

The table below shows how the chirping of a cricket is related to the temperature outside. For example, a cricket chirps 144 times each minute when the temperature is 76°.

Number Of Chirps Per Minute	Temperature
144	76°
152	78°
160	80°
168	82°
176	84°

What would be the number of chirps per minute when the temperature outside is 90° if this pattern stays the same?

Answer: _____

Explain how you figured out your answer.

Scoring Guide

Solution:

200

For every 2° that the temperature increases, the number of chirps increases by 8.

Score & Description

Extended

Answers 200 with explanation that indicates number of chirps increases by 8 for every temperature increase of 2°.

Satisfactory

Gives explanation that describes ratio, but does not carry process far enough (e.g., gives correct answer for 86° (184) or 88° (192) or carries process too far (answers 208)).

OR

Answers 200 and shows 184 86°, 192 88°, 200 90° but gives no explanation.

OR

Answers 200 with explanation that is not stated well but conveys the correct ratio.

OR

Gives clear description of ratio and clearly has minor computational error (e.g., adds incorrectly).

Partial

Answers between 176 and 208, inclusive, with explanation that says chirps increase as temperature increases.

OR

Answers between 176 and 208, inclusive, with explanation that they counted by 8 (or by 2).

OR

Uses a correct pattern or process (includes adding a number 3 times or showing 184 and 86 in chart) or demonstrates correct ratio.

OR

Has half the chart with 200 on the answer line.

OR

"I added 24" (with 200 on answer line).

Minimal

Answers between 176 and 208, inclusive, with no explanation or irrelevant or incomplete explanation.

OR

Has explanation that number of chirps increases as temperature increases but number is not in range.

OR

Has number out of range but indicates part of the process (e.g., I counted by 8's)

OR

Explanation—as temperature increases the chirps increase but number is out of range.

Incorrect

Incorrect response.

This question required students first to recognize a pattern and then extend the pattern for three more values. In addition, students were asked to explain how they arrived at the answer. The pattern was linear in two variables—number of chirps and temperature. Both algebraic and numerical reasoning were used to obtain the answer to this question. Students were permitted to use a calculator.

Extended - Student Response

The table below shows how the chirping of a cricket is related to the temperature outside. For example, a cricket chirps 144 times each minute when the temperature is 76°.

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168	82°
176	84°

What would be the number of chirps per minute when the temperature outside is 90° if this pattern stays the same?

Answer: **200 chirps**

Explain how you figured out your answer.

Well each 2° it goes 8 more chips
 86° it would be 184 chirps 88° it would
 be 192 chirps 90° it would be 200 chirps.

Satisfactory - Student Response

The table below shows how the chirping of a cricket is related to the temperature outside. For example, a cricket chirps 144 times each minute when the temperature is 76°.

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176	84°

What would be the number of chirps per minute when the temperature outside is 90° if this pattern stays the same?

Answer: 200

Explain how you figured out your answer.

I got my answer by continuing the graph until I got to 90°. Then I did the same on the other side.

If you need more room for your work, use the space below.

86
88
90

184
192
200

Partial - Student Response

The table below shows how the chirping of a cricket is related to the temperature outside. For example, a cricket chirps 144 times each minute when the temperature is 76°.

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168	82°
176	84°

What would be the number of chirps per minute when the temperature outside is 90° if this pattern stays the same?

Answer:

194

Explain how you figured out your answer.

I went up 8 chirps each 2°

Minimal - Student Response

The table below shows how the chirping of a cricket is related to the temperature outside. For example, a cricket chirps 144 times each minute when the temperature is 76°.

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168	82°
176	84°

What would be the number of chirps per minute when the temperature outside is 90° if this pattern stays the same?

Answer: 180

Explain how you figured out your answer.

you just figure, the numbers, and it will work you just add them together

Incorrect - Student Response

The table below shows how the chirping of a cricket is related to the temperature outside. For example, a cricket chirps 144 times each minute when the temperature is 76°.

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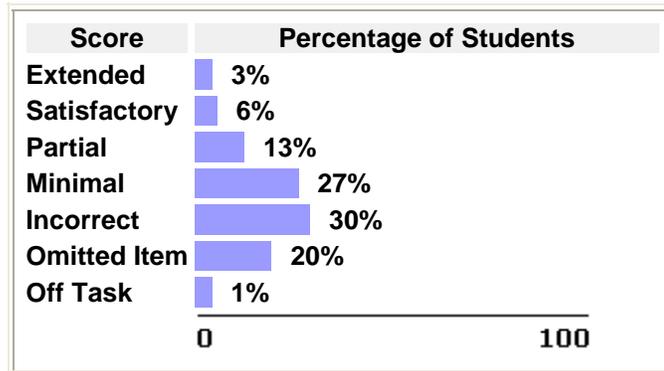
What would be the number of chirps per minute when the temperature outside is 90° if this pattern stays the same?

Answer: 2

Explain how you figured out your answer.

They are counting backwards and forwards from 2.

2003 National Performance Results



Note:

- These results are for public and nonpublic school students.
- Percentage may not add to 100 due to rounding.

Mathematical Content Area

Algebra and functions

This question was classified in the algebra and functions content area. This content area extends from work with simple patterns at grade 4, to basic algebra concepts at grade 8, to sophisticated analysis at grade 12. Students are expected to use grade-level appropriate algebraic notation and thinking in meaningful contexts to solve mathematical and real-world problems, addressing an increasing understanding of the use of functions in grades 8 and 12. Other topics assessed include using open sentences and equations as representational tools and using the notion of equivalent representations to transform and solve number sentences and equations of increasing complexity.

Mathematical Ability

Problem solving

This question measures students' problem solving ability. Students demonstrate problem solving in mathematics when they recognize and formulate problems; determine the consistency of data; use strategies, data, models; generate, extend, and modify procedures; use reasoning in new settings; and judge the reasonableness and correctness of solutions. Problem solving situations require students to connect all of their mathematical knowledge of concepts, procedures, reasoning, and communication skills to solve problems.