

• Analysis •

1. Correct Answers: 3 x 5 or 5 x 3

- ⊕ The student needed to identify the model as representing the multiplication facts 3 x 5 or 5 x 3.

SKILL: Identify the multiplication fact(s) represented by a model or diagram.

2. Correct Answer: 56

- ⊕ To be successful in *Delta*, the student must have a strong command of basic multiplication facts. He needed to be able to give the answer to the problem from memory quickly and accurately.

SKILL: Demonstrate automatic recall of basic multiplication facts.

3. Correct Answer: 21,190

- ⊕ The student needed to rewrite the problem vertically to align the numbers correctly by place value. Then he needed to be able to add the digits and regroup as necessary to find the answer.

$$\begin{array}{r}
 ^1 ^2 \\
 105 \\
 ^1 7,597 \\
 6 \\
 + ^1 13,482 \\
 \hline
 21,190
 \end{array}$$

SKILL: Demonstrate knowledge of multiple-digit column addition with regrouping.

4. Correct Answer: 347,547

- ⊕ The student needed to rewrite the problem vertically to align the numbers correctly by place value. Then he needed to be able to subtract the digits and regroup as necessary across place values to find the answer.

$$\begin{array}{r}
 \cancel{3} \cancel{3} \cancel{6}, \cancel{7} \cancel{0} \cancel{6} \\
 - 8 9, 1 5 9 \\
 \hline
 3 4 7, 5 4 7
 \end{array}$$

SKILL: Demonstrate knowledge of multiple digit subtraction with regrouping.

5. Correct Answer: 1 x 12, 12 x 1, 2 x 6, 6 x 2, 3 x 4, 4 x 3

- ⊕ The student needed to demonstrate mastery of his multiplication facts. He needed to list all the multiplication facts that equal 12.

SKILL: Determine the all multiplication facts for a given product.

6. Correct Answer: 69,008

- The student needed to multiply multiple digit numbers that required regrouping to find the answer. He could have solved this problem in one of two ways.

➤ **Solution A:**

$$\begin{array}{r}
 \overset{5}{\cancel{4}} \\
 9 \ 0 \ 8 \\
 \times \ 7 \ 6 \\
 \hline
 \overset{1}{5} \ \overset{1}{4} \ 4 \ 8 \\
 + 6 \ 3 \ 5 \ 6 \ 0 \\
 \hline
 6 \ 9, \ 0 \ 0 \ 8
 \end{array}$$

- » He found the product using the traditional method. He regrouped as necessary to find the answer.

➤ **Solution B:**

$$\begin{array}{r}
 \overset{5}{9} \ 0 \ 8 \\
 \times \ 7 \ 0 \\
 \hline
 \ 0 \ 0 \ 0 \\
 + 6 \ 3, \ 5 \ 6 \ 0 \\
 \hline
 6 \ 3, \ 5 \ 6 \ 0
 \end{array}
 \qquad
 \begin{array}{r}
 \overset{1}{6} \ \overset{1}{3}, \ \overset{1}{5} \ 6 \ 0 \\
 + \ 5, \ 4 \ 4 \ 8 \\
 \hline
 6 \ 9, \ 0 \ 0 \ 8
 \end{array}
 \qquad
 \begin{array}{r}
 \overset{1}{6} \ \overset{1}{3}, \ \overset{1}{5} \ 6 \ 0 \\
 + \ 5, \ 4 \ 4 \ 8 \\
 \hline
 6 \ 9, \ 0 \ 0 \ 8
 \end{array}$$

- » He found the partial products and then added them together to find the answer.

SKILL: Multiply a three-digit number by a two-digit number with regrouping.

7. Correct Answer: 109

- The student needed to write an equation (number sentence) to represent the situation. Then he needed to solve the equation (number sentence). He could have written an equation and solved this problem in one of two ways.

➤ **Solution A:**

- » He wrote the equation (number sentence) $323 - 214 = 109$ to solve the problem.

➤ **Solution B:**

- » He could demonstrate that addition and subtraction are inverse (opposite) operations.
- » He wrote the equation (number sentence) $214 + \underline{\hspace{1cm}} = 323$ to solve the problem.

SKILL: Apply knowledge of subtraction to solve a word problem.

8. Correct Answer: 7

- The student had to determine the unknown factor in the equation. He could have solved this problem in one of two ways.

➤ **Solution A:**

- » He explained that the factor could be found by dividing 63 by 9, which equals 7.

➤ **Solution B:**

- » He explained that he knew that 9×7 is equal to 63 because he has committed the multiplication facts to memory.

SKILL: Solve for an unknown factor.

9. Correct Answer: 32 hours

- The student needed to identify multiplication as the operation to solve this problem. Next, the student had to write and solve an equation (number sentence).
- He wrote the equation (number sentence) $4 \times 8 = 32$ or $8 \times 4 = 32$

SKILL: Apply knowledge of multiplication to solve a word problem.

10. A student who has mastered the prerequisite concepts should be able to complete the written assessment in about 20 minutes.

11. A student who has mastered the prerequisite concepts should feel confident in his or her ability to solve the problems and should not need to ask for assistance.