Montana Comprehensive Assessment System *(MontCAS, Phase 2)*

Criterion-Referenced Test (CRT)

COMMON CONSTRUCTED-RESPONSE ITEM RELEASE
MATHEMATICS, GRADE 8

2008

OPI

OFFICE OF PUBLIC INSTRUCTION

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Printed in the United States of America.

Mathematics

Session 1 (No Calculator)

You may NOT use a calculator during this session.

Write your answer in the space provided for it in your Student Response Booklet. Show all of your work.

23. Sheryl compared these two formulas for making a dirt mix of peat moss and potting soil.

Formula 1	**Formula 2**
To make 5 cups of dirt mix: Mix 1 cup peat moss with 4 cups potting soil	To make 9 cups of dirt mix: Mix 2 cups peat moss with 7 cups potting soil

a. In Formula 1, what percent of the dirt mix is made with **potting soil**? Show or explain how you found your answer.

b. Determine which formula has the highest percentage of **peat moss**. Show or explain how you found your answer.

c. Sheryl needs 45 cups of dirt mix. She decides to use Formula 2. How many cups of **peat moss** does she need to make 45 cups of dirt mix? Show or explain how you found your answer.

Scoring Guide

Score	Description
4	4 points
3	$3-3\frac{1}{2}$ points
2	$2-2\frac{1}{2}$ points
1	$\frac{1}{2}-1\frac{1}{2}$ points OR Response shows minimal understanding of problem.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Scoring Notes

Part a: 1 point for correct answer, **80%**, with correct work or explanation

OR

$\frac{1}{2}$ point for correct answer

or

$\frac{1}{2}$ point for correct explanation or strategy

Part b: 1 point for correct work or explanation showing that Formula 2 has the higher percent of peat moss

OR

$\frac{1}{2}$ point for correct percents for both formulas without work or explanation

or

$\frac{1}{2}$ point for correct explanation or strategy for finding at least one formula's percent

Part c: 2 points for correct answer, **10 cups**, with correct work or explanation

OR

1 point for correct answer

or

1 point for correct proportion

or

1 point for correct strategy with minor computational error

Sample Response:

Part a: 4 parts out of 5 parts is 4/5 = 80% potting soil.

Part b: Dirt mix made from Formula 1 has 1 out of 5 parts that is peat moss.

$\frac{1}{5} = 20\%$ peat moss

Dirt mix made from Formula 2 has 2 out of 9 parts that are peat moss.

$\frac{2}{9} = 22\%$ peat moss

Dirt mix made from Formula 2 has the highest percent of peat moss.

Part c: $\frac{2}{9} = \frac{x}{45}$, $9x = 90$, $x = 10$ cups of peat moss

Score Point 4

Sample 1

a. $\frac{4c}{5c}$ → potting soil → dirt mix

$\frac{4}{5} = 5\overline{)40}$ = 0.8

40
0

80 → move the decimal

80%

b. Formula 2

$\frac{2}{9}$ → peat moss → dirt mix

$9\overline{)20}$ = $0.\overline{22}$

18
20

$22.\overline{2}\%$

Formula 1

$\frac{1}{5}$ → peat moss → dirt mix

$5\overline{)1.0}$ = 0.2

20

20% $22.2 \geq 20$

Formula 2

c. $\frac{x}{45} = \frac{2}{9}$

peat moss needed ← x; 2 → peat moss; 45 ← dirt mix; 9 → dirt mix

$\frac{90}{9} = \frac{9x}{9}$

$10 = x$

10 cups of peat moss

Score Point 4

Sample 2

A. $\frac{4}{5} \times \frac{20}{20} = \frac{80}{100} = 80\%$

B. $\frac{1}{5} \times \frac{20}{20} = \frac{20}{100} = 20\%$ or $\frac{2}{9}$ $9\overline{)2.00}$ $0.\overline{22}$ %

.20 or $.\overline{22}$

Formula 2 because 22 percent is greater than 20 percent.

C. $\frac{45 \text{ cups}}{9 \text{ cups}} = 5 \text{ cups}$

$2 \times 5 = 10$

10 cups of peat moss

Score Point 4

Sample 3

a = 80 percent

b = formula 2

c = 10c

$9\overline{)45}$ = 5

$\frac{4}{5} = \frac{80}{100}$

$\frac{1}{5} < \frac{2}{9}$

2 cups peat moss × 5 = 10c

Score Point 3

a. $\frac{4}{5}$ = 80% potting soil

.142857

b. $\frac{1}{5}$ = 20%, $\frac{2}{7}$ = 28.57% Formula 2 has the highest percentage of peat moss

c. 10 cups of peat moss

I multiplied 9 by 5 and multiplied the others by 5. and got 10/35.

Score Point 2

Sample 1

(a) 4/5 = 80% 4/5 = 8/10 = 80%

(b) Formula 2 100 ÷ 9 = 11.T 7/9 = 22%

1/5 = 2/10 = 20%

(c) 4/5 × 2 = 90

20 cups of peat moss

Score Point 2

Sample 2

$\boxed{a.\ 40\%}$ $\boxed{b.\ \text{Formula 1}}$ $\boxed{C.\ 10\ \text{cups}}$

$$\begin{array}{r} 5 \\ +1 \\ \hline 6 \\ +4 \\ \hline 10 \end{array}$$

$4/10$

$$\begin{array}{r} 5 \\ 9\overline{)45} \\ 45 \\ \hline 0 \end{array} \qquad \begin{array}{r} 2 \\ \times 5 \\ \hline 10 \end{array}$$

Score Point 1

Sample 1

(a) .8% of the potting soil is dirt mix.
I found my answer by:

$$5\overline{)4.0} \quad .8$$

(b) Formula 2 has the highest percentage of peat moss, because 9 cup of dirt mix is more the 5 cups of dirt mix 2 cups is more than 1 cup.

(c) she needs 22½ cups of peat moss if she decided to got with formula 2. I divided 45 by 2 and got 22 ½.

$$2\overline{)45} \quad 22\tfrac{1}{2}$$
$$\begin{array}{r} 4 \\ \hline 05 \\ 4 \\ \hline 1 \end{array}$$

my work is shown here

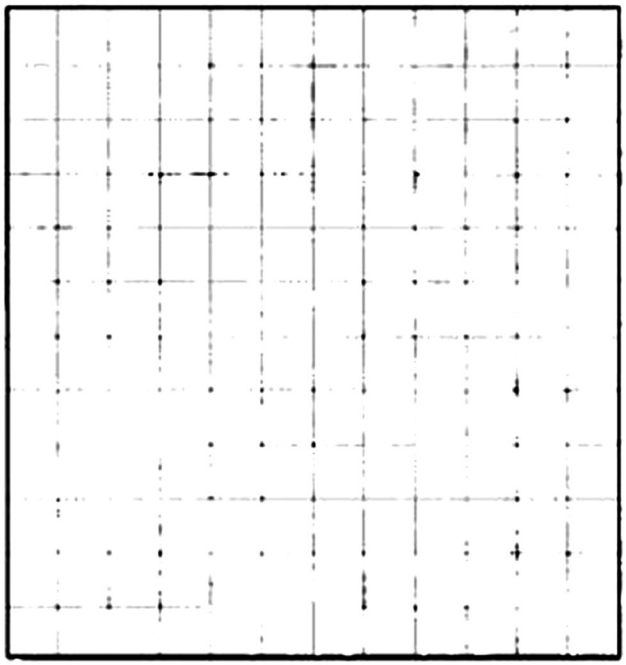
Score Point 1

Sample 2

A. 80% 4 out of five is 80%

B. Formula 2

C. 14-20 multiplied by 6.7



Score Point 0

Sample 1

a. in formula 1 the potting soil is used about 85 percent
and the Peat moss the other 15 Percent

b. formula 2 uses more Peat moss than formula 1 form. 2 7-2=
5 out of 9
form. 1 4-1= 3 out of 5

c. 45÷3= 15 Sheryl would need 15 cups of Peat moss

Score Point 0

Sample 2

A 5x4=20% A=20% of dirt mix

B B Formula 2

C 4 cups of peat moss.