
	1	1	6	5

Step Up

1. For each of these, use Deon's method to work out the difference in mass.

a.



T O t h

-				

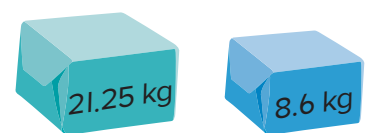
b.



T O t h

-				

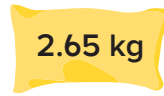
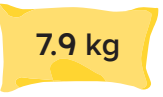
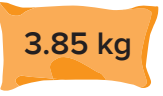
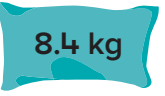
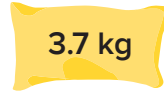
c.



T O t h

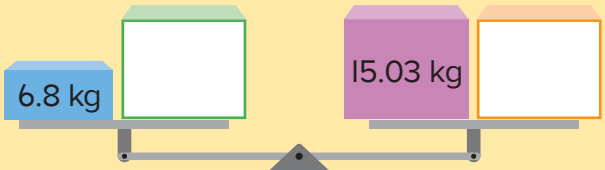
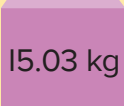
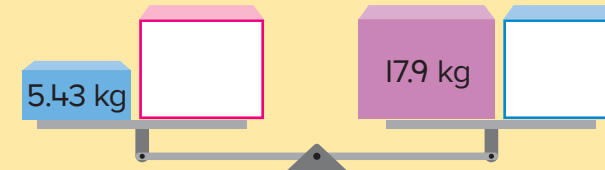
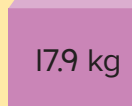
-				

2. Calculate the difference in mass between these sacks of grain. Record the steps you use.

a.  16.45 kg  8.25 kg _____ kg	b.  8.35 kg  5.75 kg _____ kg	c.  2.65 kg  8.25 kg _____ kg
d.  8.8 kg  7.9 kg _____ kg	e.  17.5 kg  8.6 kg _____ kg	f.  8.45 kg  12.8 kg _____ kg
g.  17.6 kg  3.85 kg _____ kg	h.  2.05 kg  8.4 kg _____ kg	i.  3.7 kg  12.25 kg _____ kg

Step Ahead

Write a mass in each box to make the balance pictures true.

a.  Left pan:  6.8 kg  Right pan:  15.03 kg 	b.  Left pan:  5.43 kg  Right pan:  17.9 kg 
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Introducing the Coordinate Plane and Plotting Ordered Pairs

This coordinate plane shows a town model.

The coordinates give the location of the buildings, trees, and the cars. Each star represents a tree and each circle represents a car.

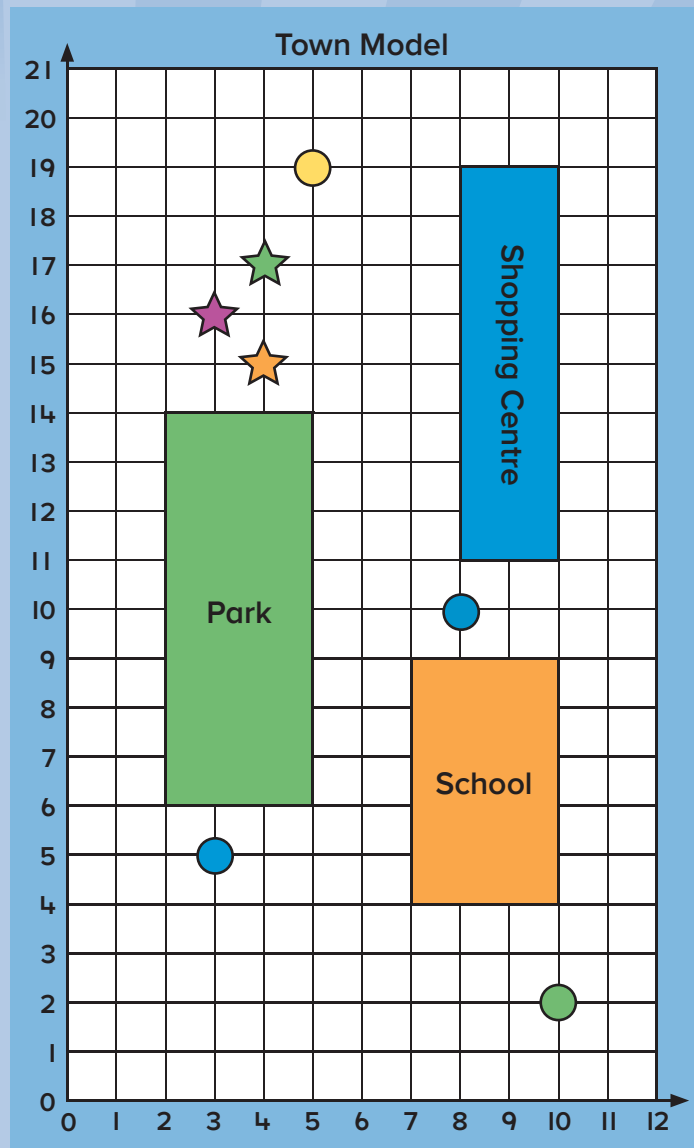
A **coordinate plane** is a rectangular grid which has a horizontal axis called the *x-axis* and a vertical axis called the *y-axis*. The origin is where the axes meet.

Two numbers that describe a specific point on a coordinate plane are known as an **ordered pair**. These numbers may also be called **coordinates**.

The first coordinate in an ordered pair tells the distance to move from the origin along the *x-axis*. The second coordinate tells the distance to move up the *y-axis*.

Where is the origin on this coordinate plane?
What are the coordinates of the origin?

What is located at the coordinates (4, 15)?



Step Up

Look at the coordinate plane above.

1. Write the coordinates and the colour of each car.

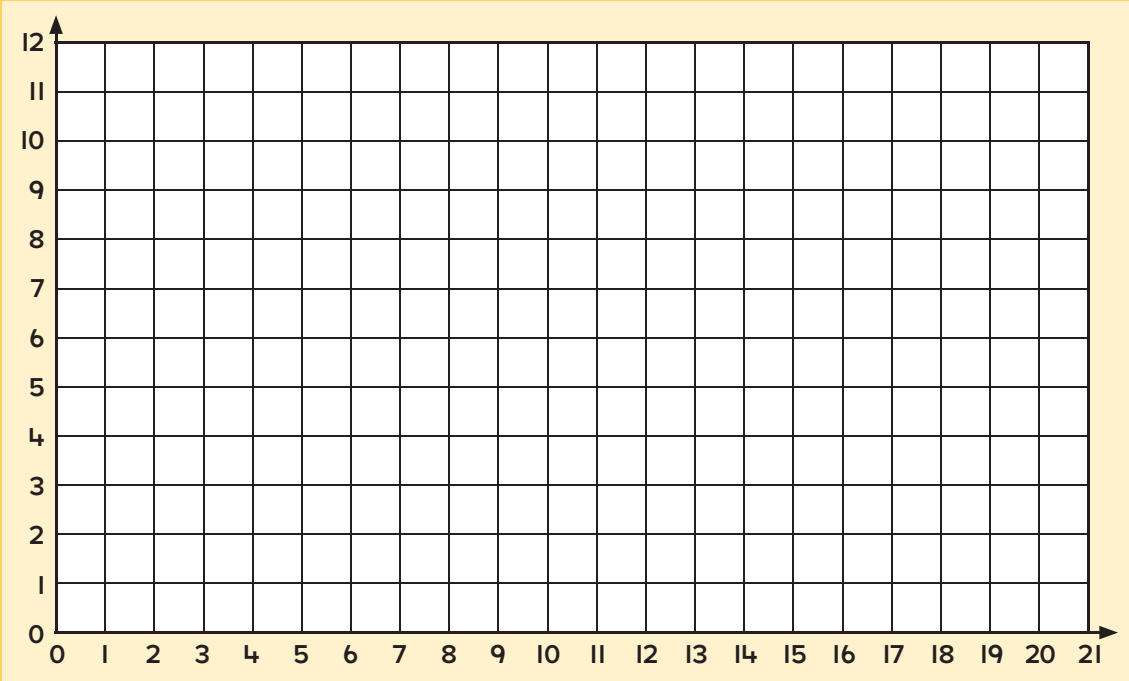
Car colour	red	_____	_____	_____
Coordinates	(8, 10)	_____	_____	_____

2. Write the coordinates of the four corners of the school and the park.

School	_____	_____	_____	_____
Park	_____	_____	_____	_____

3. This table gives the coordinates of three corners of rectangular buildings in a different part of the same town. Mark the three corners on the grid below. Write the coordinates of the 4th corner in the table. Then shade the buildings on the grid.

Bank	(3, 4)	(3, 8)	(7, 8)	_____
Hotel	(8, 7)	(8, 11)	(12, 11)	_____
Hospital	(14, 10)	(19, 10)	(19, 6)	_____



4. Mark the location of these three cars on the coordinate plane above using the information given. Make sure they are not on a building. Then complete the ordered pair for each location.

Car colour	red	blue	green
Coordinates	(14, _____)	(_____, 8)	(3, _____)

Step Ahead

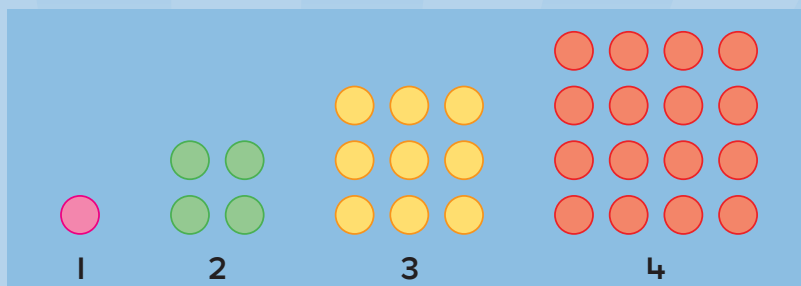
Use the model at the top of page 142. Here are the beginnings of instructions to move the red car from between the school and the shopping centre to the other side of the park. Continue and complete the instructions in the same way.

Start at (8, 10). Move to (_____, _____). Then move to _____

_____ Finally move to (1, 10).

6.9 Identifying Relationships Between Two Numerical Patterns

Look at this growing pattern.
What do you notice?



What numbers should be written in the second row of this table to describe the pattern?

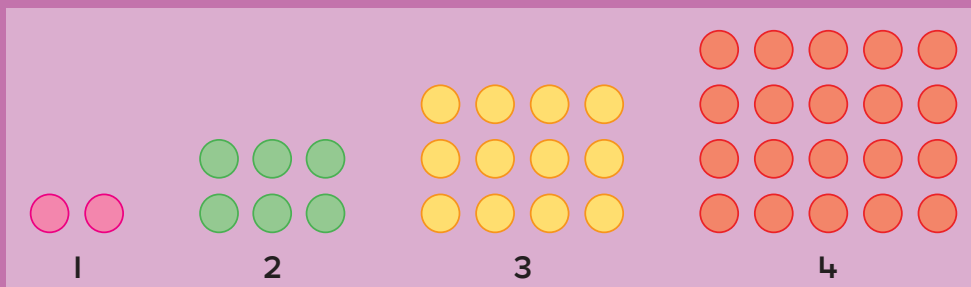
Picture number	1	2	3	4	5	6	7
Total number of counters							

How did you work out the numbers to write in the table?

What do you notice about the number you wrote for each picture?

Step Up

1. Look at the pictures in this growing pattern.

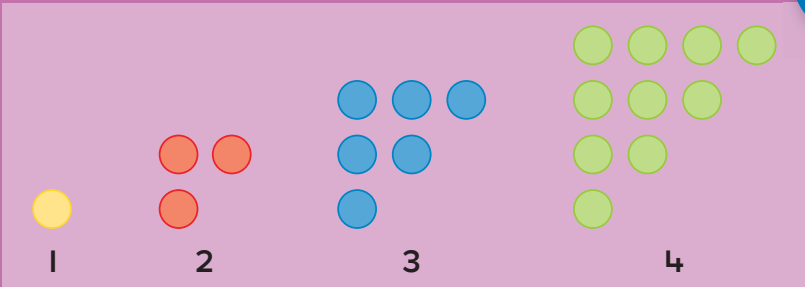


- a. Complete the table below to show the total number of counters in each picture of this pattern.

Picture number	1	2	3	4	5	6	7
Total number of counters	2						

- b. How did you work out the numbers to keep the pattern going?

2. Look at the pictures in this growing pattern.



a. Complete the table below to show the total number of counters in each picture of this pattern.

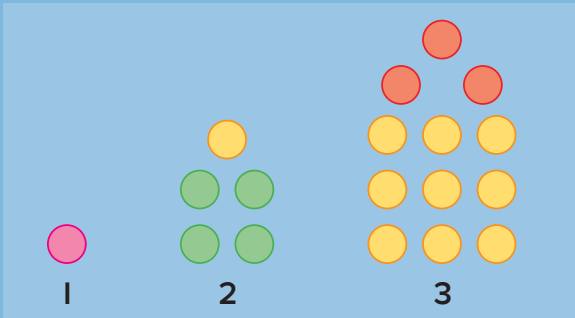
Picture number	1	2	3	4	5	6	7
Total number of counters	1						

b. How did you work out the numbers to keep the pattern going?

Step Ahead

This pattern of “houses with roofs” was made by joining the shape in the pattern above and the shape in the pattern at the top of page 144. The first row of the table matches the number rows of counters in the square part of the “house”.

a. Sketch the next picture that you would see in the pattern.

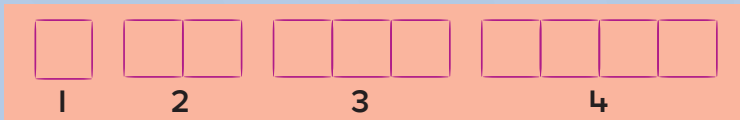


b. Complete the table below to show the total number of counters in the pictures of this pattern.

Picture number	1	2	3	4	5	6	7
Total number of counters	1						

Generating and Graphing Ordered Pairs from Two Numerical Patterns

This pattern was made with toothpicks.



What do you notice?
What patterns do you see?

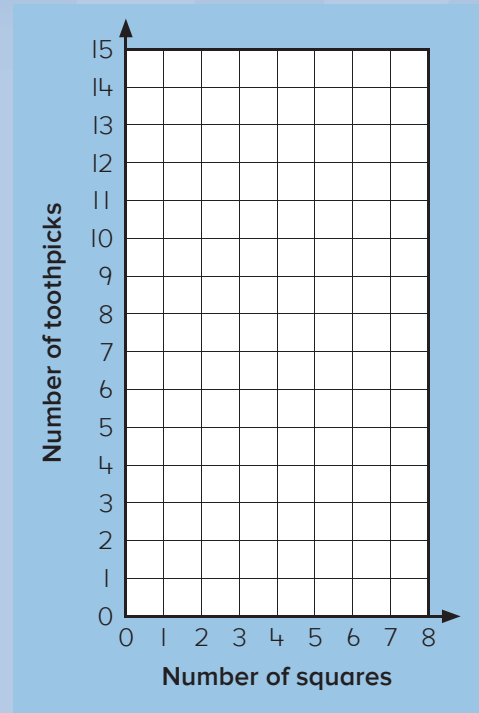
Complete this table to match the pattern.

Picture number	1	2	3	4
Number of squares	1	2		
Number of toothpicks	4	7		

What ordered pairs should they write to show the pattern?

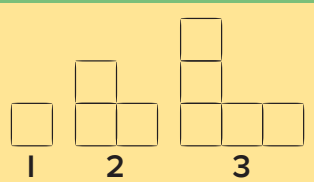
Marking ordered pairs on a coordinate plane is called graphing or plotting.

How would you graph the ordered pairs on the coordinate plane?



Step Up

1. Look at this pattern made with toothpicks.



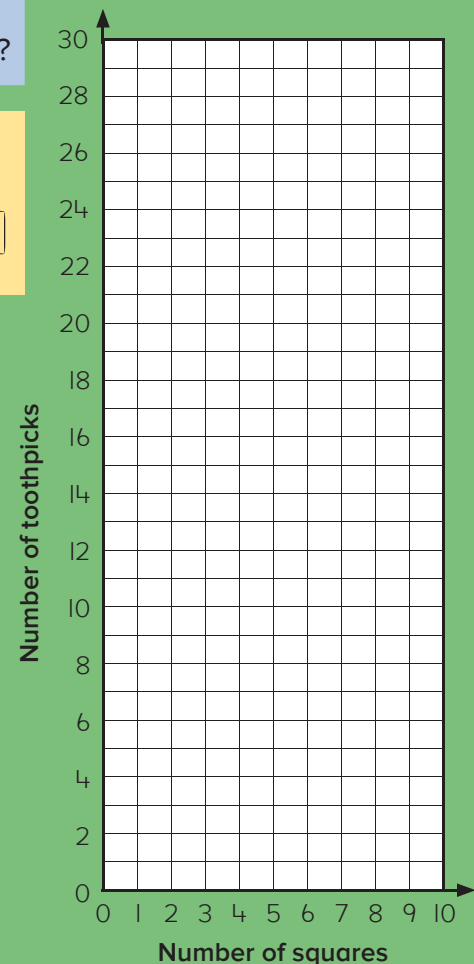
a. Complete the table. If necessary, draw more pictures on scrap paper.

Picture number	1	2	3	4	5
Number of squares	1				
Number of toothpicks	4				

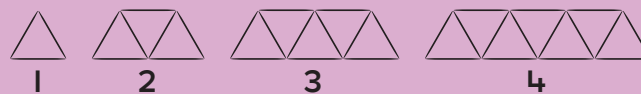
b. Use the numbers for each picture to write ordered pairs.

(,)	(,)	(,)
(,)	(,)	

c. Plot the ordered pairs on the coordinate plane.



2. Look at this pattern made with toothpicks.



a. Complete the table. If necessary, draw more pictures on scrap paper.

Picture number	1	2	3	4	5
Number of triangles	1				
Number of toothpicks	3				

b. Use the numbers for each picture to write the ordered pairs.

(,)

(,)

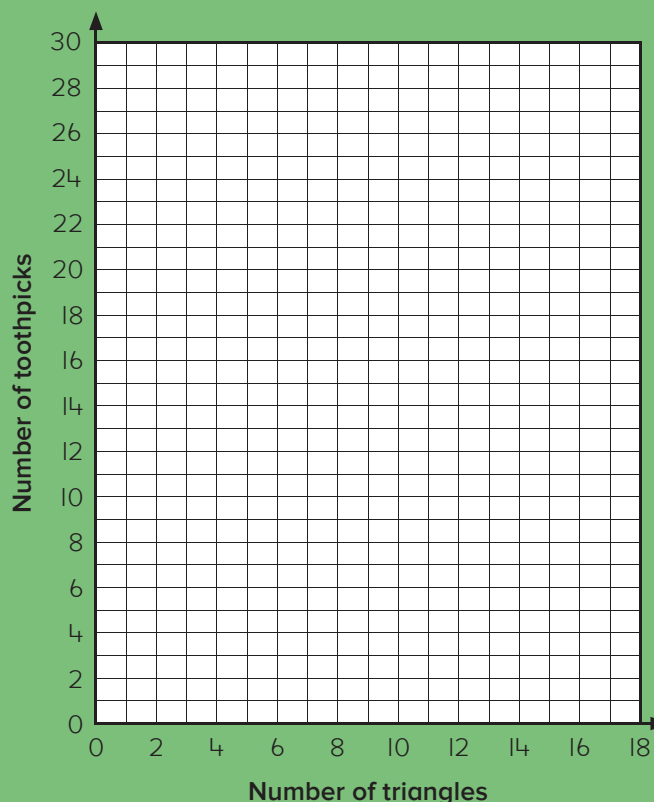
(,)

(,)

(,)

c. Plot the ordered pairs in blue on the coordinate plane.

d. Use a pattern to work out the ordered pairs for Picture 6 and Picture 7. Then plot the points on the coordinate plane.

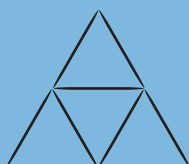


Step Ahead

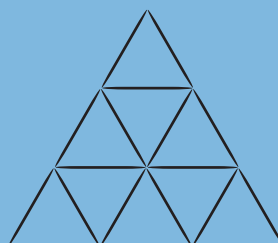
Write the first four ordered pairs for this sequence of triangle pictures made with toothpicks. Use red to plot the points on the coordinate plane above.



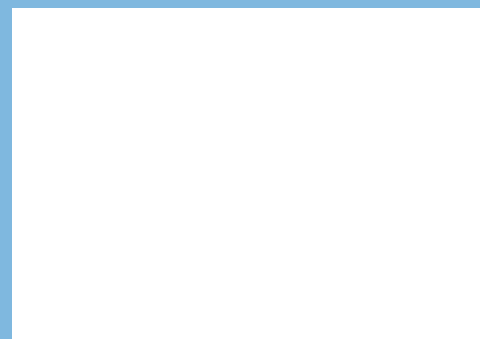
(,)



(,)



(,)



(,)

Lela has saved \$10. She plans to save \$2 each week.

How could she show the amount she will save in 10 weeks?



She could use a table.

Number of weeks	0	1	2		
Amount saved	10	12			



She could use ordered pairs.

(,)	(,)	(,)
(,)	(,)	

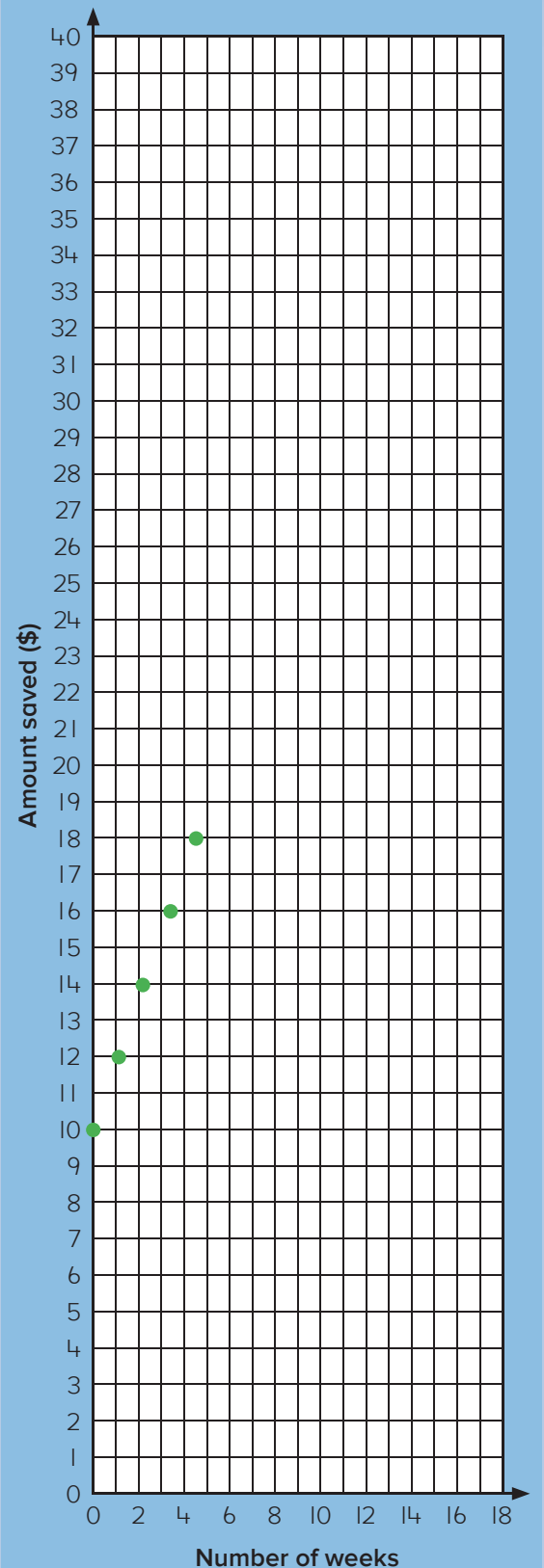


A graph on a coordinate plane is a good way to show how the savings grow.

Lela started with \$10. Where is that point on the graph?
What ordered pair matches that point?

What do you notice about all the points?

How long will it take Lela to save \$40?
How do you know?



Step Up

1. Olivia has saved \$36. She plans to **spend** \$6 every three weeks.

- a. Complete this table to show the amount she has at the start and after every three weeks until the money is spent.

Number of weeks	0	3	6	9			
Amount left	36						

- b. Write ordered pairs to match.

(0 , 36)	(3 ,)	(,)	(,)
(,)	(,)		

- c. Use blue to graph the ordered pairs on the coordinate plane on page I48.

2. Alex has saved \$40. He plans to spend \$5 every two weeks.

- a. Write ordered pairs to show the amount at the start and after every two weeks until the money is spent.

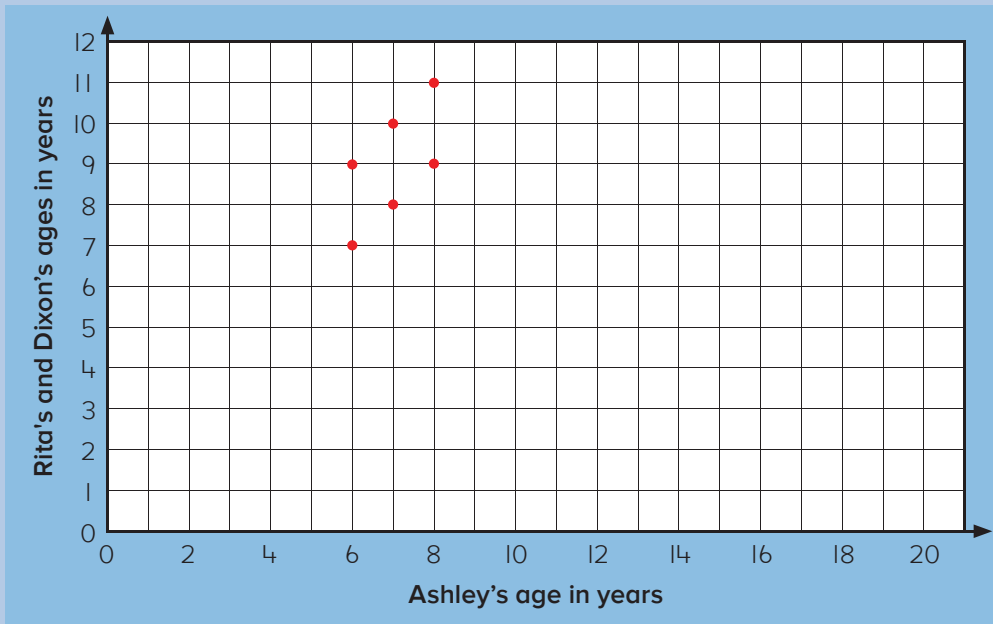
(0 , 40)	(2 ,)	(,)	(,)	(,)
(,)	(,)	(,)	(,)	

- b. Use red to graph the ordered pairs on the coordinate plane on page I48.

Step Ahead

Look at the blue and red points on the coordinate plane on page I48. Write about what do you notice.

Ashley, Rita, and Dixon are siblings. They were all born in January but in different years. The blue points show Ashley's and Rita's ages on April 4 in three consecutive years.



What do you notice about the points for the Ashley and Rita?

What ordered pairs would you write for the three points that match Ashley's and Rita's ages?

What ordered pair would you write for Ashley and Rita at their next birthday?

How do the ages of Ashley and Rita compare?

How old will Rita be when Ashley is 15 years old? How do you know?

If you know Ashley's age, how could you work out Rita's age?

Does it make sense to join the ordered pairs that show Ashley's and Rita's ages?



Step Up

1. The red points on the coordinate plane above show Ashley's and Dixon's ages on April 4 in three consecutive years.

- a. What ordered pairs would you write for the three points?

(		,		)	(		,		)	(		,		)
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- b. If you know Ashley's age, how could you work out Dixon's age?

2. The blue points show how Blake saves.

a. How much did Blake have when he started to save?

\$

b. Write the ordered pairs that match the blue points.

(,)	(,)
(,)	(,)

c. Complete these ordered pairs to show how Blake continues to save.

(11 ,)	(12 ,)	(13 ,)
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3. The red points show how Sheree saves.

a. How much did Sheree have when she started to save?

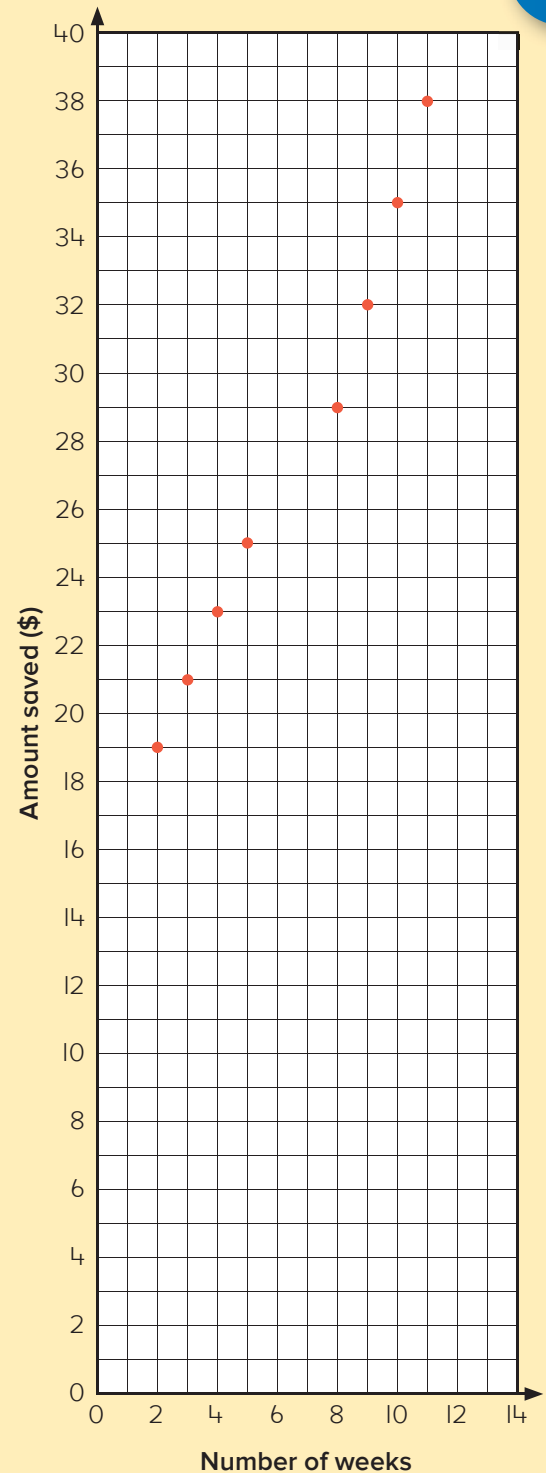
\$

b. Write the ordered pairs that match the red points.

(,)	(,)
(,)	(,)

c. Complete these ordered pairs to show how Sheree continues to save.

(6 ,)	(7 ,)	(8 ,)
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Step Ahead

Look at the coordinate plane above. Draw a line to connect the blue points and another line to connect the red points. What do you notice?
