



Math
Released Item 2016

Grade 7

High and Low Tides
1161-M20976

Tides are measured by the heights of the tide above or below sea level. The difference between the two heights represents how much greater the high tide is than the low tide. The table shows the high and low tides and the difference between their heights at each of three locations. Some of the data in the table are missing.

Tide Heights and Differences in Feet

Location	High Tide	Low Tide	Difference Between High and Low Tides
P	8.53	0.63	?
Q	6.98	-0.94	7.92
R	?	-1.02	6.75

Part A

- Find the difference between high and low tides for location P. Show your work or explain your answer.
- Find high tide for location R. Show your work or explain your answer.

Enter your answers and your work or explanations in the space provided.

Part B

The tides are measured at a fourth location, T. The mean of the low tide values at locations P, Q, R, and T is -0.27 foot. What is the value of the low tide at location T? Show your work or explain how you found your answer.

Enter your answer and your work or explanation in the space provided.

Rubric Part A

Score	Description
2	<p>Student response includes each of the following 2 elements.</p> <ul style="list-style-type: none"> • Computation component = 1 point <ul style="list-style-type: none"> ○ The student finds the difference between high and low tides for Location P, 7.9 feet. The student finds the high tide for Location R, 5.73 feet. • Reasoning component = 1 point <ul style="list-style-type: none"> ○ The student shows work or explanation how both answers were determined. <p>NOTE: A student could earn the points this alternative way:</p> <ul style="list-style-type: none"> • 1 point: Finds the difference between high and low tides for Location P, 7.9 feet and shows work or explanation. • 1 point: Finds high tide for Location R, 5.73 feet and shows work or explanation. <p>Sample Student Response: For Location P, I subtract the low tide from the high tide ($8.53 - 0.63$). For Location R, I add the difference between the tides and the low tide ($6.75 + (-1.02)$). (Accept other valid explanations.)</p> <p>The difference at Location P is 7.9 ft. High tide at Location R is 5.73 ft.</p>
1	Student response includes 1 of the above elements.
0	Student response is incorrect or irrelevant.

Rubric Part B

Score	Description
2	<p>Student response includes each of the following 2 elements.</p> <ul style="list-style-type: none"> • Computation component = 1 point <ul style="list-style-type: none"> ○ The student finds the value of the low tide at location T, 0.25 ft. • Reasoning component = 1 point <ul style="list-style-type: none"> ○ The student shows work or explains how the answer was found. <p>Sample Student Response: The low tide at location T is 0.25 ft. (Accept equivalent answers.)</p> <p>For a mean of -0.27 the sum of the 4 low tides has to be $4(-0.27) = -1.08$. Subtract the sum of the known low tides. $-1.08 - (0.63 + (-0.94) + (-1.02))$ $= -1.08 - (-1.33)$ $= -1.08 + 1.33 = 0.25$ (Accept other valid explanations.)</p>
1	Student response includes 1 of the above elements.
0	Student response is incorrect or irrelevant.

Anchor Set

A1 – A10

With Annotations

Part A: Score Point 2

Part B: Score Point 2

Part A

difference is how much between
each #'s.++

$$8.63 - .63 = 7.9 \text{ so difference is } \underline{7.9}$$

$$6.75 + -1.02 = 5.73 \text{ so high tide is } \underline{5.73}$$

Part B

$$-.27(4) = -1.08$$

so

$$1.63 + .94 + -1.02 + t = 1.08$$

so

$$-1.33 + t = -1.08$$

and

$$-1.33 + .25 = -1.08$$

so

$$t = .25$$

Annotation

Anchor Paper 1

Part A: Score Point 2

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

- The student finds the correct difference between high and low tides for location P and shows supporting work ($8.53 - .63 = 7.9$).
- The student finds the correct high tide for location R and shows supporting work ($6.75 + -1.02 = 5.73$).

Part B: Score Point 2

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

- The student finds the correct value of the low tide for location T (.25).
- The student shows appropriate work to find that value ($.63 + -.94 + -1.02 + t = -1.08$, $-1.33 + t = -1.08$, $t = .25$).

Part A: Score Point 2

Part B: Score Point 2

Part A

- Find the difference between high and low tides for location P. Show your work or explain your answer.
- Find high tide for location R. Show your work or explain your answer.

$$\begin{aligned}8.53 - 0.63 &= 7.9 \\ \text{difference for } p &= 7.9 \\ 6.75 - 1.02 &= 5.73 \\ \text{high tide for } r &= 5.73\end{aligned}$$

Part B

The tides are measured at a fourth location, T. The mean of the low tide values at locations P, Q, R, and T is -0.27 foot. What is the value of the low tide at location T? Show your work or explain how you found your answer.

$$\begin{aligned}\text{low tide } T &= 0.25 \\ -0.27 \times 4 &= -1.08 \\ 0.63 + -0.94 + -1.02 + 0.25 &= -1.08\end{aligned}$$

Annotation

Anchor Paper 2

Part A: Score Point 2

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

- The student finds the correct difference between high and low tides for location P and shows supporting work ($8.53 - 0.63 = 7.9$).
- The student finds the correct high tide for location R and shows supporting work ($6.75 - 1.02 = 5.73$).

Part B: Score Point 2

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

- The student finds the correct value of the low tide for location T (0.25).
- The student shows appropriate work to find that value ($-0.27 \times 4 = -1.08$, $0.63 + -0.94 + -1.02 + 0.25 = -1.08$).

Part A: Score Point 2

Part B: Score Point 1

Part A

- Find the difference between high and low tides for location P. Show your work or explain your answer.
- Find high tide for location R. Show your work or explain your answer.

$$8.53 - 0.63 = 7.9$$

$$HT - (-1.02) = 6.75$$

$$HT = 5.73$$

The difference between high and low tide for location P is 7.9. The high tide for location R is 5.73.

Part B

The tides are measured at a fourth location, T. The mean of the low tide values at locations P, Q, R, and T is -0.27 foot. What is the value of the low tide at location T? Show your work or explain how you found your answer.

$$\text{Mean} = -0.27$$

$$P = 0.63$$

$$Q = -0.94$$

$$R = -1.02$$

$$T = ?$$

$$0.63 - 0.94 - 1.02 = (-1.33) \cdot \square$$

$$T = .25$$



Annotation

Anchor Paper 3

Part A: Score Point 2

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

- The student finds the correct difference between high and low tides for location P and shows supporting work ($8.53 - 0.63 = 7.9$).
- The student finds the correct high tide for location R and shows supporting work ($HT - [-1.02] = 6.75$, $HT = 5.73$).

Part B: Score Point 1

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

- The student shows the correct value of the low tide for location T (.25).

The student shows incomplete work to find the value of the low tide ($0.63 - 0.94 - 1.02 = [-1.33]$).

Part A: Score Point 1

Part B: Score Point 2

Part A

- Find the difference between high and low tides for location P. Show your work or explain your answer.
- Find high tide for location R. Show your work or explain your answer.

The difference between high and low tides of Location P is 7.90 feet because I subtracted the high tide by the low tide.

The high tide for location R is 6.75 feet because I added 6.75 to -1.02 .

Part B

The tides are measured at a fourth location, T. The mean of the low tide values at locations P, Q, R, and T is -0.27 foot. What is the value of the low tide at location T? Show your work or explain how you found your answer.

The value of the low tide at location T is 0.25 feet because I gathered up all the low tide data, and substituted into this:

$$\frac{p+q+r+t}{4} = -0.27$$

into their respective places, location p to p, etc.

Annotation

Anchor Paper 4

Part A: Score Point 1

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

- The student finds the correct difference between high and low tides for location P (7.90) and explains how to find that difference (I subtracted the high tide by the low tide).

Although the student explains correct work to find the high tide for location R (I added 6.75 to -1.02), the value stated is incorrect (high tide . . . is 6.75).

Part B: Score Point 2

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

- The student finds the correct value of the low tide for location T (0.25).
- The student shows and explains appropriate work to find that value (gathered up all low tide data, and substituted into this: $\frac{p+q+r+t}{4} = -0.27$ into their respective places, location p to p, etc.).

Part A: Score Point 2

Part B: Score Point 0

Part A

- Find the difference between high and low tides for location P. Show your work or explain your answer.
- Find high tide for location R. Show your work or explain your answer.

$$8.53 - 0.63 = 7.90$$



$$6.75 - 1.02 = 5.73$$

Part B

The tides are measured at a fourth location, T. The mean of the low tide values at locations P, Q, R, and T is -0.27 foot. What is the value of the low tide at location T? Show your work or explain how you found your answer.

$$0.43 + x \div 4 = 0.27$$

$$x \div 4 = (-0.16) \cdot \square$$

$$\square \times 4 \quad \square \times 4$$

$$x = -0.64$$

Annotation

Anchor Paper 5

Part A: Score Point 2

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

- The student finds the correct difference between high and low tides for Location P and shows supporting work ($8.53 - 0.63 = 7.90$).
- The student finds the correct high tide for Location R and shows supporting work ($6.75 - 1.02 = 5.73$).

Part B: Score Point 0

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

The value of the low tide at location T is incorrect (-0.64).

The procedure shown to find the correct value is inappropriate ($0.43 + x \div 4 = 0.27$).

Part A: Score Point 1

Part B: Score Point 1

Part A

- Find the difference between high and low tides for location P. Show your work or explain your answer.
- Find high tide for location R. Show your work or explain your answer.

The difference between the high and low tide of P is 7.9
The high tide of R is 5.73.

Part B

The tides are measured at a fourth location, T. The mean of the low tide values at locations P, Q, R, and T is -0.27 foot. What is the value of the low tide at location T? Show your work or explain how you found your answer.

the low tide of T is -0.71 . I used the equation $\frac{-1.33+x}{4} = -0.27$ to find my answer.

Annotation

Anchor Paper 6

Part A: Score Point 1

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

- The student includes the correct difference between high and low tides for location P (7.9) and the correct high tide for location R (5.73).

The student does not show or explain how to find either of these values.

Part B: Score Point 1

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

- The student shows an appropriate procedure to find the value of the low tide at location T ($\frac{-1.33+x}{4} = -0.27$).

The student states an incorrect value for the low tide (-0.71).

Part A: Score Point 1

Part B: Score Point 0

Part A

- Find the difference between high and low tides for location P. Show your work or explain your answer.
- Find high tide for location R. Show your work or explain your answer.

The difference between high and low tides for location p is 7.90 because i subtracted 8.53 by 0.63

The high tide for location r is 5.73

Part B

The tides are measured at a fourth location, T. The mean of the low tide values at locations P, Q, R, and T is -0.27 foot. What is the value of the low tide at location T? Show your work or explain how you found your answer.

I added the numbers of the low tide of locations p q and r and got 5.73

Annotation

Anchor Paper 7

Part A: Score Point 1

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

- The student finds the correct difference between high and low tides for location P (7.90) and explains how to find that difference (subtracted 8.53 by 0.63).

Although the student provides the correct high tide for location R (5.73), there is no explanation or work shown to determine that value.

Part B: Score Point 0

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

The value of the low tide for location T is incorrect (5.73).

The procedure to find this value is also incorrect (I added the number of the low tide of p q and r and got 5.73). The correct sum of the low tides of P, Q and R would be $0.63 - 0.94 - 1.02 = -1.33$.

Part A: Score Point 0

Part B: Score Point 1

Part A

- Find the difference between high and low tides for location P. Show your work or explain your answer.
- Find high tide for location R. Show your work or explain your answer.

$$P = 7.9$$
$$R = 5.72$$

Part B

The tides are measured at a fourth location, T. The mean of the low tide values at locations P, Q, R, and T is -0.27 foot. What is the value of the low tide at location T? Show your work or explain how you found your answer.

$$0.25$$

Annotation

Anchor Paper 8

Part A: Score Point 0

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

The student provides the correct difference between high and low tides for location P (7.9), but shows no procedure to find that value.

The student provides an incorrect high tide for location R (5.72) and no explanation for determining that value.

Part B: Score Point 1

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

- The student states the correct value of the low tide for location T (0.25).

The student does not include any explanation or show how to determine that value.

Part A: Score Point 0

Part B: Score Point 0

Part A

- Find the difference between high and low tides for location P. Show your work or explain your answer.
- Find high tide for location R. Show your work or explain your answer.

The difference between the high and low tides for location P is 7.90 because for Q the operation is *High Tide* – *Low Tide*. So $6.98 - (-0.94) = 7.90$.

Part B

The tides are measured at a fourth location, T. The mean of the low tide values at locations P, Q, R, and T is -0.27 foot. What is the value of the low tide at location T? Show your work or explain how you found your answer.

0.17 because
 $0.63 + (-0.94) + (-1.02)$
 $= -1.33$ and
 $-1.33 \div (-0.27) \square = -0.17$

Annotation

Anchor Paper 9

Part A: Score Point 0

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

Although the student provides the correct difference between the high and low tides of location P (7.90), the procedure shown ($6.98 - [-0.94] = 7.90$) is incorrect. The student uses the values for location Q, not location P.

There is no attempt to find the high tide for location R.

Part B: Score Point 0

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

The student states an incorrect value for the low tide of location T (0.17).

Provides an inappropriate procedure to find the correct value ($-1.33 \div [-0.27] = -0.17$).

Part A: Score Point 0

Part B: Score Point 0

Part A

• the difference is 9.16

$$\begin{array}{r} 8.53 \\ + 0.63 \\ \hline 9.16 \end{array}$$

• the high tide for R is 5.73

$$\begin{array}{r} 6.75 \\ - 1.02 \\ \hline 5.73 \end{array}$$

Part B

14.63 is the answer because

$$5.73 + 9.16 + -0.27 = 14.62$$

Annotation

Anchor Paper 10

Part A: Score Point 0

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

The student does not provide the correct difference between the high and low tides of location P (9.16) or show an appropriate procedure to find the correct value ($8.53 + 0.63 = 9.16$). The student needed to subtract 0.68 from 8.53.

Although the student provides the high tide for location R (5.73), the work shown is incorrect ($6.75 - -1.02 = 5.73$). 6.75 minus a negative 1.02 equals 7.77.

Part B: Score Point 0

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

Provides an incorrect low tide value for location T (14.63).

Provides an incorrect procedure to determine the correct value ($5.73 + 9.16 + -0.27 = 14.62$).

Practice Set P101 - P105

No Annotations Included

Part A

$$\begin{array}{r} 78.53 \\ - .63 \\ \hline 7.90 \\ \boxed{7.90} \end{array}$$

I + is 7.90 because to find the difference of High and low tides you have to subtract $8.53 - .63 = 7.90$.

6.75 The high tide is 5.73 because you have to add $6.75 +$
 $+1.02 = 5.73$ and it is just like subtracting because if
 $\boxed{5.73}$ you add negative its like subtracting.

Part B

$$\begin{array}{r} -27 \\ - .4 \\ \hline -1.08 \end{array} \quad \begin{array}{r} -108 \\ - .63 \\ \hline -1.71 \end{array} \quad \begin{array}{r} -1.71 \\ + .94 \\ \hline -.77 \end{array} \quad \begin{array}{r} -.77 \\ +1.02 \\ \hline .25 \end{array}$$

T=.25

It is .25 because I did every thing you do to find the mean except backwards because that's what you need to do to find one of the low tides.

Part A

- Find the difference between high and low tides for location P. Show your work or explain your answer.
- Find high tide for location R. Show your work or explain your answer.

7.9 is the difference for P.
5.73 is the high tide for R.

Part B

The tides are measured at a fourth location, T. The mean of the low tide values at locations P, Q, R, and T is -0.27 foot. What is the value of the low tide at location T? Show your work or explain how you found your answer.

.25 because $p + q + r = -1.33$
and in order to get the mean down to
 $-.27$ you needed to have -1.08 and
in order to get -1.08 you needed to
add .25 and so my answer is .25

Part A

- Find the difference between high and low tides for location P. Show your work or explain your answer.
- Find high tide for location R. Show your work or explain your answer.

The difference between high and low tides for location "P" is 7.9. All you do to find the answer is to subtract $8.53 - 0.63 = 7.9$. The high tide for location "R" is 7.77. I found that answer by subtracting $6.75 - (-1.02) = 7.77$. The -1.02 is also negative.

Part B

The tides are measured at a fourth location, T. The mean of the low tide values at locations P, Q, R, and T is -0.27 foot. What is the value of the low tide at location T? Show your work or explain how you found your answer.

The value of the low tide at location "T" is 0.27. I found that answer by re-reading the question. The following sentence says, "The mean of the low tide values at locations P, Q, R, and T is 0.27."

Part A

- Find the difference between high and low tides for location P. Show your work or explain your answer.
- Find high tide for location R. Show your work or explain your answer.

The difference between tides in location p is 7.9 feet because when subtracting 8.53 by .63 we get 7.9 feet.

The high tide for r is 5.73 feet.

Part B

The tides are measured at a fourth location, T. The mean of the low tide values at locations P, Q, R, and T is -0.27 foot. What is the value of the low tide at location T? Show your work or explain how you found your answer.

.25 is the final value for T.

Part A

- Find the difference between high and low tides for location P. Show your work or explain your answer.
- Find high tide for location R. Show your work or explain your answer.

The difference between high and low tides for location P is 7.9 feet. This is because the high tide is 8.53, and the low is 0.63, so $8.53 - 0.63 = 7.9$.

the

high tide is 5.73 feet.

High tide $- (-1.02) = 6.75$

so $6.75 - 1.02 = 5.73$

so high *tide* = 5.73 feet.

Part B

The tides are measured at a fourth location, T. The mean of the low tide values at locations P, Q, R, and T is -0.27 foot. What is the value of the low tide at location T? Show your work or explain how you found your answer.

The low tide at location T is 0.25.

This is because the mean of the other three locations is -1.33 , so to get a m

Practice Set

Paper	Score
P101	2,2
P102	1,2
P103	1,0
P104	1,1
P105	2,1