

Math
Released Item 2016

Grade 7

Depth of a Submarine
1449-M22048

The table shows the relationship between the depth, in meters, of a submarine and the time, in minutes, since it started a dive.

Submarine Depth

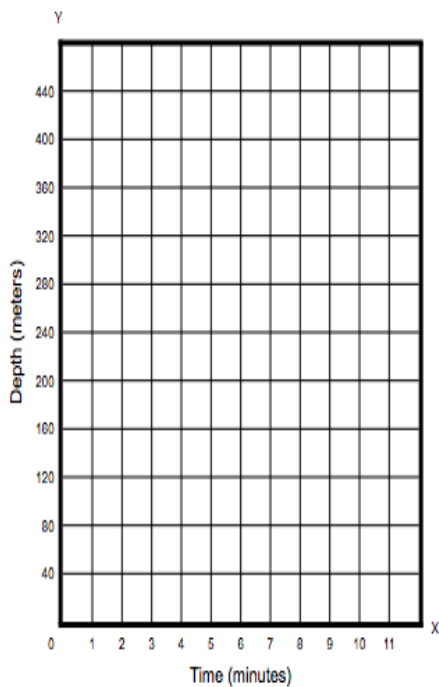
Time (minutes)	Depth (meters)
2	100
4	180
6	260
8	340

Part A

Plot the values in the table on the coordinate plane shown.

Select the places on the coordinate plane to plot the points.

Submarine Depth



Part B

Determine whether the relationship is proportional or not. Explain how the relationship shown in the table supports your answer. Explain how your graph supports your answer.

Enter your answer and your explanations in the space provided.

Rubric Part A (Machine Scored)

Score	Description
1	<p>Student response includes the following element.</p> <ul style="list-style-type: none"> • Reasoning component = 1 point <ul style="list-style-type: none"> ○ Student correctly plots the points (2, 100), (4, 180), (6, 260), and (8, 340) on the coordinate grid.
0	Student response is incorrect or irrelevant.

Rubric Part B

Score	Description
2	<p>Student response includes both of the following 2 elements.</p> <ul style="list-style-type: none"> • Reasoning component = 1 point <ul style="list-style-type: none"> ○ Student provides a valid explanation, using the table, of why the relationship is not proportional. • Reasoning component = 1 point <ul style="list-style-type: none"> ○ Student provides a valid explanation, using the graph, of why the relationship is not proportional. <p>Sample Student Response:</p> <p>The relationship is not proportional. The table supports that the relationship is not proportional because the ratio between the two quantities is not the same for each x- and y-value.</p> $\frac{100}{2} \neq \frac{180}{4} \neq \frac{260}{6} \neq \frac{340}{8}$ <p>Because the ratios are not equal, the student can conclude that the relationship is not proportional.</p> <p>The graph supports that the relationship is not proportional because the points I plotted on the graph of the relationship lie on a line, but the line does not intersect the origin. Instead, it intersects the y-axis at the point (0, 20). Therefore, the relationship between depth and time is not proportional.</p> <p>(If students correctly apply this method, count their work as correct.)</p>
1	Student response includes 1 of the above elements.
0	Student response is incorrect or irrelevant.

Anchor Set A1 – A5

With Annotations

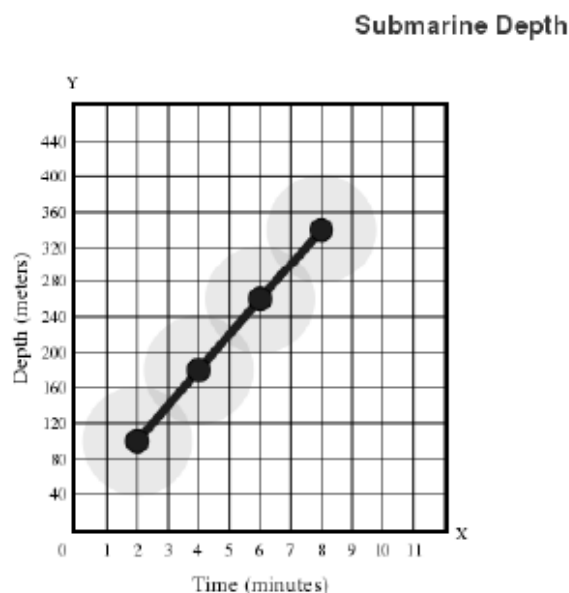
Part B: Score Point 2

Part A

The table shows the relationship between the depth, in meters, of a submarine and the time, in minutes, since it started a dive.

Submarine Depth	
Time (minutes)	Depth (meters)
2	100
4	180
6	260
8	340

Plot the values in the table on the coordinate grid shown.



Part B

Determine whether the relationship is proportional or not. Explain how the relationship shown in the table supports your answer. Explain how your graph supports your answer.

the relationship is not proportional because even though the graph shows a straight line, it would not have gone through the origin. Also, if you divide each number for the "depth" by the number given for the minutes, the numbers are not equal.

Annotation

Anchor Paper 1

Part B: Score Point 2

This response receives full credit. The student includes each of the two required elements:

- Using the table, the student gives a valid explanation of why the relationship is not proportional (if you divide each number for the "depth" by the number given for the minutes, the numbers are not equal).
- Using the graph, the student gives a valid explanation of why the relationship is not proportional (even though the graph shows a straight line, it would not have gone through the origin). The response must show or explain both characteristics of being a straight line and that it does not go through the origin.

Part B: Score Point 1

Part A

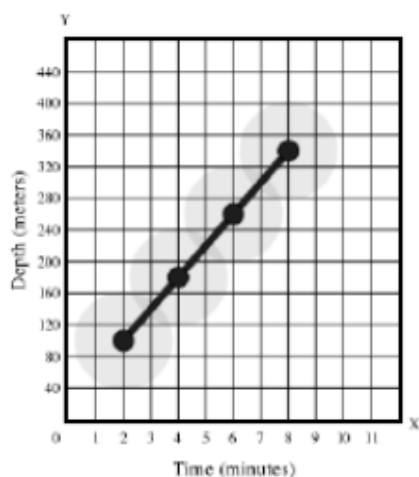
The table shows the relationship between the depth, in meters, of a submarine and the time, in minutes, since it started a dive.

Submarine Depth

Time (minutes)	Depth (meters)
2	100
4	180
6	260
8	340

Plot the values in the table on the coordinate grid shown.

Submarine Depth



Part B

Determine whether the relationship is proportional or not. Explain how the relationship shown in the table supports your answer. Explain how your graph supports your answer.

$$\frac{100}{2} = 50$$

$$\frac{180}{4} = 45$$

$$\frac{260}{6} = 43.333$$

$$\frac{340}{8} = 42.5$$

Not proportional

Numbers

Arithmetic and Units

Exponents and Roots

Relations

Geometry

Groups

Annotation

Anchor Paper 2

Part B: Score Point 1

This response receives partial credit. The student includes one of the two required elements:

- Using the table, the student shows a valid explanation of why the relationship is not proportional ($\frac{100}{2} = 50$, $\frac{180}{4} = 45$, $\frac{260}{6} = 43.333$, $\frac{340}{8} = 42.5$). The response shows that the rates are not the same.

The student does not attempt to explain why the graph shows that the relationship is not proportional. Showing a straight line on the graph is not sufficient for credit for this element.

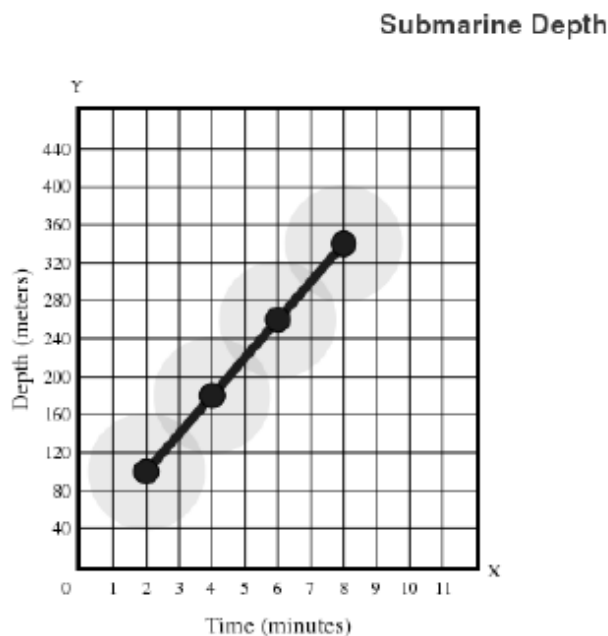
Part B: Score Point 1

Part A

The table shows the relationship between the depth, in meters, of a submarine and the time, in minutes, since it started a dive.

Submarine Depth	
Time (minutes)	Depth (meters)
2	100
4	180
6	260
8	340

Plot the values in the table on the coordinate grid shown.



Part B

Determine whether the relationship is proportional or not. Explain how the relationship shown in the table supports your answer. Explain how your graph supports your answer.

it is not proportional because it does not cross the origin.

Annotation
Anchor Paper 3
Part B: Score Point 1
<p>This response receives partial credit. The student includes one of the two required elements:</p> <ul style="list-style-type: none">• Using the graph, the student gives a valid explanation of why the relationship is not proportional (it does not cross the origin). <p>The student does not attempt to use the table to explain why the relationship is not proportional.</p>

Part A

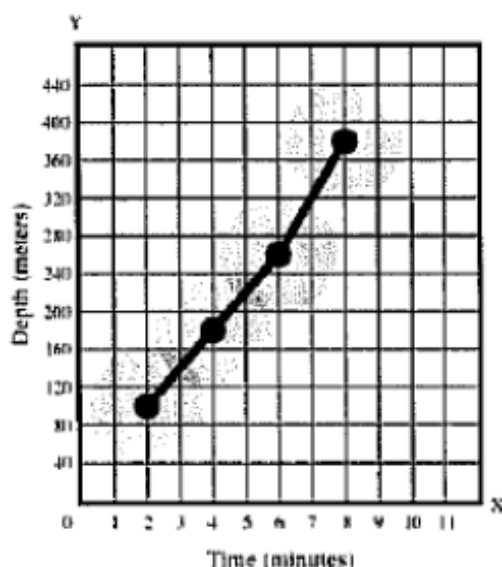
The table shows the relationship between the depth, in meters, of a submarine and the time, in minutes, since it started a dive.

Submarine Depth

Time (minutes)	Depth (meters)
2	100
4	180
6	260
8	340

Plot the values in the table on the coordinate grid shown.

Submarine Depth

**Part B**

Determine whether the relationship is proportional or not. Explain how the relationship shown in the table supports your answer. Explain how your graph supports your answer.

yes it is because it goes in a line and in the table it goes up just 80 every time so yes it is proportional.

Annotation

Anchor Paper 4

Part B: Score Point 0

This response receives no credit. The student includes none of the two required elements.

The student states an incorrect interval (it goes up just 80 every time). The table shows that the first interval is $2/100$, not $2/80$. Therefore, the conclusion made by the student is incorrect (it is proportional).

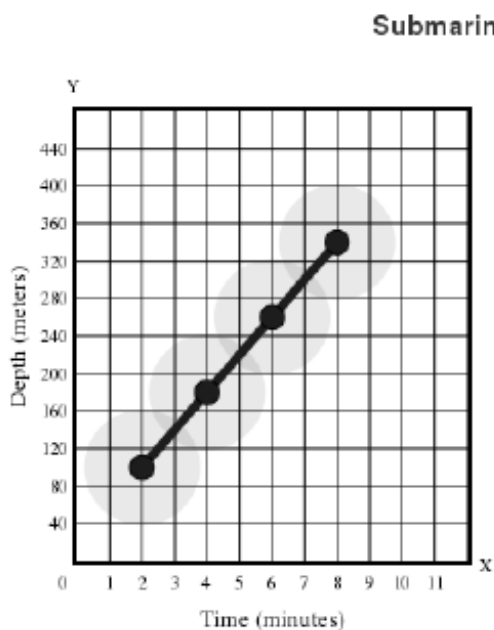
The student makes an attempt to use the graph to show that the relationship is proportional (it goes in a line). The plotted graph shows a line that is not straight, nor does it go through the origin. Both of these characteristics need to be fulfilled if the relationship is proportional. The response needs to state that the relationship is not proportional.

Part A

The table shows the relationship between the depth, in meters, of a submarine and the time, in minutes, since it started a dive.

Submarine Depth	
Time (minutes)	Depth (meters)
2	100
4	180
6	260
8	340

Plot the values in the table on the coordinate grid shown.

**Part B**

Determine whether the relationship is proportional or not. Explain how the relationship shown in the table supports your answer. Explain how your graph supports your answer.

The relation ship is proportal. It is propotional because it is in a stright line going up awrd on the graph.

Annotation

Anchor Paper 5

Part B: Score Point 0

This response receives no credit. The student includes none of the two required elements.

There is no attempt to provide an explanation of why the table shows that the relationship is not proportional.

Although a correct analysis of the graph is provided (it is in a straight line), the student provides an incorrect conclusion (The relationship is proportional). The student does not show or explain that the line does not go through the origin.

Practice Set

P101 - P105

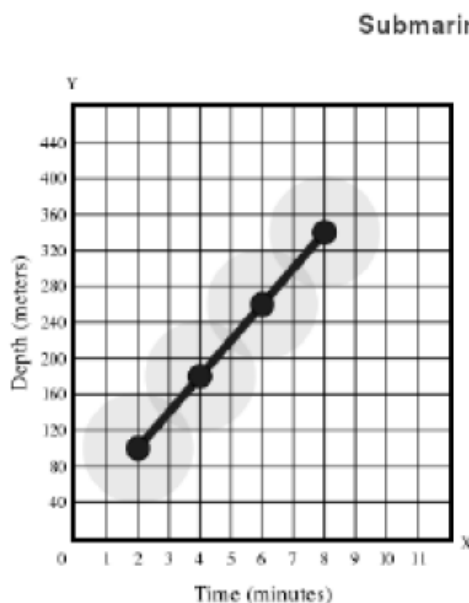
No Annotations Included

Part A

The table shows the relationship between the depth, in meters, of a submarine and the time, in minutes, since it started a dive.

Submarine Depth	
Time (minutes)	Depth (meters)
2	100
4	180
6	260
8	340

Plot the values in the table on the coordinate grid shown.



Part B

Determine whether the relationship is proportional or not. Explain how the relationship shown in the table supports your answer. Explain how your graph supports your answer.

It is not proportional because it does not start at the point of origin. If you make it start from the beginning, it would start at about the 20.

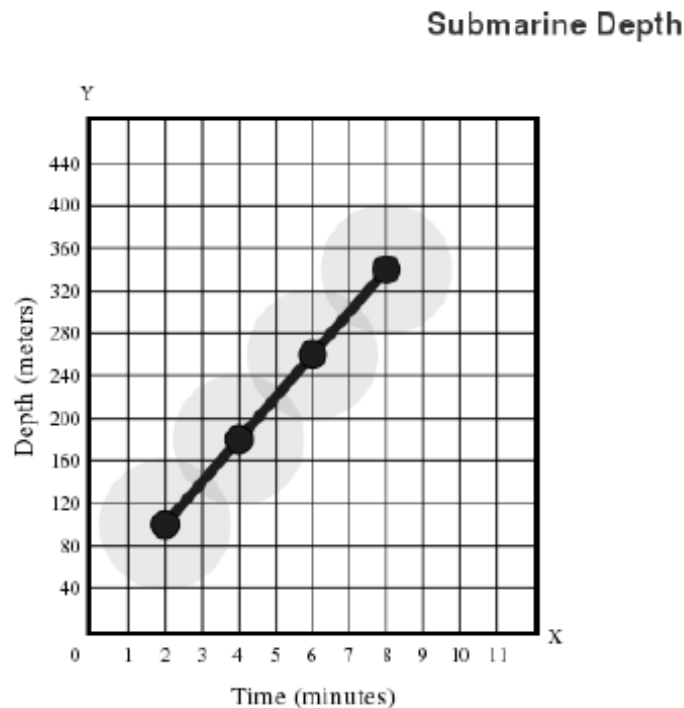
- Numbers
- Arithmetic and Units
- Exponents and Roots
- Relations
- Geometry

Part A

The table shows the relationship between the depth, in meters, of a submarine and the time, in minutes, since it started a dive.

Submarine Depth	
Time (minutes)	Depth (meters)
2	100
4	180
6	260
8	340

Plot the values in the table on the coordinate grid shown.

**Part B**

Determine whether the relationship is proportional or not. Explain how the relationship shown in the table supports your answer. Explain how your graph supports your answer.

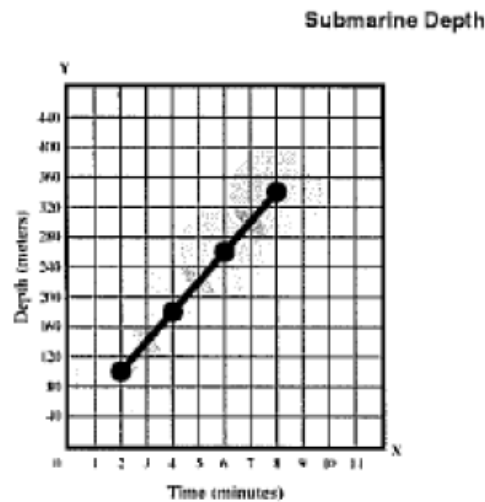
yes, it is proportional because it does not pass through 0,0

Part A

The table shows the relationship between the depth, in meters, of a submarine and the time, in minutes, since it started a dive.

Submarine Depth	
2	100
4	180
6	260
8	340

Plot the values in the table on the coordinate grid shown.

**Part B**

Determine whether the relationship is proportional or not. Explain how the relationship shown in the table supports your answer. Explain how your graph supports your answer.

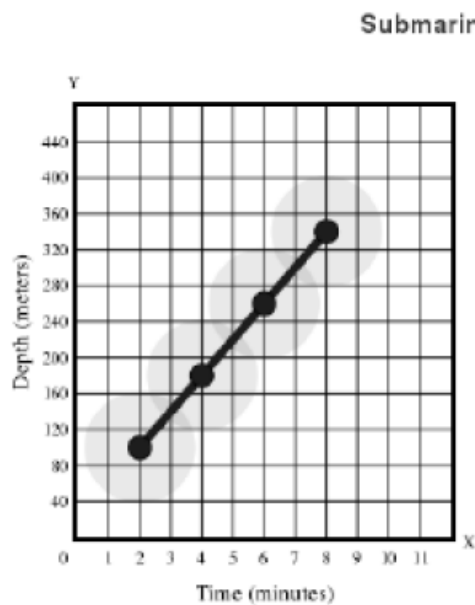
No, because it doesn't start at zero.

Part A

The table shows the relationship between the depth, in meters, of a submarine and the time, in minutes, since it started a dive.

Submarine Depth	
Time (minutes)	Depth (meters)
2	100
4	180
6	260
8	340

Plot the values in the table on the coordinate grid shown.



Part B

Determine whether the relationship is proportional or not. Explain how the relationship shown in the table supports your answer. Explain how your graph supports your answer.

it is proportional because it goes through the origin and it is a straight line.

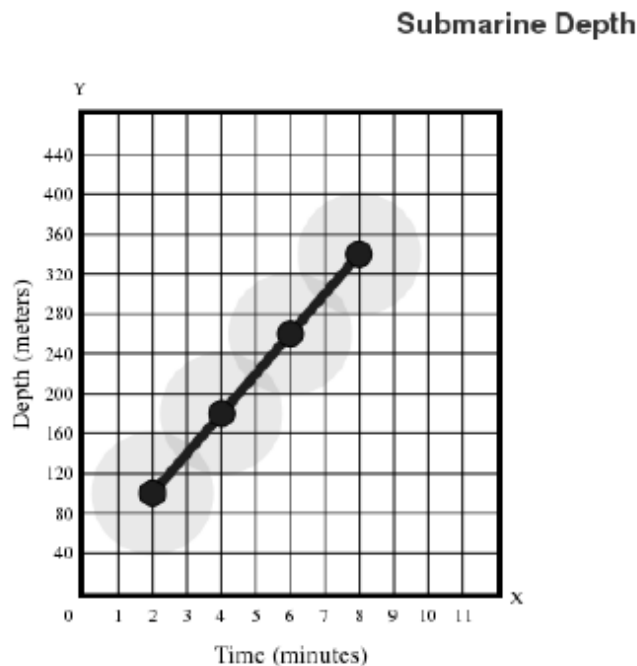
- Numbers
- Arithmetic and Units
- Exponents and Roots
- Relations

Part A

The table shows the relationship between the depth, in meters, of a submarine and the time, in minutes, since it started a dive.

Submarine Depth	
Time (minutes)	Depth (meters)
2	100
4	180
6	260
8	340

Plot the values in the table on the coordinate grid shown.

**Part B**

Determine whether the relationship is proportional or not. Explain how the relationship shown in the table supports your answer. Explain how your graph supports your answer.

The relationship is non proportional because it doesn't run through the origin $(0, 0)$ and that's how you know something is proportional because it runs through the origin.

Practice Set

Paper	Score
P101	1
P102	0
P103	1
P104	0
P105	1