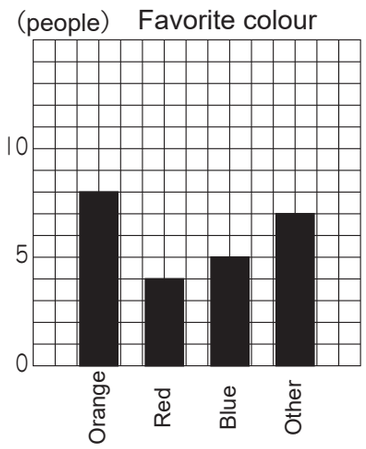
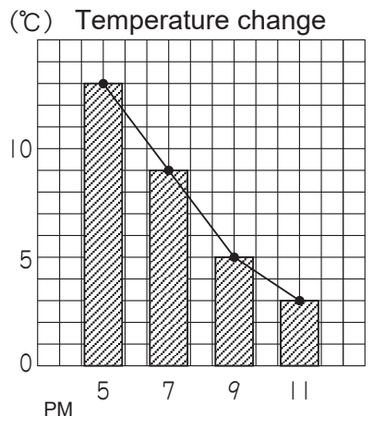
3 - 1 Line Graphs

How to Read Line Graphs

Instruction Let's compare the following graphs.



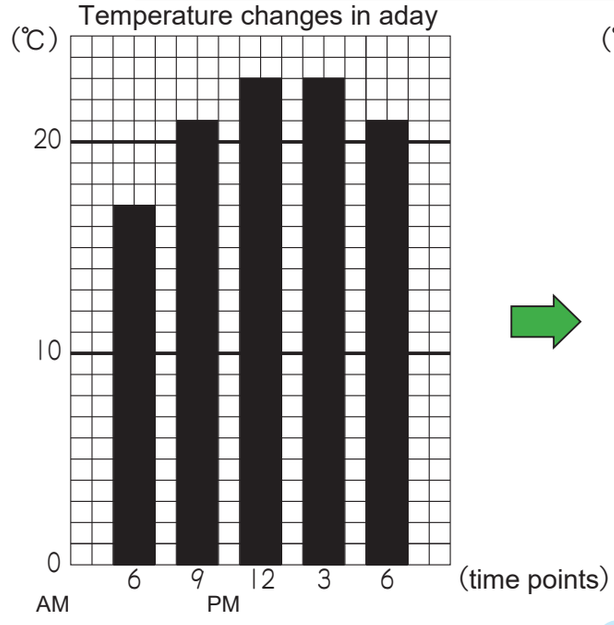


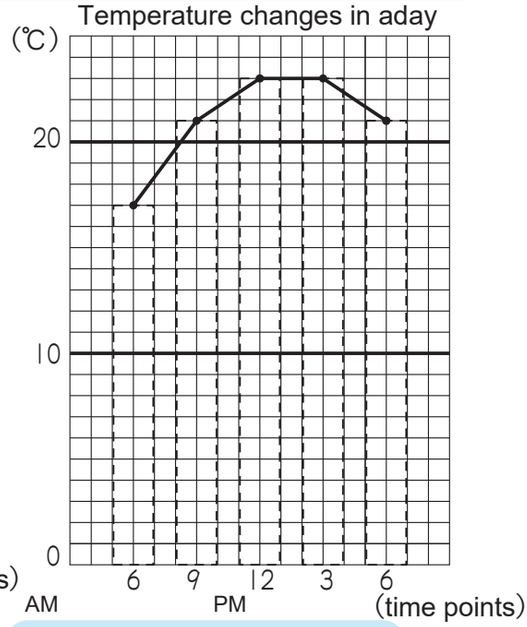
Both are bar graphs, and it looks similar…

Look at the horizontal scale. The graph on the right shows the time series. To show time-series changes, we can use another representation, a **line graph**.

Instruction Let's find how much the temperature changes in a day.

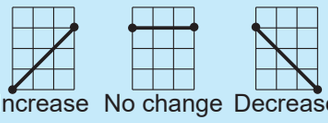
Time	6 a.m.	9 a.m.	12 p.m.	3 p.m.	6 p.m.
Temperature (℃)	17	21	23	23	21



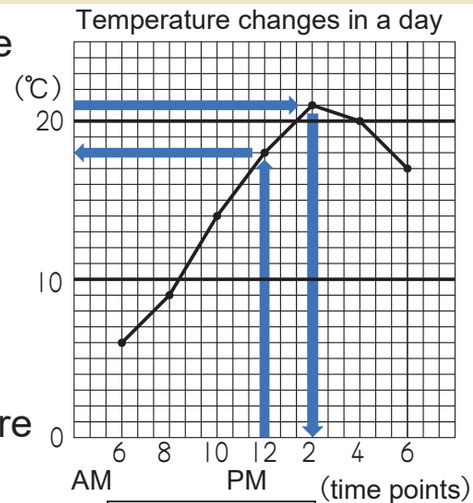


- Graphs like the one on the right is called a line graph.
- The slope of the line shows how quantities change.

It is necessary to see changes using a line graph.



Example The graph below shows ground temperature every two hours.



1 What was the ground temperature at 12 p.m.?

18 ℃

2 At what time was the temperature 21 ℃ ?

2:00 p.m.

3 What was the lowest temperature and when was it?

Temperature : 6 ℃ Time point : 6:00 a.m.

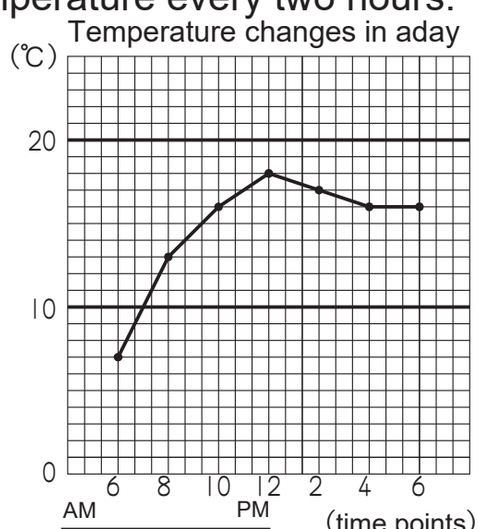
4 Between which two time points did the temperature rise?

From 6:00 a.m. to 2:00 p.m.

5 Between which two time points did the temperature decline?

From 2:00 p.m. to 6:00 p.m.

1 The graph below shows ground temperature every two hours.



1 What was the grand temperature at 6 a.m.?

℃

2 At what time was the temperature 18 ℃ ?

3 What was the lowest temperature and when was it?

Temperature : ℃ Time point :

4 Between which two time points did the temperature rise?

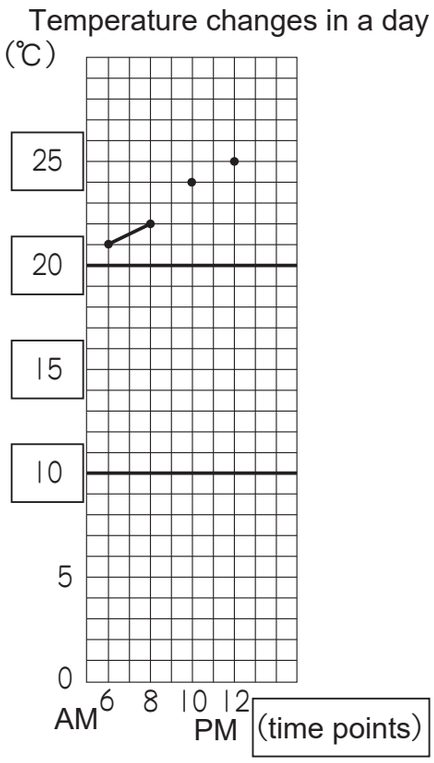
From to

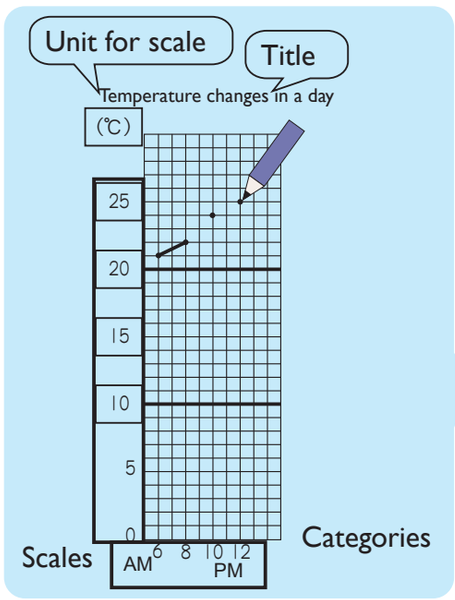
3 - 2 Line Graphs

How to Draw Line Graphs (1)

Example 1 The graph below shows ground temperature every two hours. Draw the line graph.

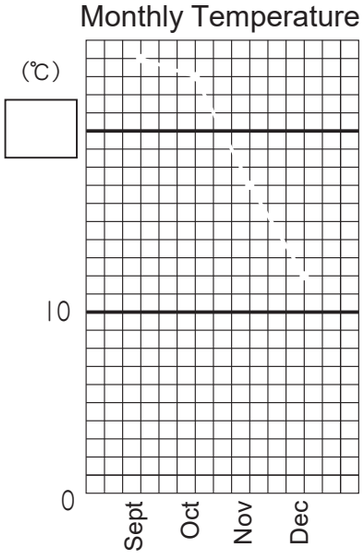
Time	A.M. 6	8	10	P.M. 12
Temperature (℃)	21	22	24	25

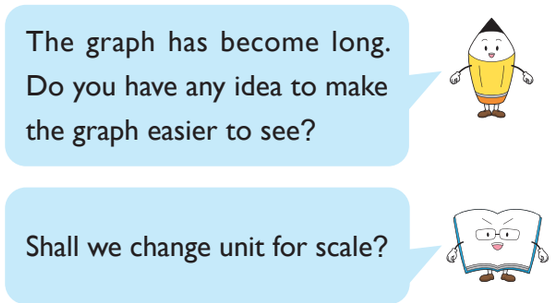




1 The graph below shows monthly temperatures for four months. Draw the two kinds of line graphs with different scales.

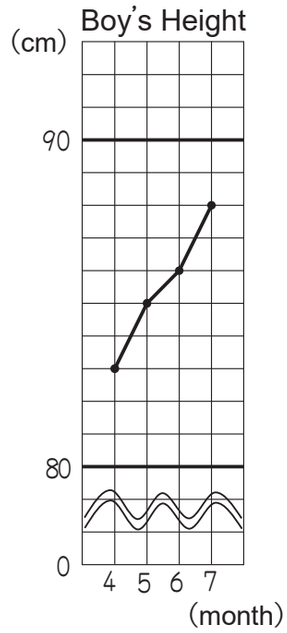
Month	September	October	November	December
Temperature (℃)	28	23	17	12





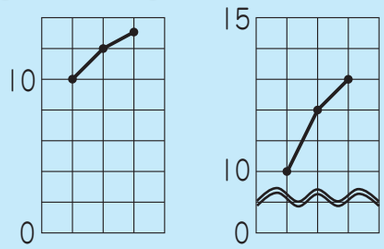
Example 2 The table below shows the record of a baby boy's height from April to July. Draw a line graph using the information in the table.

Month	April	May	June	July
Height (cm)	83	85	86	88



shows where part of the graph has been omitted. This is one of the tips to represent a graph more accurately.

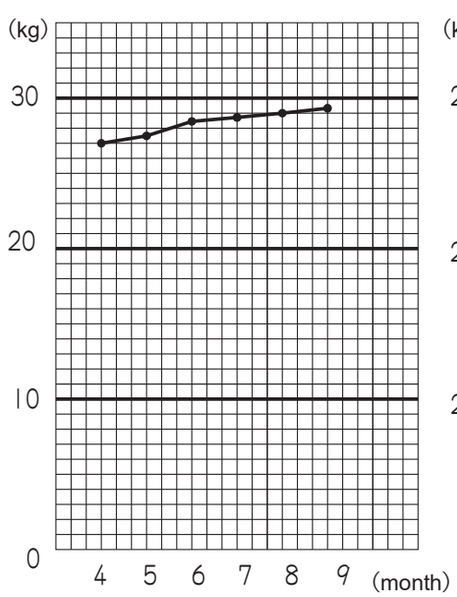
Look at both line graphs below. Which graph does the change look bigger? By using ,it makes easy to see the change on the right.



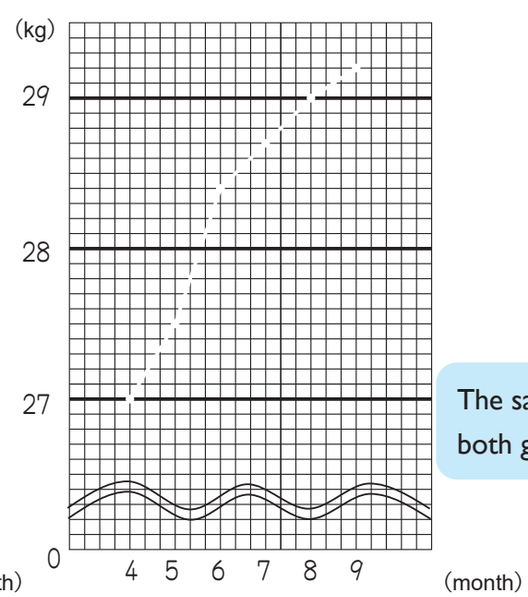
2 The following table shows how a boy's weight changed. Based on this, the graph became as shown in A. Rewrite the graph on grid paper B.

month	4	5	6	7	8	9
Weight (g)	27	27.5	28.4	28.7	29	29.2

A How weight changes



B How weight changes



The same data drew both graphs.

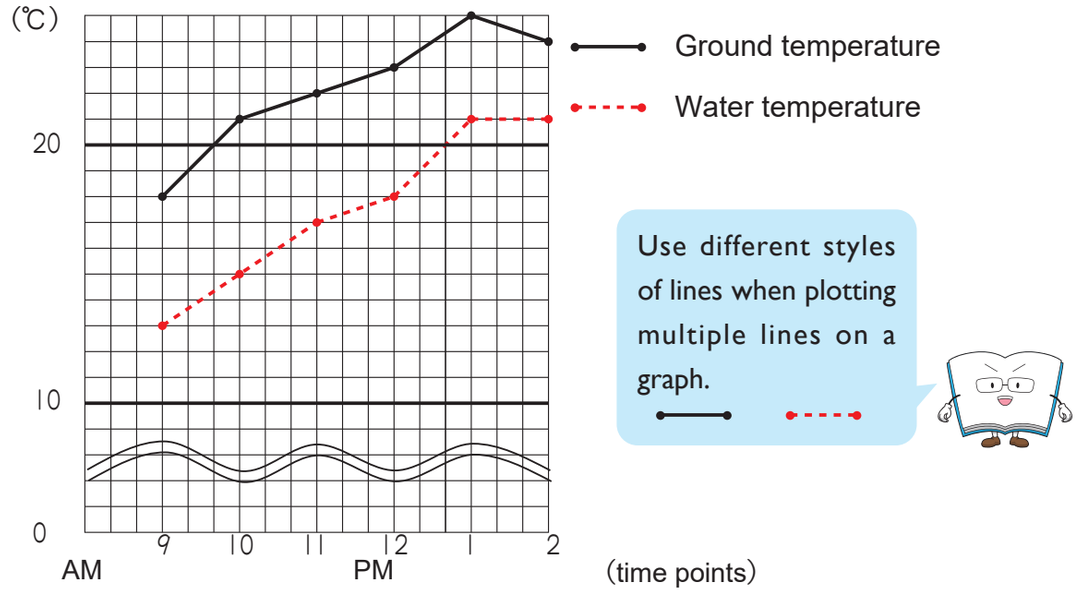
3 - 3 Line Graphs

How to Draw Line Graphs (2)

Example An aquaculture fisher is considering feeding. The table below shows ground temperature and water temperature. Draw the line graphs using the information and answer the following questions.

Time points	A.M. 9	10	11	P.M. 12	1	2
Ground temperature (℃)	18	21	22	23	25	24
Water temperature (℃)	13	15	17	18	21	21

Ground and water temperature



1 When is the biggest difference between the ground temperature and the water temperature? How many ℃ is the difference?

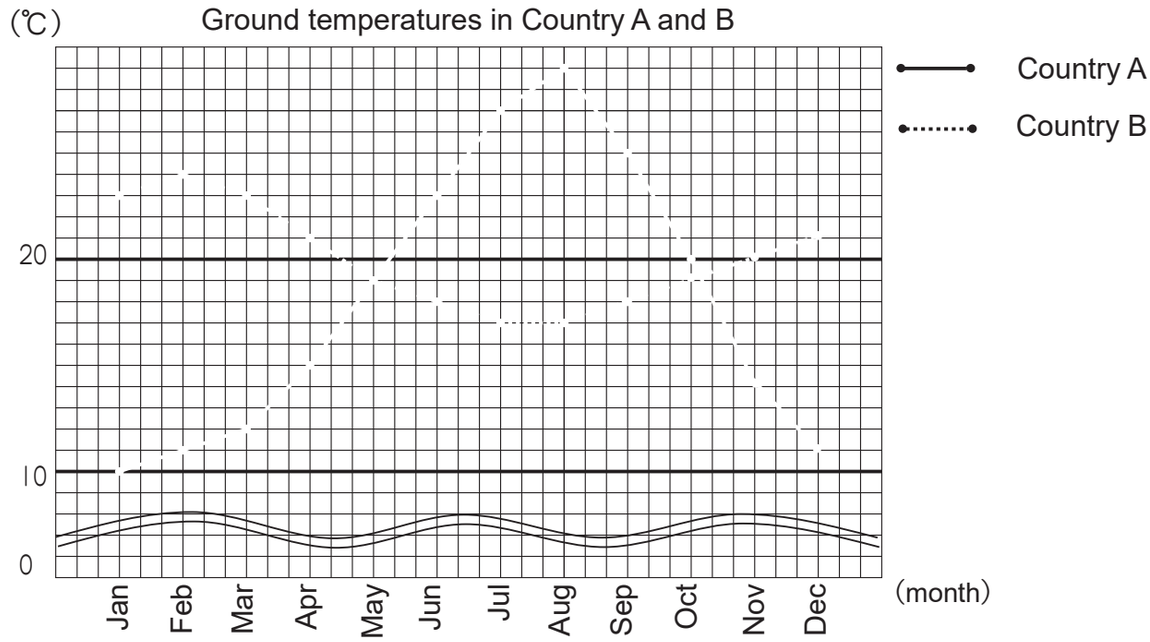
Time points: 10:00 a.m. Difference: 6 ℃

2 When is the smallest difference between the ground temperature and the water temperature? How many ℃ is the difference?

Time points: 2:00 p.m. Difference: 3 ℃

A man lives in country A and considering vacation to country B. The table below shows two countries' ground temperature each month. Draw the line graphs and answer the following questions.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature in country A (℃)	10	11	12	15	19	23	27	29	25	20	14	11
Temperature in country B (℃)	23	24	23	21	19	18	17	17	18	19	20	21



1 What are the highest temperatures in each country?

Country A: ☐ ℃ Country B: ☐ ℃

2 What are the lowest temperatures in each country?

Country A: ☐ ℃ Country B: ☐ ℃

3 When is the biggest difference between the ground temperature and the water temperature? How many ℃ is the difference?

Month: ☐ Difference: ☐ ℃

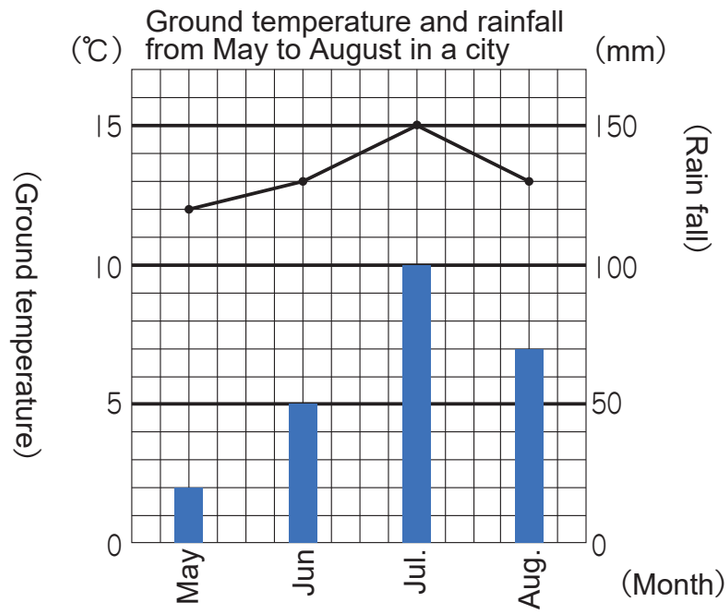
4 In which month are the temperatures in the two cities the same?

☐

3 - 4 Line Graphs

Bar Graphs and Line Graphs

Example The graph below shows both the ground temperature in a line graph and the rain fall in a bar graph.



Note that the units and the amount of one mark are different on the right and left sides.

Let's think about what we can understand from the two graphs.

By using two kinds of graphs, you can see the relationship between temperature changes and amount of rainfall per month.

1 In which month did rainfall the most? How many mm did it rain?

Month: July Rainfall: 100 mm

2 Choose appropriate observation on the graphs.

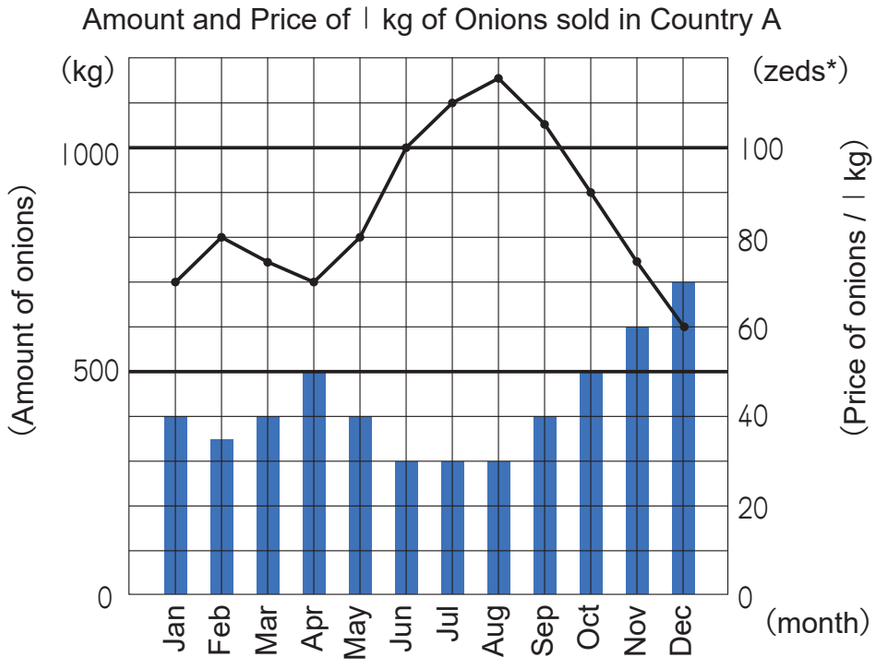
A The amount of rainfall and temperature are decreased from May to August.

B When the temperature is the highest, the amount of rainfall is the largest.

C If the temperature raises, the rainfall increases.

B, C

The graph below shows both the amount of onion sold at a city market in a bar graph and the price of 1 kg of onions in a line graph.



(* "zed (s)" is the fictional currency unit.)

1 Which month had the largest amount of onions? How much kg of onions were there?

Month: ☐ Amount: ☐ kg

2 Choose appropriate observation on the graphs.

A | From Jun to August, the price tends to be the lowest.

B | When the amount of onions goes up, the price goes down.

C | When the amount of onions is not changed, the price is decreased.

☐

3 How much money was made by selling onions in June?

Math sentence

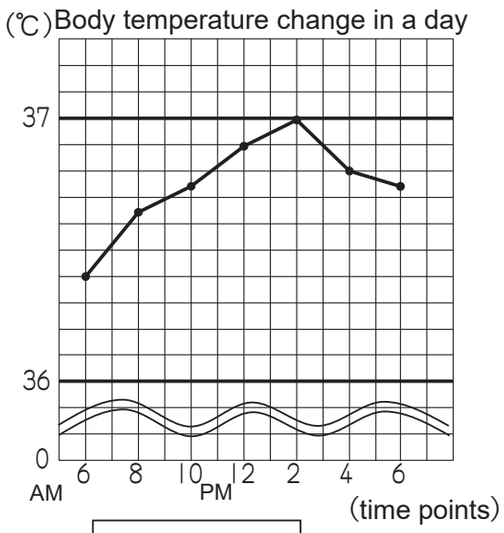
How many kg of onions were there and how much was price per kg?

Answer _____

3 - 5 Line Graphs

Review

1 A boy recorded his body temperature to check his health on the graph below.



① What was his body temperature at 6 a.m.?

□ ℃

② When was his temperature 36.8 ℃ ?

□

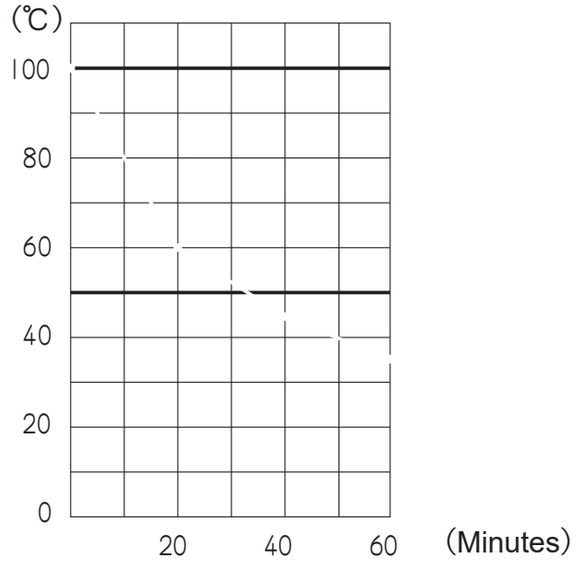
③ What was the highest temperature and when was it?

Temperature : □ ℃ Time point : □

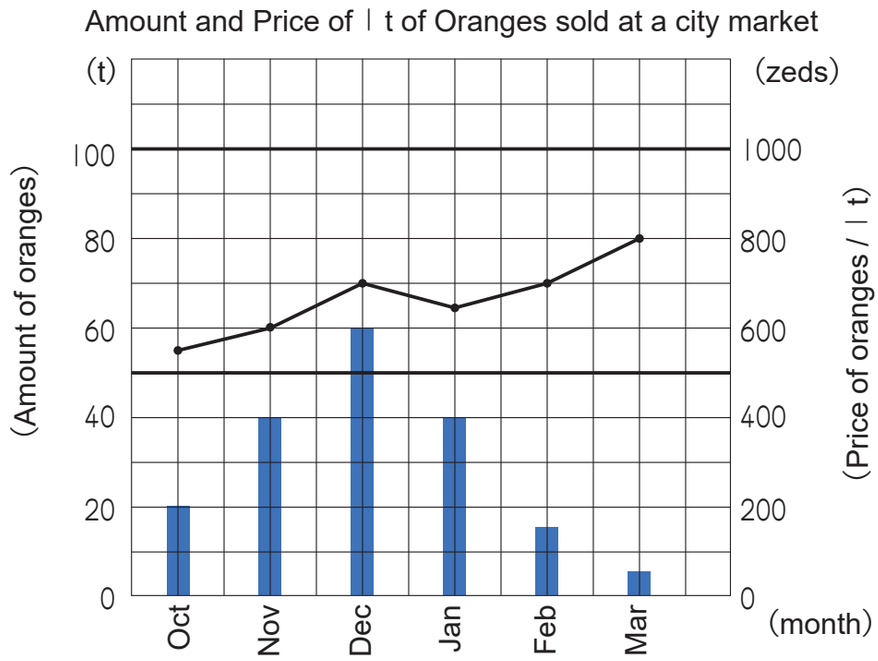
2 A manufacturer is developing a new mug. The table below shows the temperature change of coffee poured into an ordinal mug. Draw the line graphs using the information below.

Time interval since pouring (minute)	0	20	40	60
Coffee temperature (℃)	100	60	45	35

Temperature change of coffee poured into a mug



3 The graph below shows the amount of oranges sold at a city market in the bar graph and the price of 1 t of oranges in the line graph.



1 Which month had the largest amount of oranges? How much was it?

Month: ☐ Amount: ☐ t

2 Observe the graphs and write what you noticed.

A When the amount of oranges increase, the price is reduced.

B From January to March the amount of orange goes up and the price goes down.

C Regardless of the amount of oranges, the price is increasing toward March.

☐

3 How much money was made by selling oranges in March?

Math sentence

Answer _____