

• **Analysis** •

**1. Correct Answer:**  $15 \div 3 = 5$

➤ Students working in *Epsilon* must have a strong command of basic multiplication and division facts and must understand the following concepts related to division:

1. Fifteen objects are separated (divided) into 3 groups.
2. There are 5 objects in each group.

➤ The student then had to write an equation to represent the model based on these observations.

*SKILL: Identify the division fact represented by a model or diagram.*

**2. Correct Answer:** 132,886

➤ First, the student needed to rewrite the problem vertically to align the numbers correctly by place value.

$$\begin{array}{r} 197 \\ 128,650 \\ + 4,039 \\ \hline \end{array}$$

➤ Then he needed to add the digits and regroup (or “carry”) when needed to find the sum.

$$\begin{array}{r} \overset{1}{1} \overset{1}{9} 7 \\ \overset{1}{1} 28,650 \\ + 4,039 \\ \hline 132,886 \end{array}$$

*SKILL: Add multiple-digit numbers in a column, regrouping as needed.*

**3. Correct Answer:** 44,205

➤ First, the student needed to rewrite the problem vertically to align the numbers correctly by place value.

$$\begin{array}{r} 54,001 \\ - 9,796 \\ \hline \end{array}$$

➤ Then he needed to subtract the digits and regroup (or “borrow”) when needed to find the difference.

$$\begin{array}{r} \overset{4}{5} \overset{13}{4}, \overset{9}{10} \overset{9}{10} \overset{11}{1} \\ - 9, 7 9 6 \\ \hline 4 4, 2 0 5 \end{array}$$

*SKILL: Demonstrate knowledge of multiple digit subtraction with regrouping.*

**4. Correct Answer:** 1,305

- The student needed to know basic multiplication facts from memory. He also needed to perform multiplication with regrouping to find the product.

$$\begin{array}{r}
 \phantom{0}^1 \\
 45 \\
 \times 29 \\
 \hline
 405 \\
 + 900 \\
 \hline
 1,305
 \end{array}$$

SKILL: Find the product of double-digit numbers with regrouping.

**5. Correct Answer:** 1,794,100

- The student could have solved this problem in one of two ways.
  1. Multiply 2,563 by 7, regroup or “carry” when necessary, and then add two zeros to the end of the product to represent the hundreds.

$$\begin{array}{r}
 \phantom{0}^3 \phantom{0}^4 \phantom{0}^2 \\
 2,563 \\
 \times 7 \phantom{0} \phantom{0} \\
 \hline
 1,794,100
 \end{array}$$

2. Multiply the two numbers using the traditional method, regrouping as needed to find the product.

$$\begin{array}{r}
 \phantom{0}^4 \phantom{0}^2 \\
 2,563 \\
 \times 700 \\
 \hline
 0000 \\
 00000 \\
 +1794100 \\
 \hline
 1,794,100
 \end{array}$$

SKILL: Multiply numbers with several digits by a multiple of 10.

**6. Correct Answer:** 167 R1 or  $R\frac{1}{3}$

- The student needed to perform long division to solve the problem and write a remainder to show that the numbers did not divide evenly.

$$\begin{array}{r}
 167 \text{ R}1 \text{ or } R\frac{1}{3} \\
 3 \overline{)502} \\
 \underline{-3} \\
 20 \\
 \underline{-18} \\
 22 \\
 \underline{-21} \\
 1
 \end{array}$$

SKILL: Divide a three-digit dividend by a single-digit divisor.

**7. Correct Answer:** 12 cakes

- ➔ The student needed to:
  - » Know that division was the appropriate operation to use.
  - » Write an appropriate equation:  $37 \div 3 = x$  OR  $3x = 37$
  - » Solve by dividing.

*SKILL: Divide to solve a word problem.*

**8. Correct Answer:** 2,004 R14 or  $R \frac{14}{21}$  or  $R \frac{2}{7}$ 

- ➔ The student needed to perform long division to solve the problem.
- ➔ He needed to use zeros as place holders in the quotient when needed; also, he needed to write a remainder to show the numbers did not divide evenly.

*SKILL: Divide a five-digit dividend by a two-digit divisor.*

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

**10. 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.**