

2004 MSA MATHEMATICS SAMPLE ITEM

AMANDA'S TELEPHONE PLAN

GRADE 7 ECR

1.B.1.b

PRACTICE SET

Grade 7
Algebra 1B.1.b.
Extended Constructed Response Sample Item

Note: This problem is solved without a calculator.

Amanda's long distance telephone plan charges a monthly fee of \$14.95 and \$.05 per minute for the number of minutes (m) that she uses her telephone. The monthly charge for Amanda's long distance telephone plan is represented by the expression shown below.

$$14.95 + 0.05 m$$

Step A

How much is the monthly charge for Amanda's long distance telephone plan if she talks for 150 minutes in one month?

Step B

- Use what you know about expressions to explain how you determined the monthly charge for Amanda's long distance telephone plan. Use words, numbers, and/or symbols in your explanation.
- Suppose that the cost per minute changes to \$.07 per minute. Explain how this change will affect the charge for Amanda's telephone plan. Use words, numbers, and/or symbols in your explanation.

Grade 7 No calculator use is allowed on this question.

Amanda's long distance telephone plan charges a monthly fee of \$14.95 and \$.05 per minute for the number of minutes (m) that she uses her telephone. The monthly charge for Amanda's long distance telephone plan is represented by the expression shown below.

$$\begin{array}{r}
 14.95 \\
 + 7.50 \\
 \hline
 \end{array}$$

$14.95 + 0.05m$

Step A

$$\begin{array}{r}
 22.45 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 150 \\
 \times 0.05 \\
 \hline
 750 \\
 0000 \\
 \hline
 7500
 \end{array}$$

How much is the monthly charge for Amanda's long distance telephone plan if she talks for 150 minutes in one month?

$$\begin{array}{r}
 22.45 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 10.50 \\
 + 14.95 \\
 \hline
 25.45
 \end{array}$$

Step B

- Use what you know about expressions to explain how you determined the monthly charge for Amanda's long distance telephone plan. Use words, numbers, and/or symbols in your explanation.
- Suppose that the charge per minute changes to \$.07 per minute. Explain how this change will affect the charge for Amanda's telephone plan. Use words, numbers, and/or symbols in your explanation.

$$\begin{array}{r}
 50 \\
 7 \\
 \hline
 050
 \end{array}$$

The extra will increase Amandas long distance charged by \$10.50. Her total monthly fee will be 25.45.

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$$14.95 + 0.05m$$

Step A

How much is the monthly charge for Amanda's long distance telephone plan if she talks for 150 minutes in one month?

\$750

Step B

- Use what you know about expressions to explain how you determined the monthly charge for Amanda's long distance telephone plan. Use words, numbers, and/or symbols in your explanation.
- Suppose that the charge per minute changes to \$.07 per minute. Explain how this change will affect the charge for Amanda's telephone plan. Use words, numbers, and/or symbols in your explanation.

$$\begin{array}{r} 3 \\ 150 \\ \times 7 \\ \hline 1050 \end{array}$$

I took the 5 cents and times it
by the 150 minutes and got
\$750.

Instead of paying \$750 with the
5 cents per minute she would pay
\$1050 dollars with 7 cents per minutes

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$$14.95 + 0.05m$$

Step A

How much is the monthly charge for Amanda's long distance telephone plan if she talks for 150 minutes in one month?

\$22.45

$$\begin{array}{r}
 150 \\
 \times 0.05 \\
 \hline
 7.50 \\
 + 14.95 \\
 \hline
 22.45
 \end{array}$$

$$\begin{array}{r}
 150 \\
 \times 0.07 \\
 \hline
 10.50 \\
 + 14.95 \\
 \hline
 25.45
 \end{array}$$

Step B

- Use what you know about expressions to explain how you determined the monthly charge for Amanda's long distance telephone plan. Use words, numbers, and/or symbols in your explanation.
- Suppose that the charge per minute changes to \$.07 per minute. Explain how this change will affect the charge for Amanda's telephone plan. Use words, numbers, and/or symbols in your explanation.

I got this answer by multiply 150 x 0.05
which came out to be 7.50. Then I had
to add 14.95 to come to a total of \$22.45.
But if it was 0.07[?] per minute
the money would go up. The answer
would come out to be \$25.45.

Grade 7 No calculator use is allowed on this question.

Amanda's long distance telephone plan charges a monthly fee of \$14.95 and \$.05 per minute for the number of minutes (m) that she uses her telephone. The monthly charge for Amanda's long distance telephone plan is represented by the expression shown below.

Step A

$$14.95 + 0.05m$$

How much is the monthly charge for Amanda's long distance telephone plan if she talks for 150 minutes in one month?

\$7.50

$$\begin{array}{r} 150 \\ \times .05 \\ \hline 7.50 \end{array}$$

Step B

- Use what you know about expressions to explain how you determined the monthly charge for Amanda's long distance telephone plan. Use words, numbers, and/or symbols in your explanation.
- Suppose that the charge per minute changes to \$.07 per minute. Explain how this change will affect the charge for Amanda's telephone plan. Use words, numbers, and/or symbols in your explanation.

This would change the telephone plan
by increasing the amount that Amanda
pays per month for calling long distance.
For example, if she used 275 minutes
in one month, her bill would be a
total of \$19.25 for calling long
distance in one month.

Grade 7 No calculator use is allowed on this question.

Amanda's long distance telephone plan charges a monthly fee of \$14.95 and \$.05 per minute for the number of minutes (m) that she uses her telephone. The monthly charge for Amanda's long distance telephone plan is represented by the expression shown below.

$$14.95 + 0.05m$$

Step A

$$14.95$$

How much is the monthly charge for Amanda's long distance telephone plan if she talks for 150 minutes in one month?

$$\underline{22.45}$$

Step B

- Use what you know about expressions to explain how you determined the monthly charge for Amanda's long distance telephone plan. Use words, numbers, and/or symbols in your explanation.
- Suppose that the charge per minute changes to \$.07 per minute. Explain how this change will affect the charge for Amanda's telephone plan. Use words, numbers, and/or symbols in your explanation.

$$\underline{150 \times .05 = \$7.5}$$

$$\underline{14.95 + 7.5 = \$22.45}$$

$$\underline{\text{Answer } \$22.45}$$

Before

After

$$150 \times 0.05 = \$7.5$$

$$150 \times .07 = \$10.5$$

$$\begin{array}{r} \text{Compare } 25.45 \\ + \\ 22.45 \end{array}$$

$$14.95 + \$7.5 = \$22.45$$

$$14.95 + 10.5 = \$25.45$$

Grade No calculator use is allowed on this question.

Amanda's long distance telephone plan charges a monthly fee of \$14.95 and \$.05 per minute for the number of minutes (m) that she uses her telephone. The monthly charge for Amanda's long distance telephone plan is represented by the expression shown below.

Step A

$$\begin{array}{r} 030\$ \\ 5 \overline{)150} \\ \underline{15} \\ 00 \end{array}$$

$$14.95 + 0.05m \\ = 15.00$$

\$30

How much is the monthly charge for Amanda's long distance telephone plan if she talks for 150 minutes in one month?

\$30

Step B

- Use what you know about expressions to explain how you determined the monthly charge for Amanda's long distance telephone plan. Use words, numbers, and/or symbols in your explanation.
- Suppose that the charge per minute changes to \$.07 per minute. Explain how this change will affect the charge for Amanda's telephone plan. Use words, numbers, and/or symbols in your explanation.

Monthly Amanda would pay \$30 because $5 \div 150 = 30$ which those two equal how much to pay a month. Well if you had .07 per m you would have to x it by two making you pay \$60 monthly for your phone bill.

Grade 7 No calculator use is allowed on this question.

Amanda's long distance telephone plan charges a monthly fee of \$14.95 and \$.05 per minute for the number of minutes (m) that she uses her telephone. The monthly charge for Amanda's long distance telephone plan is represented by the expression shown below.

$$14.95 + 0.05m$$

Step A

How much is the monthly charge for Amanda's long distance telephone plan if she talks for 150 minutes in one month?

22.45 \$

Step B

- Use what you know about expressions to explain how you determined the monthly charge for Amanda's long distance telephone plan. Use words, numbers, and/or symbols in your explanation.
- Suppose that the charge per minute changes to \$.07 per minute. Explain how this change will affect the charge for Amanda's telephone plan. Use words, numbers, and/or symbols in your explanation.

First I multiplied the number of minutes she talked on the phone (150) by the charge per minute (.05¢) and then used that answer (7.50\$) and added it to the monthly fee (14.95\$) to get the total money she owed (22.45\$). Depending how .07¢ is .02¢ more than .05¢, it would obviously make the total charge a little more.

Grade 7 No calculator use is allowed on this question.

Amanda's long distance telephone plan charges a monthly fee of \$14.95 and \$.05 per minute for the number of minutes (m) that she uses her telephone. The monthly charge for Amanda's long distance telephone plan is represented by the expression shown below.

$$14.95 + 0.05m$$

Step A

How much is the monthly charge for Amanda's long distance telephone plan if she talks for 150 minutes in one month?

$$\begin{array}{r} 150 \\ \times .05 \\ \hline 750 \\ 000 \\ \hline 7.50 \end{array} \qquad \begin{array}{r} 150 \\ \times .07 \\ \hline 1050 \\ 000 \\ \hline 10.50 \end{array}$$

Step B

- Use what you know about expressions to explain how you determined the monthly charge for Amanda's long distance telephone plan. Use words, numbers, and/or symbols in your explanation.
- Suppose that the charge per minute changes to \$.07 per minute. Explain how this change will affect the charge for Amanda's telephone plan. Use words, numbers, and/or symbols in your explanation.

To figure out how I solved Amanda's problem is by multiplying the charge that she has to pay for 1 minute by the minutes she talked on the phone.

If Amanda had to pay 2 more cents for the cost of the month she will be paying more.

$$.05¢ = \$7.50$$

$$.07¢ = \$10.50$$

Grade 7 – Amanda’s Telephone Plan Practice Set Annotations

PS1

Step A Score Level 1

Step B Score Level 3

This response demonstrates a comprehensive understanding and analysis of the problem. The student applies a reasonable strategy in the context of the problem. The student provides support for explanations that are clear, fully developed, and logical. The student provides support for these explanations by showing all work as the expression is solved both when m equals \$.05 and when m equals \$.07.

Refer to Guide Paper G7 in the Scoring Guide.

PS2

Step A Score Level 0

Step B Score Level 1

This response demonstrates a minimal understanding and analysis of the problem. The student uses a partial application of a strategy by taking “the 5 cents and times it by the 150 minutes and got \$750.” However, the explanation for the process used to solve the problem reveals a serious logical flaw in as the student omits the decimal point in the product. In addition, the student does not add this product to \$14.95. The explanation for how the change in the per minute charge affects the monthly charge is incomplete, and omits the decimal point. The student implies how the cost will change by multiplying 150 by 7 cents to arrive at \$1050, but ignores the constant charge as part of the monthly cost. Refer to Guide Paper G4.

PS3**Step A Score Level 1****Step B Score Level 3**

This response demonstrates a comprehensive understanding and analysis of the problem. The student applies a reasonable strategy in the context of the problem. The explanations provided are clear, fully developed, and logical. The student provides numerical support for the original cost of \$22.45 and changed cost of \$25.45. The connection between the change in the cost per minute and the total monthly cost is stated explicitly, "the money would go up. The answer would come out to be \$25.45."

Refer to Guide Paper G8.

PS4**Step A Score Level 0****Step B Score Level 1**

This response demonstrates a minimal understanding and analysis of the problem. The student uses a partial application of a strategy by multiplying \$.05 by 150. However, the explanation reveals a logical flaw as the student fails to add this product to \$14.95. The student correctly states that increasing the per minute charge of the plan "would change the plan by increasing the amount that Amanda pays per month for calling long distance." However, appropriate support for this connection is not provided.

Refer to Guide Paper G2.

PS5**Step A Score Level 1****Step B Score Level 3**

This response demonstrates a comprehensive understanding and analysis of the problem. The student applies a reasonable strategy in the context of the problem. The student provides numerical support for explanations that are fully developed, and logical. The student uses a comparison to state explicitly the connection between raising the per minute charge and the amount that is paid per month.

Refer to Guide Paper G7.

PS6**Step A Score Level 0****Step B Score Level 0**

This response is completely incorrect. The strategy of dividing 150 by 5 is inappropriate for this problem.

PS7**Step A Score Level 1****Step B Score Level 2**

This response demonstrates a general understanding and analysis of the problem. The student applies a reasonable strategy in the context of the problem to arrive at the solution to Step A of this problem. The student provides appropriate support by explaining how this total cost was determined; "I multiplied the number of minutes... by the charge per minute... and added it to the monthly fee to get the total money she owed." However, the explanation of the relationship between the change in the charge per minute and the monthly charge for the telephone plan is overly general and lacks support, "It would obviously make the total charge a little more."

Refer to Guide Paper G5.

PS8**Step A Score Level 0****Step B Score Level 2**

This response demonstrates a general understanding and analysis of the problem. The student uses a partial application of a strategy by multiplying 150 by the cost per minute to arrive at \$7.50 for the first charge and \$10.50 for the increased charge. However, the response is flawed because the student never adds the constant \$14.95 fee to either of these products. Thus, the connection between the initial fee and the increased fee is overly general and lacks the appropriate support.

Refer to Guide Paper G4.