

- 1)  $-11^{\circ}\text{C}$
- 2)  $-69^{\circ}\text{C}$
- 3) September
- 4)  $20^{\circ}\text{C}$
- 5)  $6^{\circ}\text{C}$
- 6)  $68^{\circ}\text{C}$



- 1)
  - a) Mars had the coolest average daytime temperature in March. True.
  - b) The difference between the warmest and coolest average night-time temperatures was  $18^{\circ}\text{C}$ .  
False – the difference is  $20^{\circ}\text{C}$ .
  - c) The difference between average daytime and night-time temperatures in July was  $72^{\circ}\text{C}$ .  
False - the difference is  $80^{\circ}\text{C}$ .
  - d) From any one month to the next month, the average night-time temperature didn't increase by more than  $6^{\circ}\text{C}$ .  
True.



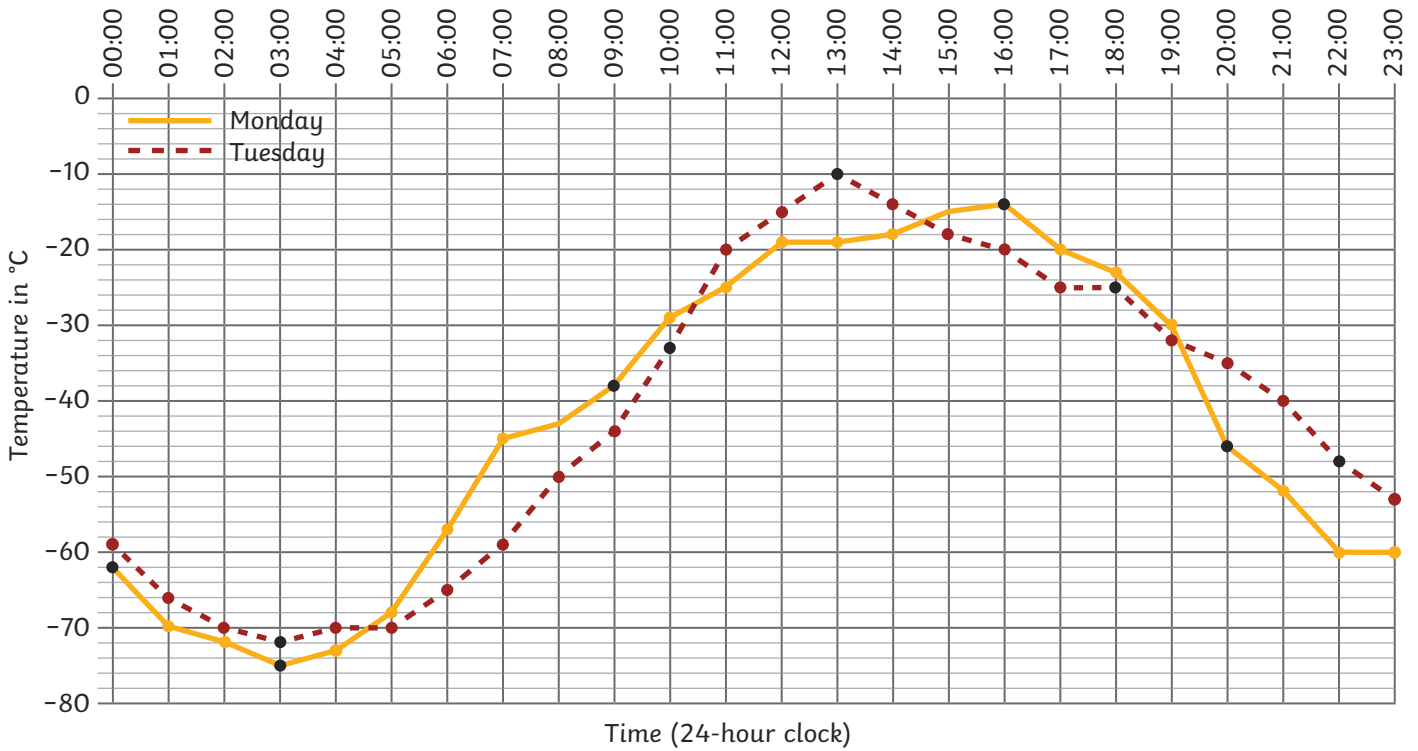


- 1)  $-75^{\circ}\text{C}$
- 2)  $-14^{\circ}\text{C}$
- 3)  $-72^{\circ}\text{C}$
- 4)  $-10^{\circ}\text{C}$
- 5)  $3^{\circ}\text{C}$
- 6)  $4^{\circ}\text{C}$
- 7)  $4^{\circ}\text{C}$
- 8) 07:00
- 9)  $14^{\circ}\text{C}$

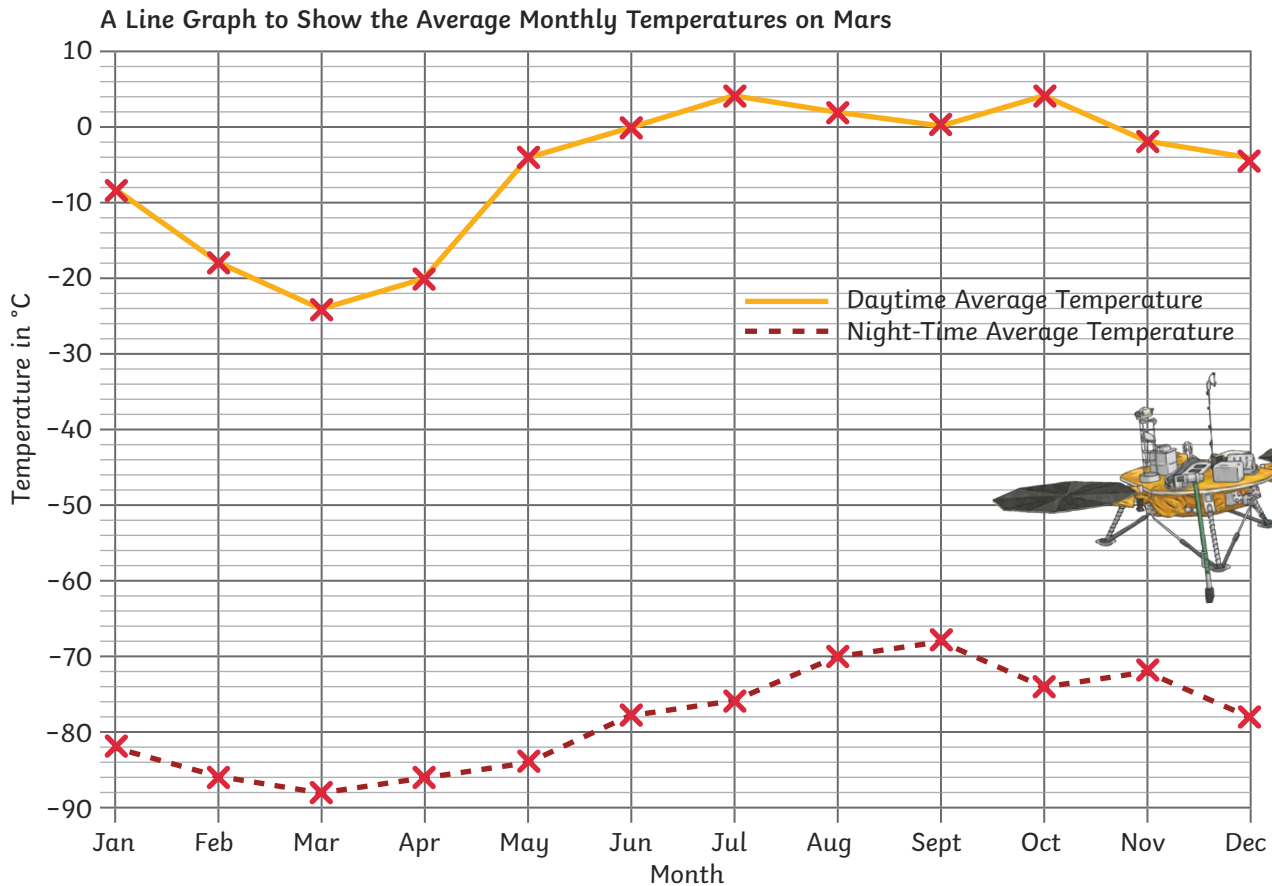
Missing Data:

Time	Temperature in $^{\circ}\text{C}$	
	Monday	Tuesday
00:00	-62	-59
01:00	-70	-66
02:00	-72	-70
03:00	-75	-72
04:00	-75	-70
05:00	-68	-70
06:00	-57	-65
07:00	-45	-59
08:00	-43	-50
09:00	-38	-44
10:00	-29	-33
11:00	-25	-20
12:00	-19	-15
13:00	-19	-10
14:00	-18	-14
15:00	-15	-18
16:00	-14	-20
17:00	-20	-25
18:00	-23	-25
19:00	-30	-32
20:00	-46	-35
21:00	-52	-40
22:00	-60	-48
23:00	-60	-53

A Line Graph to Show the Temperature on Mars over 24 Hours



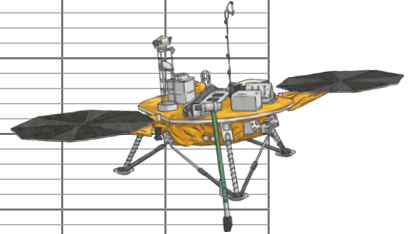
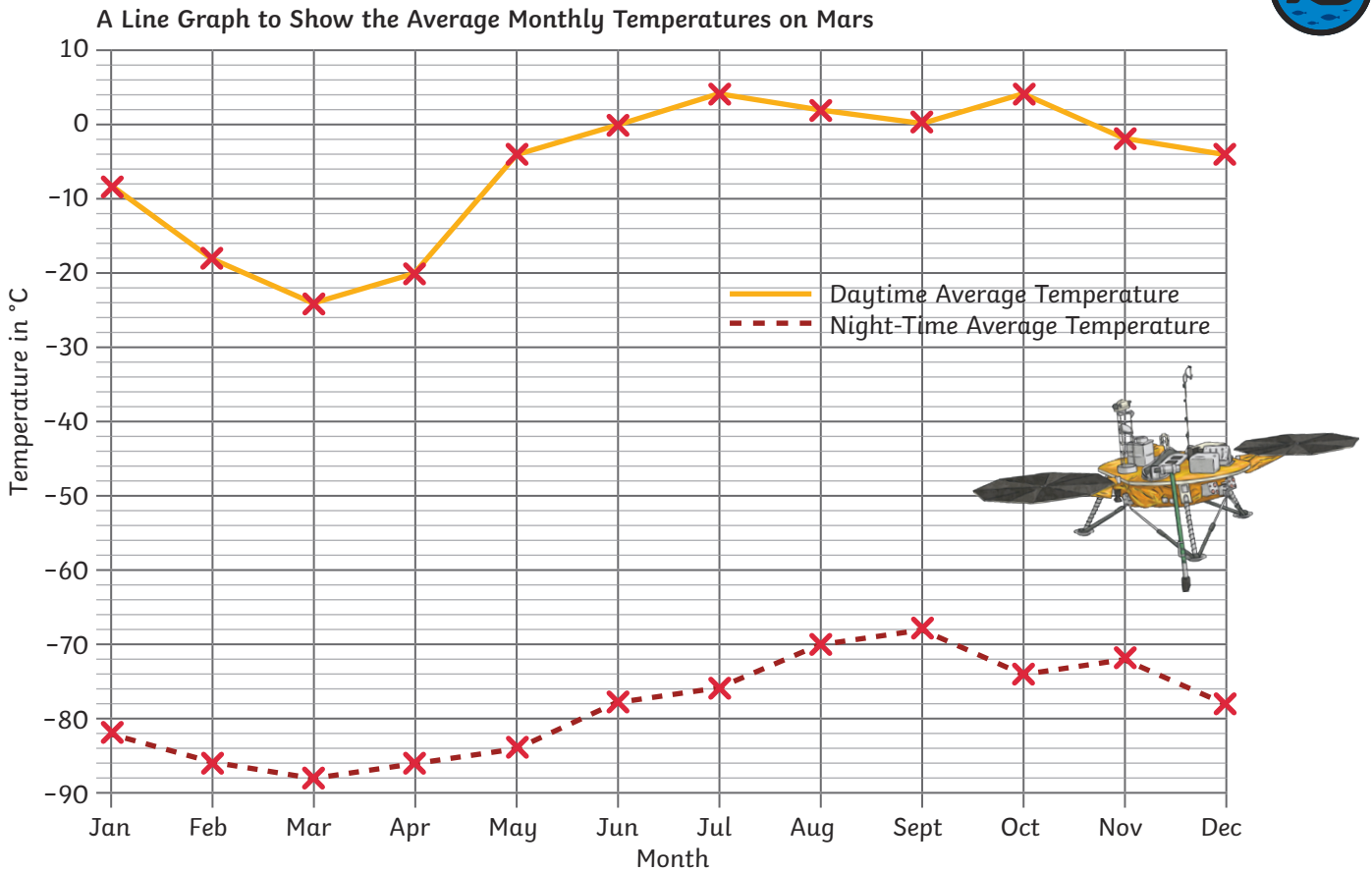
This line graph shows the average monthly temperatures on Mars for daytime and night time.



- 1) What was the average daytime temperature on Mars in April? \_\_\_\_\_
- 2) What was the average night-time temperature on Mars in August? \_\_\_\_\_
- 3) In which month was the average night-time temperature on Mars  $-69^{\circ}\text{C}$ ? \_\_\_\_\_
- 4) By how many degrees did the average daytime temperature on Mars change from April to June? \_\_\_\_\_
- 5) By how many degrees did the average night-time temperature on Mars change from January to March? \_\_\_\_\_
- 6) What was the difference between average daytime and night-time temperatures in February? \_\_\_\_\_



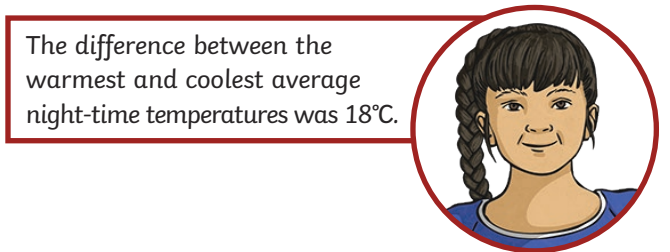
This line graph shows the average monthly temperatures on Mars for daytime and night time.



- 1) Decide whether each statement is true or false. If you think the statement is false, explain how to change it to make it true.



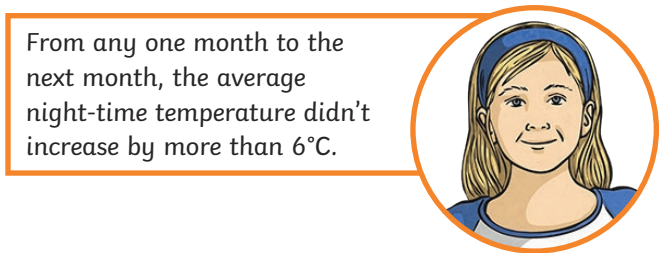
Mars had its coolest average daytime temperature in March.



The difference between the warmest and coolest average night-time temperatures was 18°C.



The difference between average daytime and night-time temperatures in July was 72°C.



From any one month to the next month, the average night-time temperature didn't increase by more than 6°C.

- 2) Write your own true or false statements about the data for a friend to solve.

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Some NASA scientists want to find out the answer to this question:

**How does the temperature change on Mars?**

They program the Mars rover to collect data for the temperature on Mars on two different days to find out.

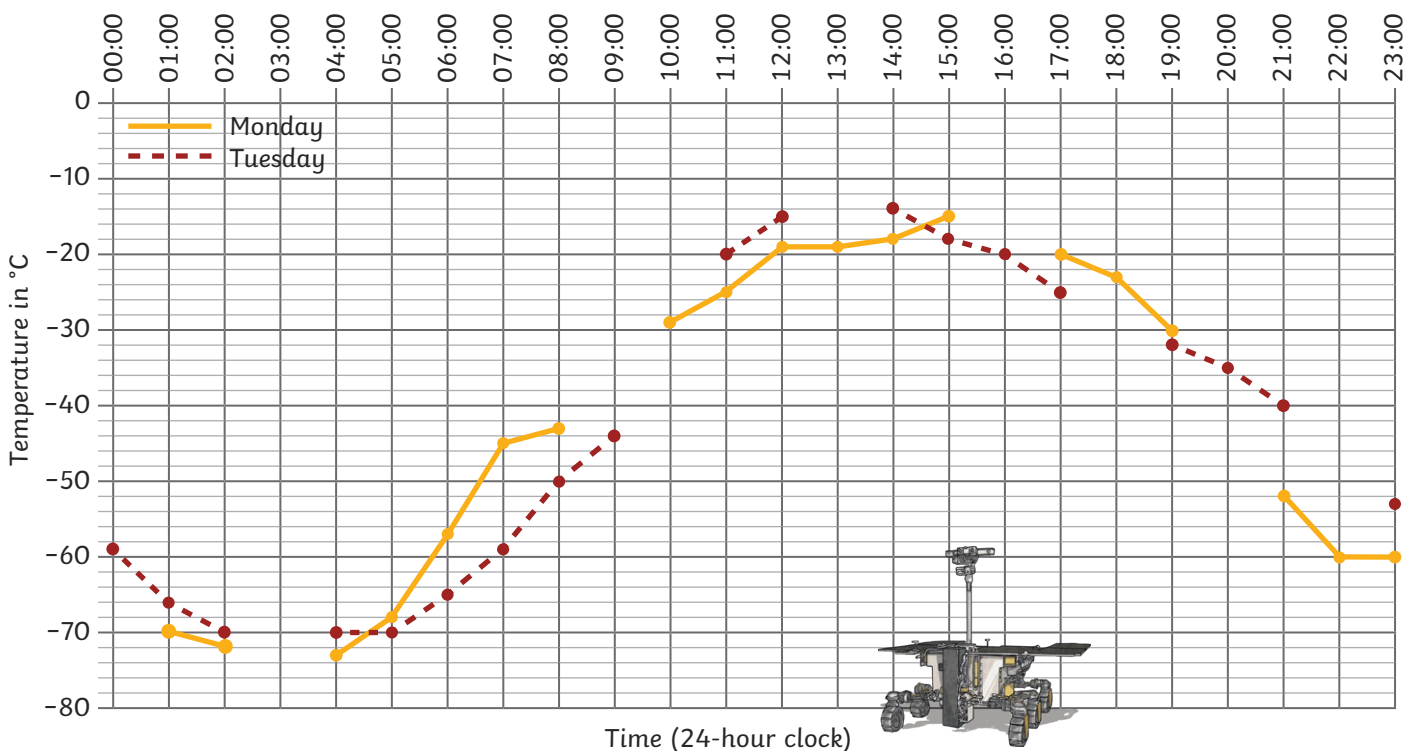
Use the clues and the partial line graph to fill in the table and find out the difference in temperatures between Monday and Tuesday.



1) Coolest temperature on Monday:	
2) Warmest temperature on Monday:	
3) Coolest temperature on Tuesday:	
4) Warmest temperature on Tuesday:	
5) Difference in coolest temperatures between Monday and Tuesday:	
6) Difference in warmest temperatures between Monday and Tuesday:	
7) The difference between the temperature at 11:00 on Monday and on Tuesday was 5°C. What was the difference between the temperatures of the two days at 12:00?	
8) At what time did the temperatures on Monday and Tuesday have the greatest difference?	
9) What was the difference between the two temperatures at this time?	

- At 13:00, the temperature on Tuesday was 9°C warmer than on Monday.
- At 16:00, the temperature on Tuesday was 6°C cooler than on Monday.
- On Tuesday, the temperature at 18:00 was 2°C cooler than the same time on Monday. Two hours later, the difference in both temperatures at this time had increased to 11°C, and it was now cooler on Monday at this time.
- At midnight, the temperature on Tuesday was 3°C warmer than the same time on Monday. At 22:00, the temperature on Tuesday was 11°C warmer than it had been at midnight.
- From 02:00 to 03:00 on Monday, the temperature dropped by 3°C. Between these times on Tuesday, the drop in temperature was 1°C less than this.
- On Monday, the temperature at 09:00 was 6°C warmer than the same time on Tuesday.
- On Tuesday, the temperature at 10:00 was 4°C cooler than the same time on Monday.

A Line Graph to Show the Temperature on Mars over 24 Hours



**Diving into Mastery**



# Use Line Graphs to Solve Problems



# Diving into Mastery Guidance for Educators

Each activity sheet is split into three sections, diving, deeper and deepest, which are represented by the following icons:



**Diving**



**Deeper**



**Deepest**

These carefully designed activities take your children through a learning journey, initially ensuring they are fluent with the key concept being taught; then applying this to a range of reasoning and problem-solving activities.

These sheets might not necessarily be used in a linear way. Some children might begin at the 'Deeper' section and in fact, others may 'dive straight in' to the 'Deepest' section if they have already mastered the skill and are applying this to show their depth of understanding.

# Aim

- Solve comparison, sum and difference problems using information presented in a line graph.



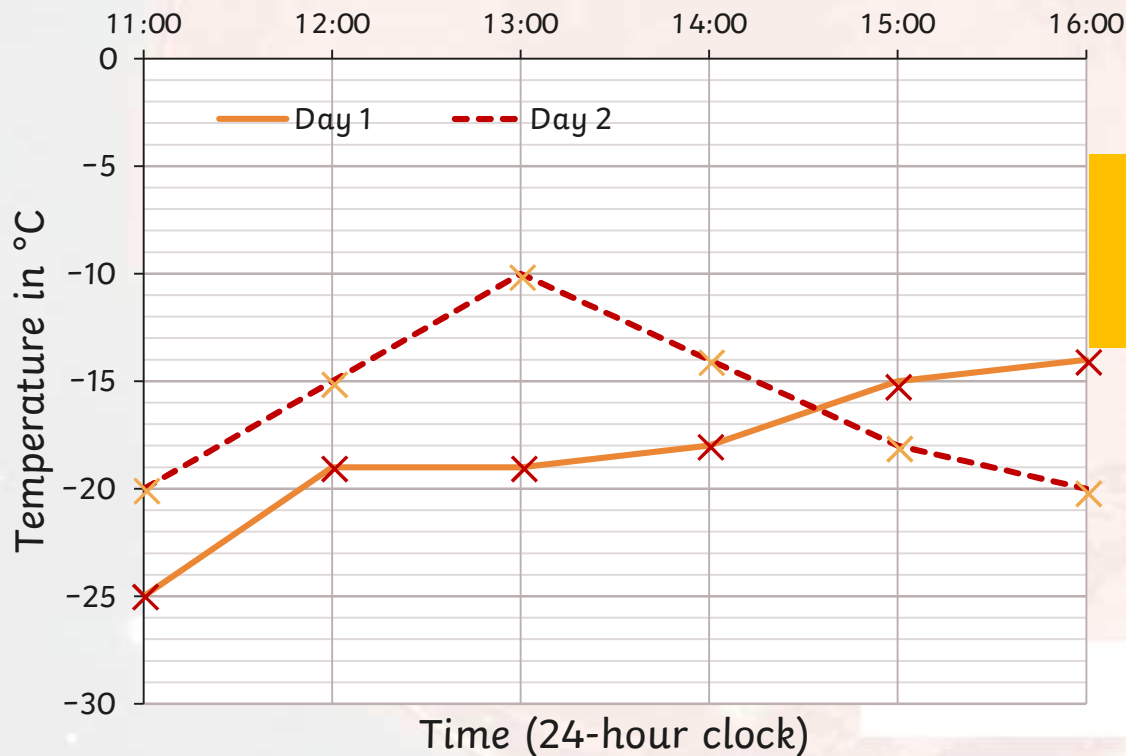
## Use Line Graphs to Solve Problems

## Diving



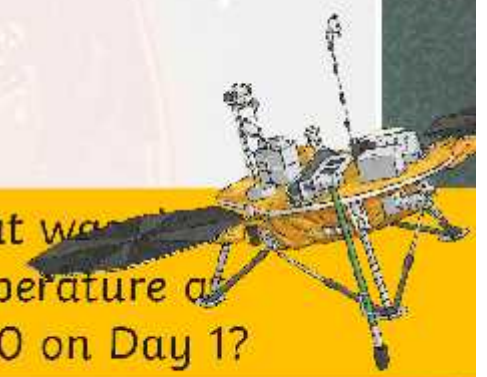
Here is a line graph showing the temperature on Mars on two different days.

A Line Graph to Show the Temperature on Mars



What was the temperature at 12:00 on Day 1?

-19°C



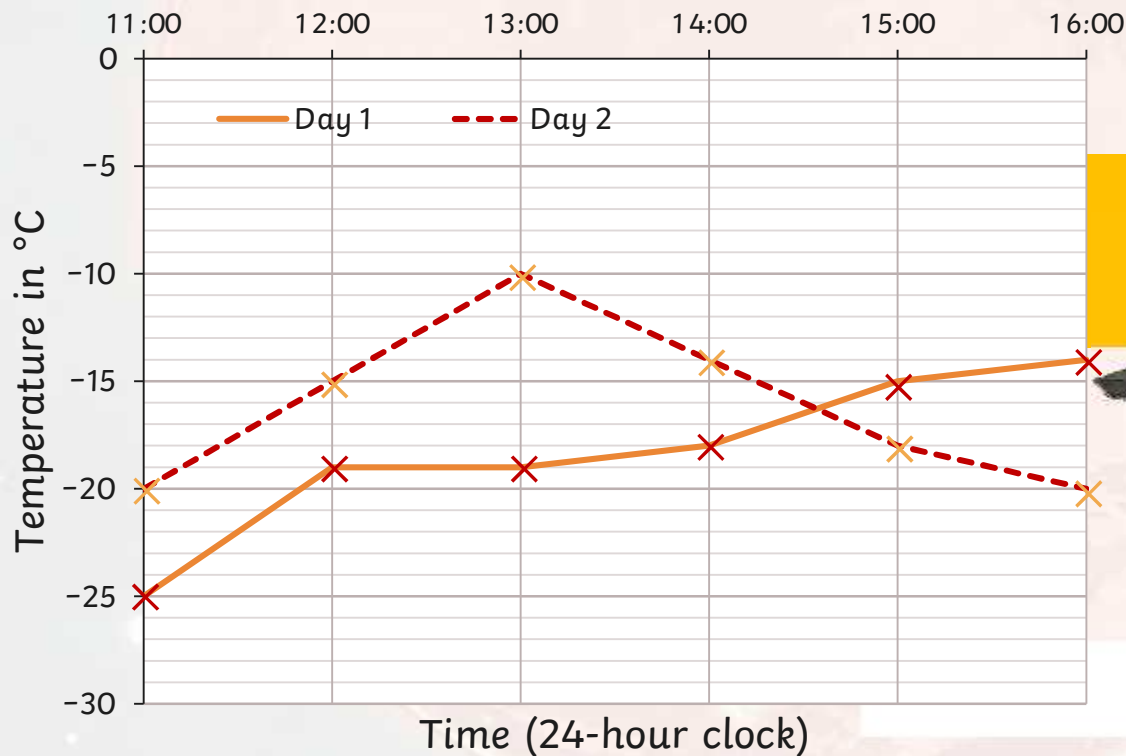
## Use Line Graphs to Solve Problems

## Diving



Here is a line graph showing the temperature on Mars on two different days.

A Line Graph to Show the Temperature on Mars



What was the temperature at 14:00 on Day 2?



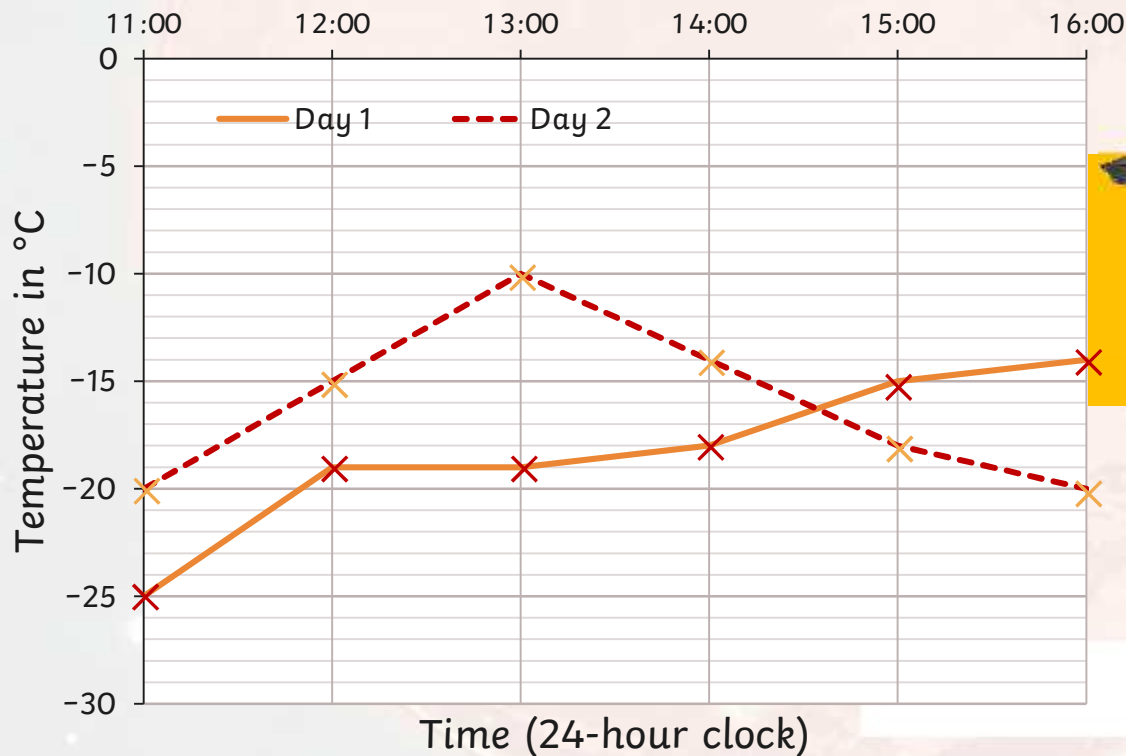
## Use Line Graphs to Solve Problems

## Diving



Here is a line graph showing the temperature on Mars on two different days.

A Line Graph to Show the Temperature on Mars



At 15:00, what was the difference in temperature between the two days?

3°C

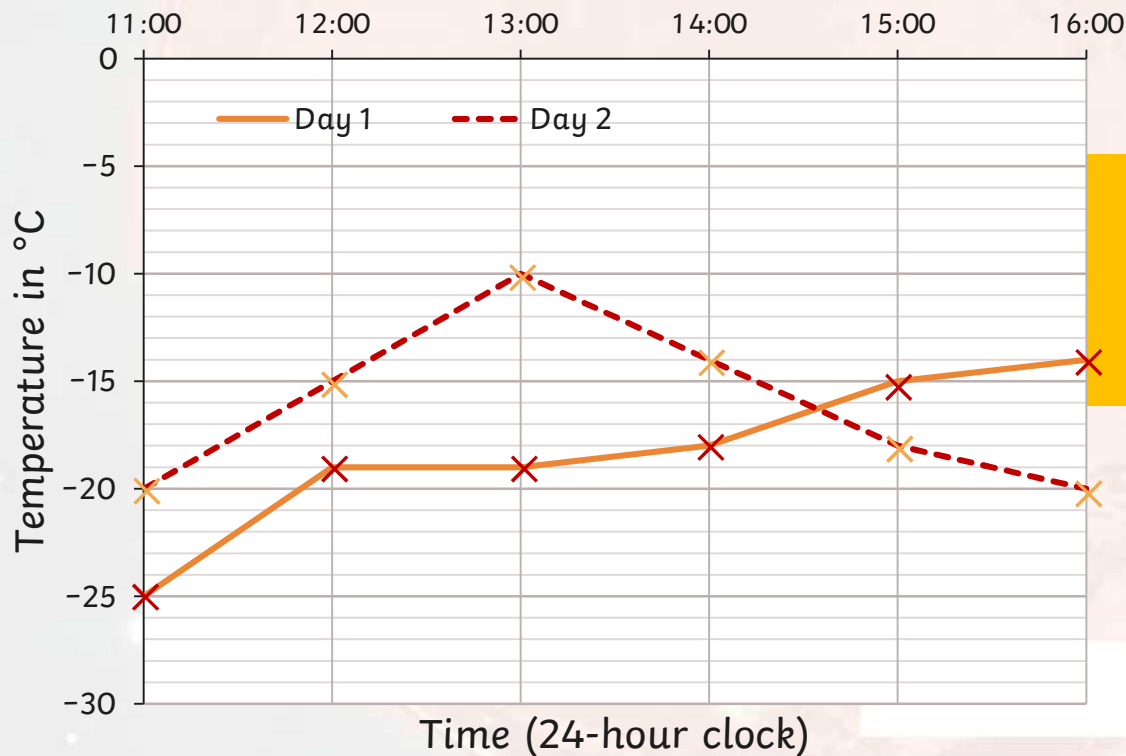
## Use Line Graphs to Solve Problems

## Diving



Here is a line graph showing the temperature on Mars on two different days.

A Line Graph to Show the Temperature on Mars



At which time did the two days have the smallest difference in temperature?

Approximately 14:30.



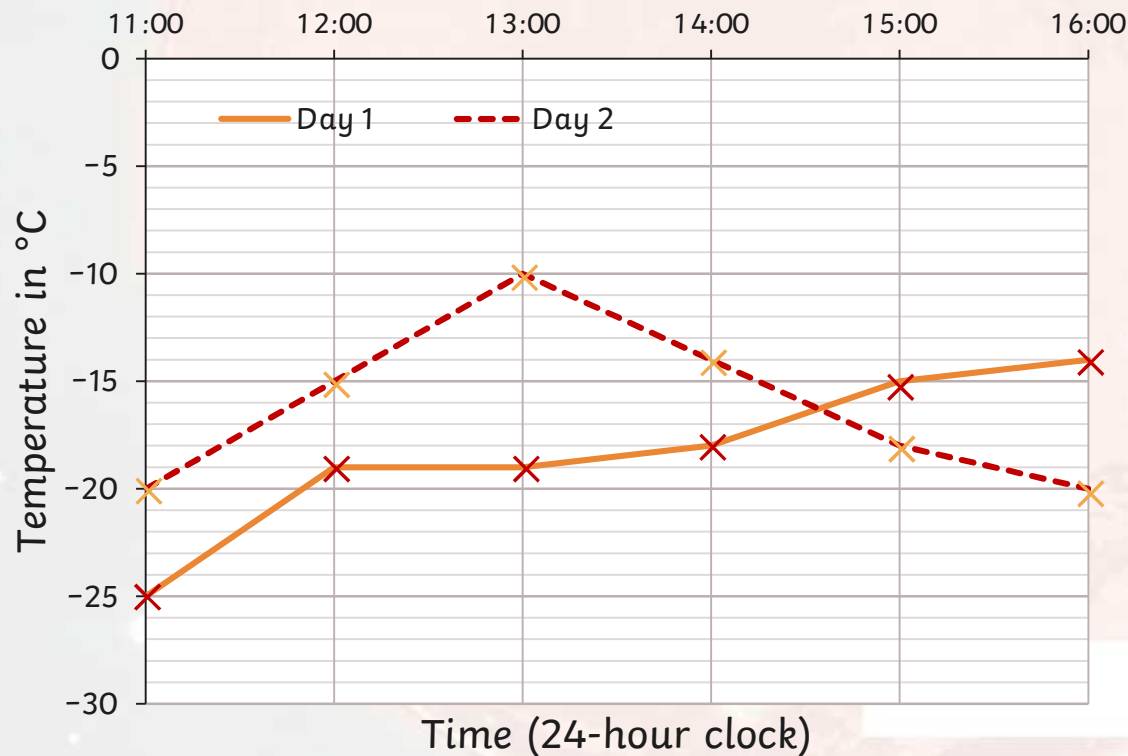
## Use Line Graphs to Solve Problems

## Deeper



Decide whether the graph showing the temperature on Mars for two different days is false. If you think the graph is false, explain how to change it to make it true.

A Line Graph to Show the Temperature on Mars



The temperature at 12:00 on Day 2 was  $-21^{\circ}\text{C}$ .

False - the temperature was  $-15^{\circ}\text{C}$ .

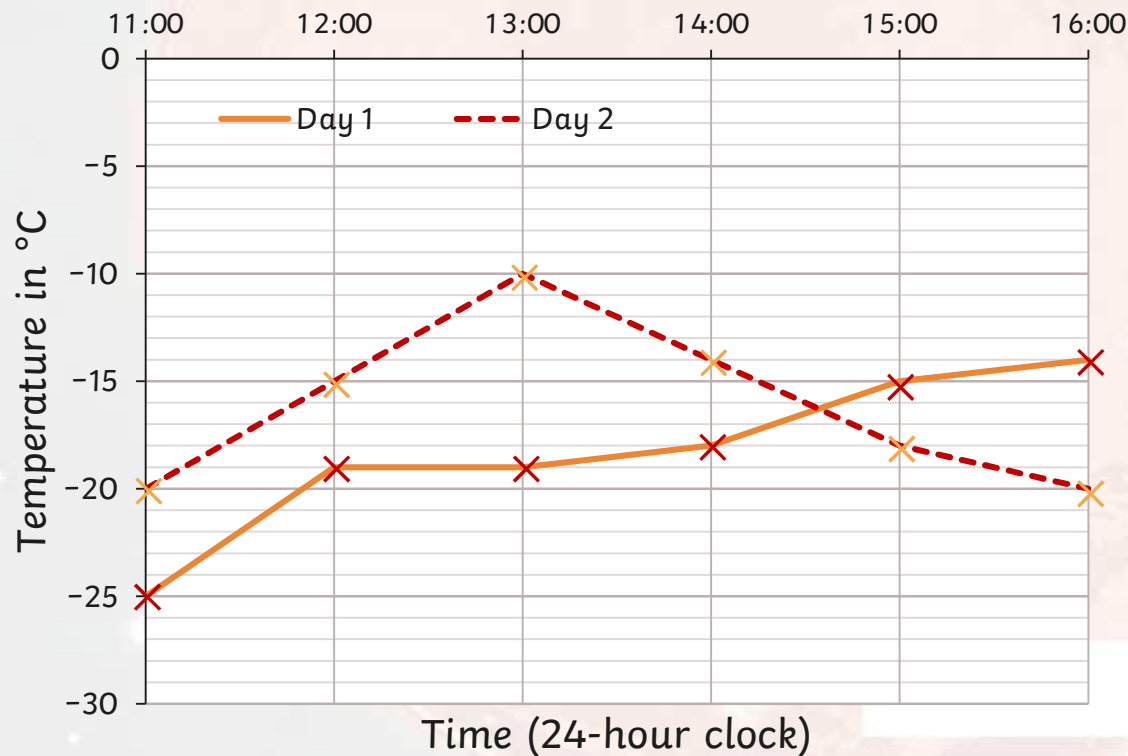
## Use Line Graphs to Solve Problems

## Deeper



Decide whether each statement is true or false. If you think the statement is false, explain how to change it to make it true.

A Line Graph to Show the Temperature on Mars



The difference in temperature at 11:00 on the two days was 10°C.

False - the difference was 5°C.

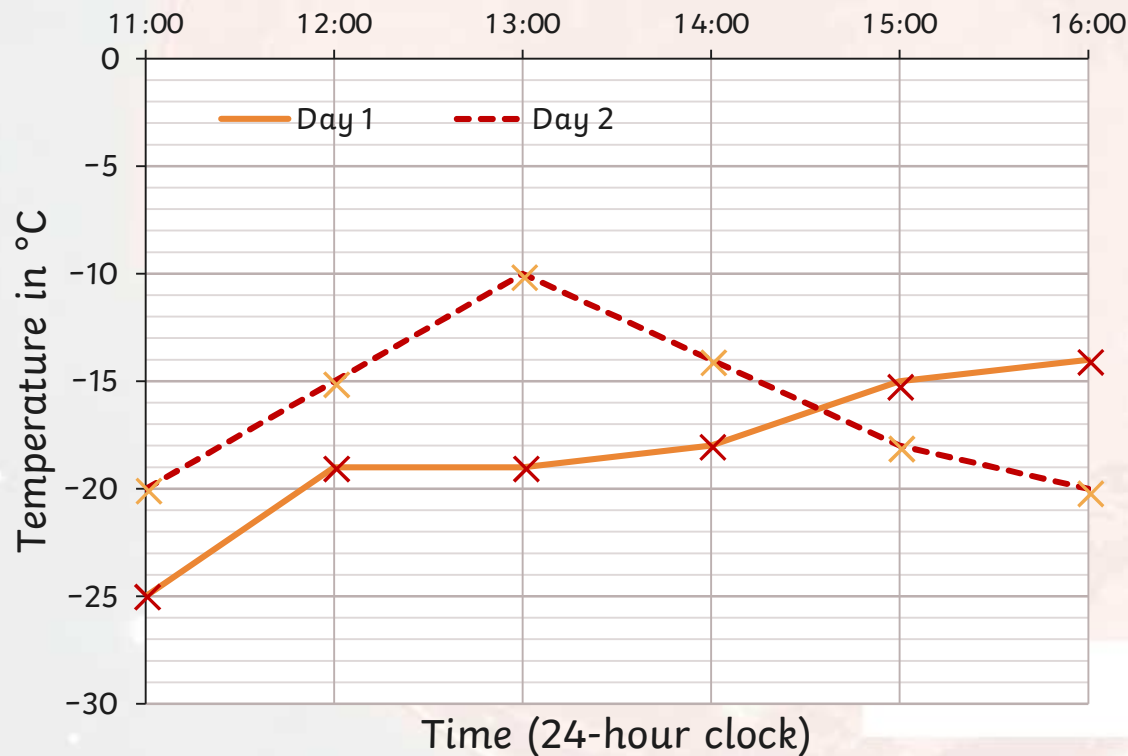
## Use Line Graphs to Solve Problems

## Deeper



Decide whether each statement is true or false. If you think the statement is false, explain how to change it to make it true.

A Line Graph to Show the Temperature on Mars



On Day 1, the temperature increased by  $11^{\circ}\text{C}$  over the six hours.

True.

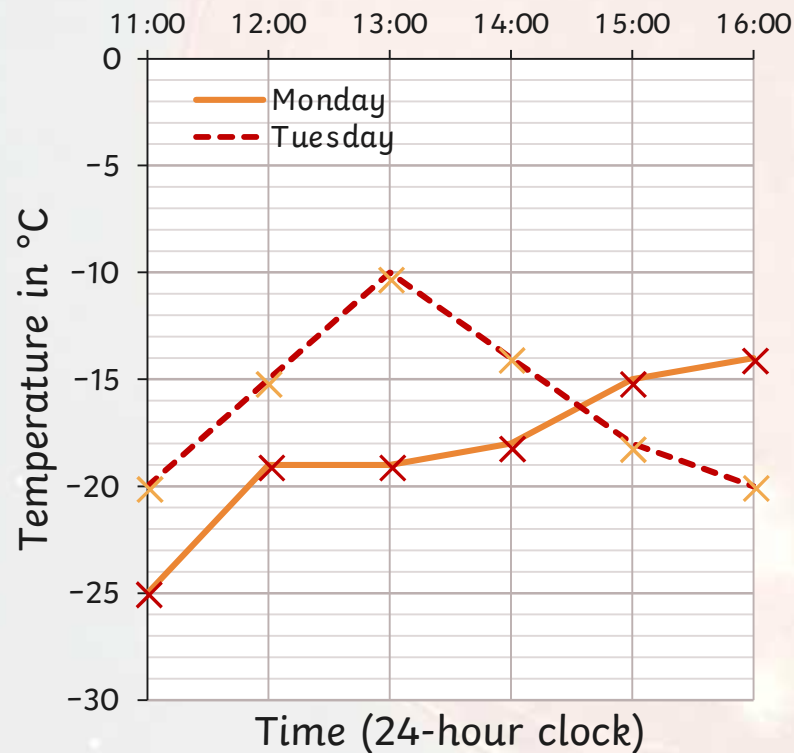
## Use Line Graphs to Solve Problems

## Deepest



Complete the table of data for the NASA scientists.

A Line Graph to Show the Temperature on Mars



Coolest temperature on Monday:	-25°C
Warmest temperature on Monday:	-14°C
Coolest temperature on Tuesday:	-20°C
Warmest temperature on Tuesday:	-10°C
Difference in coolest temperatures between Monday and Tuesday:	5°C
Difference in warmest temperatures between Monday and Tuesday:	4°C



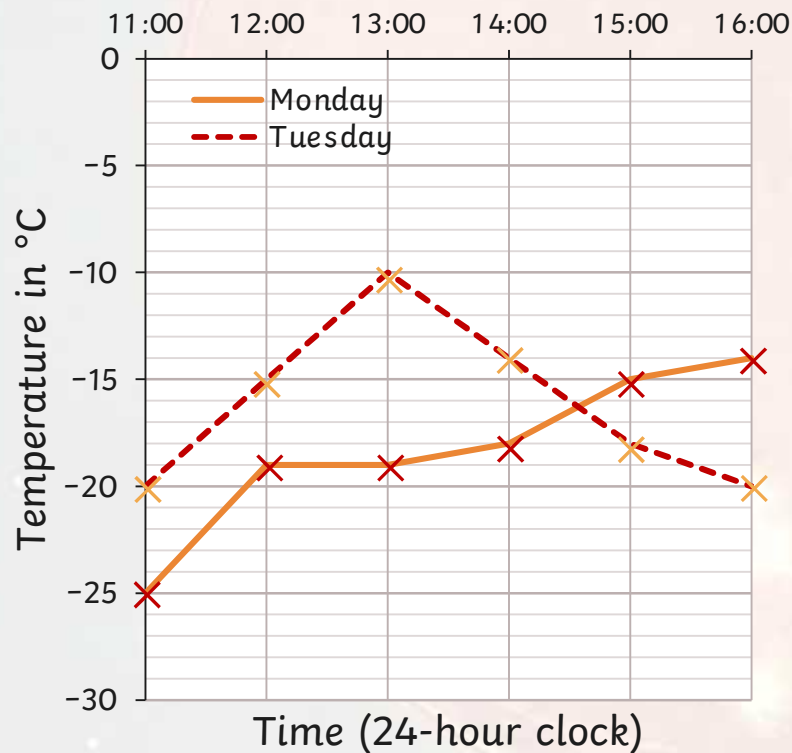
## Use Line Graphs to Solve Problems

## Deepest



Complete the table of data for the NASA scientists.

A Line Graph to Show the Temperature on Mars



The difference between the temperature at 14:00 on Monday and on Tuesday is  $4^{\circ}\text{C}$ .  
What is the difference between the temperatures of the two days at 15:00?

$3^{\circ}\text{C}$

At what time did the temperatures on Monday and Tuesday have the greatest difference?

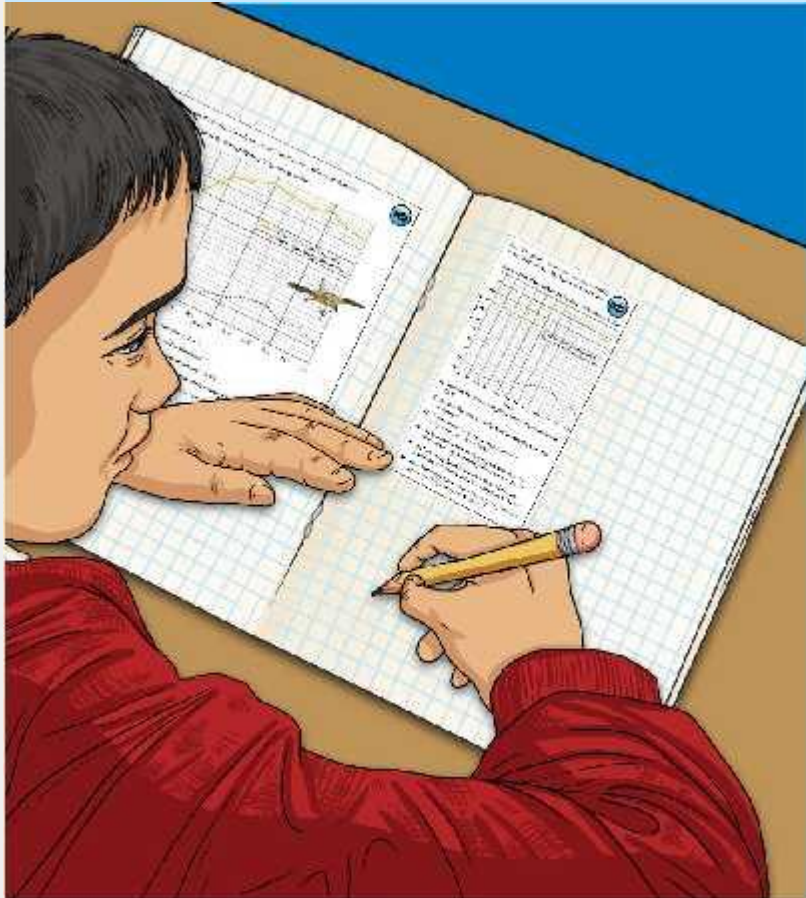
13:00

What was the difference between the two temperatures at this time?

$9^{\circ}\text{C}$

## Use Line Graphs to Solve Problems

Dive in by completing your own activity!



The line graph shows the average monthly temperature in Miami for daytime and night time.

Use the line graph to answer the questions below.

Month	Daytime Average Temperature (°F)	Nighttime Average Temperature (°F)
Jan	75	60
Feb	70	58
Mar	75	58
Apr	85	60
May	90	62
Jun	90	65
Jul	90	65
Aug	85	65
Sep	80	65
Oct	75	62
Nov	70	60
Dec	75	58

1) What was the average daytime temperature in Miami in April?

2) What was the average nighttime temperature in Miami in August?

3) In which month was the average night time temperature the lowest?

4) By how many degrees Fahrenheit did the average daytime temperature in Miami change from April to June?

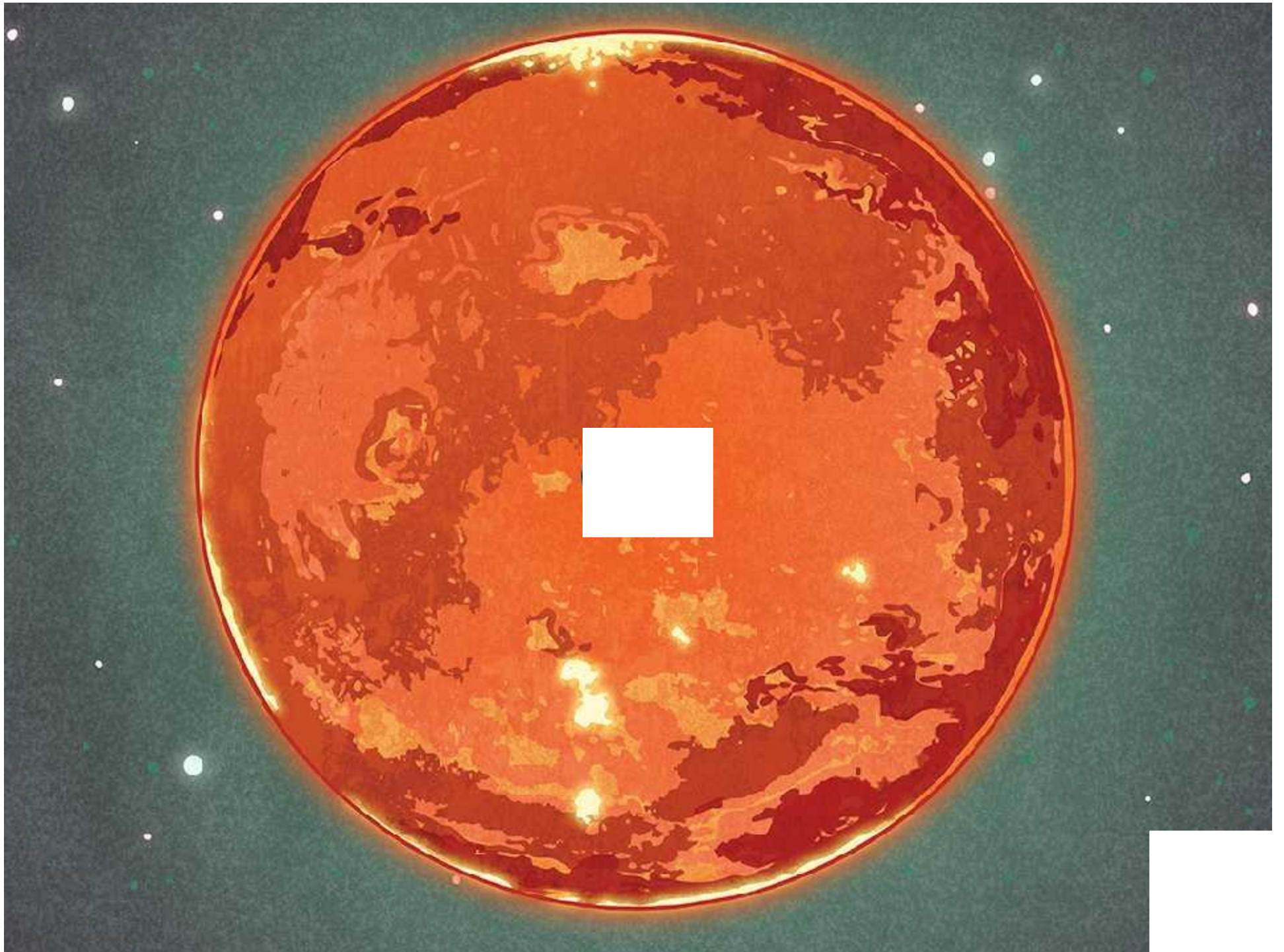
5) By how many degrees Fahrenheit did the average nighttime temperature in Miami change from June to April?

6) What was the difference between average daytime and nighttime temperatures in Miami in February?

7) What was the average nighttime temperature in Miami in January?

8) What was the average daytime temperature in Miami in December?

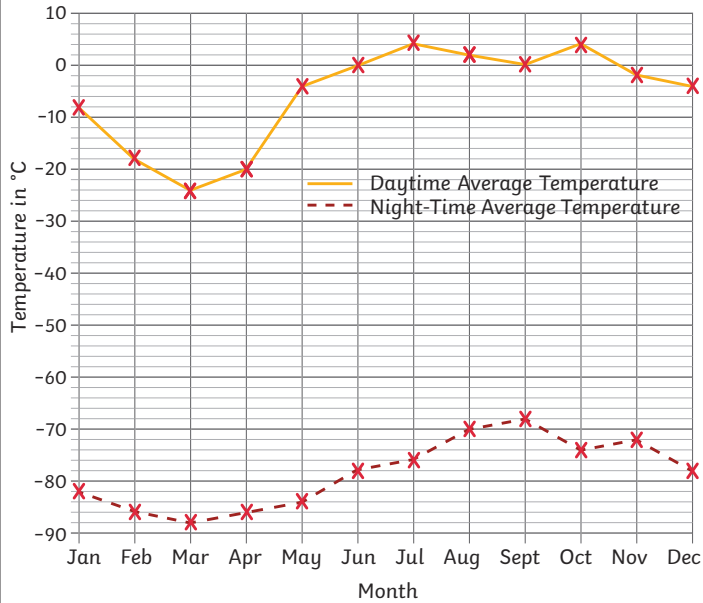




This line graph shows the average monthly temperatures on Mars for daytime and night time.



A Line Graph to Show the Average Monthly Temperatures on Mars

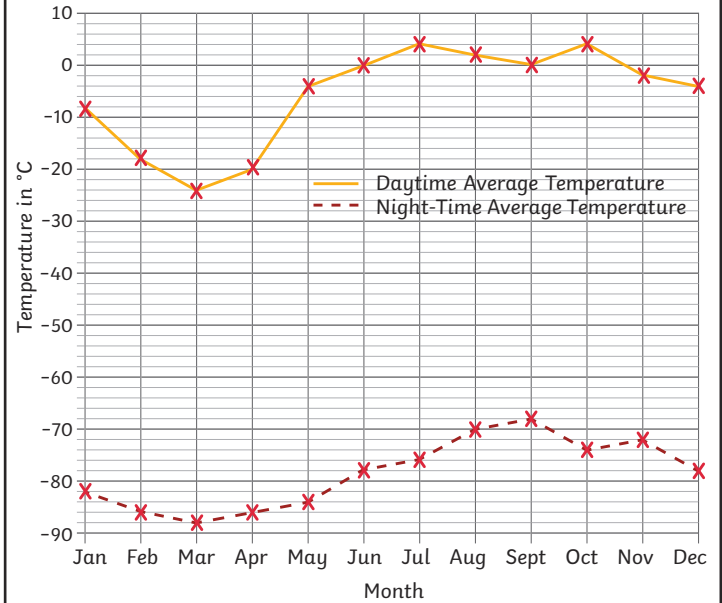


- 1) What was the average daytime temperature on Mars in April?
- 2) What was the average night-time temperature on Mars in August?
- 3) In which month was the average night-time temperature on Mars  $-68^{\circ}\text{C}$ ?
- 4) By how many degrees did the average daytime temperature on Mars change from April to June?
- 5) By how many degrees did the average night-time temperature on Mars change from January to March?
- 6) What was the difference between average daytime and night-time temperatures in February?

This line graph shows the average monthly temperatures on Mars for daytime and night time.



A Line Graph to Show the Average Monthly Temperatures on Mars



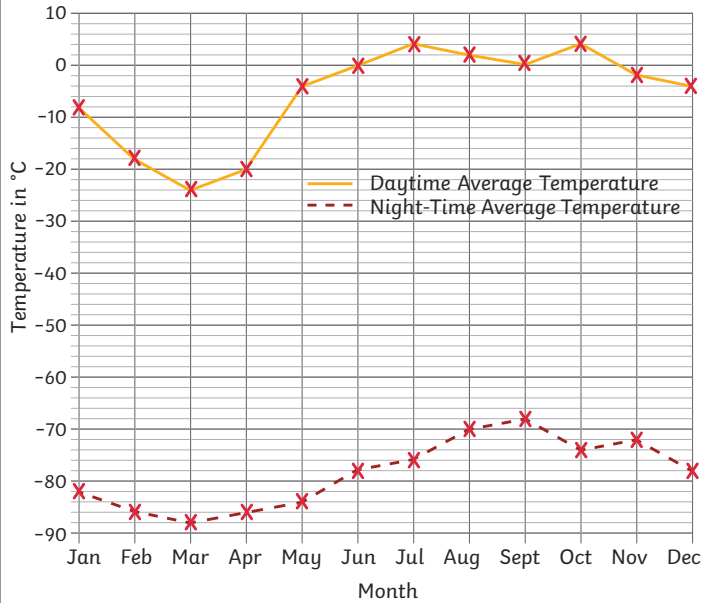
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- 5) By how many degrees did the average night-time temperature on Mars change from January to March?
- 6) What was the difference between average daytime and night-time temperatures in February?



This line graph shows the average monthly temperatures on Mars for daytime and night time.



A Line Graph to Show the Average Monthly Temperatures on Mars



- 1) Decide whether each statement is true or false. If you think the statement is false, explain how to change it to make it true.



Mars had its coolest average daytime temperature in March.



The difference between the warmest and coolest average night-time temperatures is 18°C.



The difference between average daytime and night-time temperatures in July is 72°C.



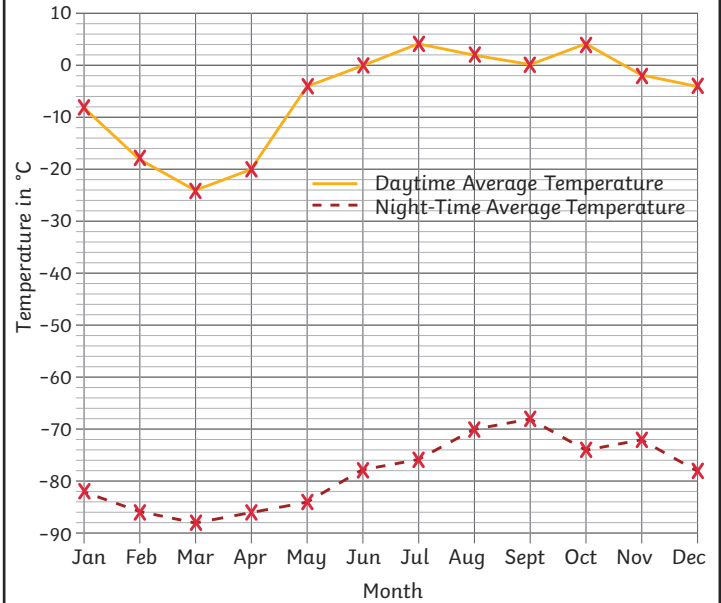
From any one month to the next month, the average night-time temperature doesn't increase by more than 6°C.

- 2) Write your own true or false statements about the data for a friend to solve.

This line graph shows the average monthly temperatures on Mars for daytime and night time.



A Line Graph to Show the Average Monthly Temperatures on Mars



- 1) Decide whether each statement is true or false. If you think the statement is false, explain how to change it to make it true.



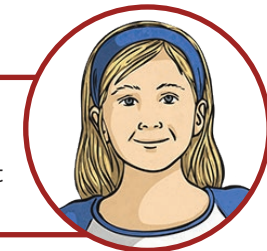
Mars had its coolest average daytime temperature in March.



The difference between the warmest and coolest average night-time temperatures is 18°C.



The difference between average daytime and night-time temperatures in July is 72°C.



From any one month to the next month, the average night-time temperature doesn't increase by more than 6°C.

- 2) Write your own true or false statements about the data for a friend to solve.

Some NASA scientists want to find out the answer to this question:



**How does the temperature change on Mars?**

They program the Mars rover to collect data for the temperature on Mars on two different days to find out.



Use the clues below and the partial line graph on the separate sheet to answer the questions and find out the difference in temperatures between Monday and Tuesday.

- At 13:00, the temperature on Tuesday was 9°C warmer than on Monday.
- At 16:00, the temperature on Tuesday was 6°C cooler than on Monday.
- On Tuesday, the temperature at 18:00 was 2°C cooler than the same time on Monday. Two hours later, the difference in both temperatures at this time had increased to 11°C, and it was now cooler on Monday at this time.
- At midnight, the temperature on Tuesday was 3°C warmer than the same time on Monday. At 22:00, the temperature on Tuesday was 11°C warmer than it had been at midnight.
- From 02:00 to 03:00 on Monday, the temperature dropped by 3°C. Between these times on Tuesday, the drop in temperature was 1°C less than this.
- On Monday, the temperature at 09:00 was 6°C warmer than the same time on Tuesday.
- On Tuesday, the temperature at 10:00 was 4°C cooler than the same time on Monday.

- 1) What was the coolest temperature on Monday?
- 2) What was the warmest temperature on Monday?
- 3) What was the coolest temperature on Tuesday?
- 4) What was the warmest temperature on Tuesday?
- 5) What was the difference in coolest temperatures between Monday and Tuesday?
- 6) What was the difference in warmest temperatures between Monday and Tuesday?
- 7) The difference between the temperature at 11:00 on Monday and on Tuesday was 5°C. What was the difference between the temperatures of the two days at 12:00?
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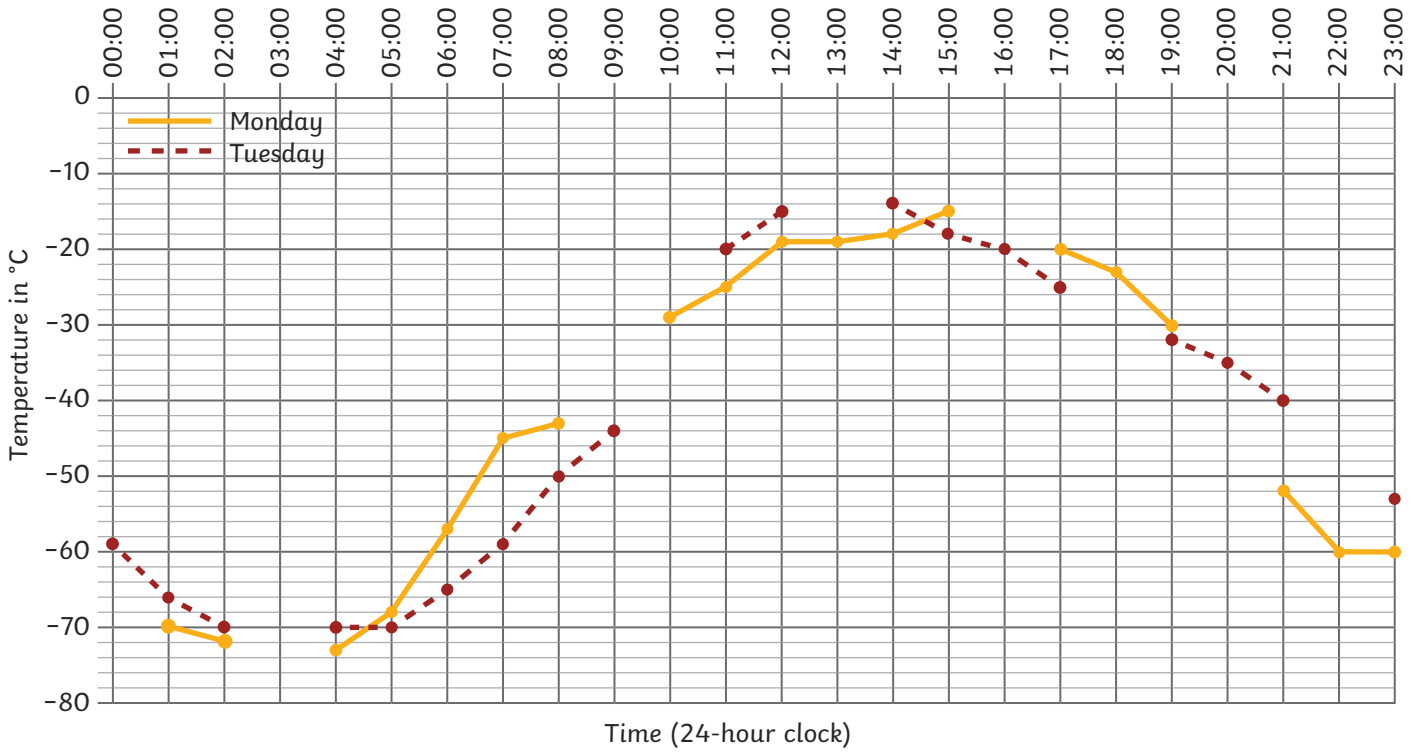


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- 1) What was the coolest temperature on Monday?
- 2) What was the warmest temperature on Monday?
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A Line Graph to Show the Temperature on Mars over 24 Hours



A Line Graph to Show the Temperature on Mars over 24 Hours

