

**NEW YORK STATE
COMPONENT RETEST**

**MATHEMATICS A
COMPONENT 5
TASK 1**

WEDNESDAY, APRIL 24, 2002

**SCORING KEY
AND
RATING GUIDE**

Multiple Choice Key

1	3
2	4
3	1
4	4
5	2
6	1

COMPONENT 5
MODULE 1

QUESTION 7

TRAINING SET

Part II

Answer all questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [12]

- 7 Terrell has a set of 2-inch by 2-inch by 2-inch cubic blocks. He also has a box with inside dimensions of 16 inches by 12 inches by 8 inches. How many blocks will fit into Terrell's box?

Part II

Answer all questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [12]

- 7 Terrell has a set of 2-inch by 2-inch by 2-inch cubic blocks. He also has a box with inside dimensions of 16 inches by 12 inches by 8 inches. How many blocks will fit into Terrell's box?

Sample Response

$$16 \times 12 \times 8 = 1,536$$

$$1,536 \div 8 = 192$$

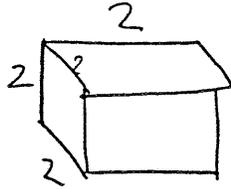
OR

$$\frac{16}{2} = 8, \quad \frac{12}{2} = 6, \quad \frac{8}{2} = 4 \quad \text{and} \quad 8 \times 6 \times 4 = 192$$

Rubric:

- [4] 192, and appropriate work is shown, such as either method shown in the sample response.
- [3] Appropriate work is shown, but one computational error is made.
- [2] Appropriate work is shown, but more than one computational error is made.
or
- [2] Appropriate work is shown, but one conceptual error is made, such as using the area instead of the volume of the box or block or subtracting instead of dividing the volumes, but an appropriate answer is determined.
- [1] The volume of the box or the volume of the block is determined correctly, but no further work is shown.
or
- [1] Multiple computational and conceptual errors are made, but some correct work is shown.
or
- [1] 192, but no work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Terrell has a set of 2-inch by 2-inch by 2-inch cubic blocks. He also has a box with inside dimensions of 16 inches by 12 inches by 8 inches. How many blocks will fit into Terrell's box?



$$\begin{aligned} \text{cubes} &= (2)(2)(2) \\ &= 8 \end{aligned}$$

$$\begin{aligned} \text{Box dimensions} &= lwd \\ &= (16)(12)(8) \\ &= 1536 \end{aligned}$$

$$\frac{1536}{8} =$$

192 blocks will fit inside the box

SCORE POINT: 4

Terrell has a set of 2-inch by 2-inch by 2-inch cubic blocks. He also has a box with inside dimensions of 16 inches by 12 inches by 8 inches. How many blocks will fit into Terrell's box?

$$2 \times 2 \times 2 = 6$$

$$16 \times 12 \times 8 = 1536$$

$$\frac{1536}{6}$$

$$= 256 \text{ blocks}$$

SCORE POINT: 3

Terrell has a set of 2-inch by 2-inch by 2-inch cubic blocks. He also has a box with inside dimensions of 16 inches by 12 inches by 8 inches. How many blocks will fit into Terrell's box?

$$2 \times 2 \times 2 = 8 \quad \text{volume of block}$$

$$16 \times 12 \times 8 = 1560 \quad \text{volume of box}$$

$$\frac{1560}{8} = 159 \quad \text{blocks can fit in the box}$$

SCORE POINT: 2

Terrell has a set of 2-inch by 2-inch by 2-inch cubic blocks. He also has a box with inside dimensions of 16 inches by 12 inches by 8 inches. How many blocks will fit into Terrell's box?

$$\begin{array}{l} 2 \times 2 \times 2 \\ 4 \times 2 \\ 8 \text{ in}^2 \end{array}$$

$$16 \times 12 \times 8 = 1536 \text{ in}^2$$

$$\sqrt[8 \text{ in}^2]{1536 \text{ in}^2} = \sqrt[8 \text{ in}^2]{192 \text{ in}^2} = 24 \text{ blocks}$$

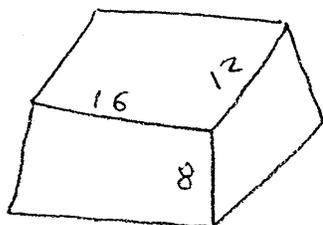
24 blocks will fit into Terrell's
box

$$\frac{1}{8} = \frac{x}{192}$$

$$\begin{array}{l} 8x = 192 \\ \frac{8x}{8} = \frac{192}{8} \\ \textcircled{x = 24} \end{array}$$

SCORE POINT: 2

Terrell has a set of 2-inch by 2-inch by 2-inch cubic blocks. He also has a box with inside dimensions of 16 inches by 12 inches by 8 inches. How many blocks will fit into Terrell's box?



$$\text{Volume} = 16 \times 12 \times 8$$

$$\text{Volume} = 1536$$

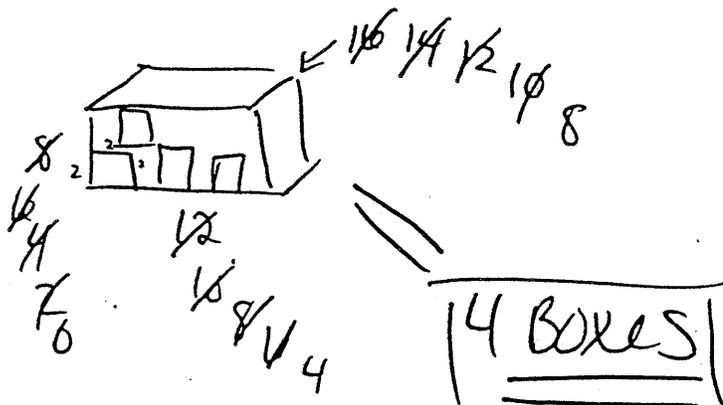
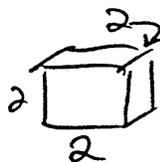
SCORE POINT: 1

Terrell has a set of 2-inch by 2-inch by 2-inch cubic blocks. He also has a box with inside dimensions of 16 inches by 12 inches by 8 inches. How many blocks will fit into Terrell's box?

192

SCORE POINT: 1

Terrell has a set of 2-inch by 2-inch by 2-inch cubic blocks. He also has a box with inside dimensions of 16 inches by 12 inches by 8 inches. How many blocks will fit into Terrell's box?



Score Point: 0

Terrell has a set of 2-inch by 2-inch by 2-inch cubic blocks. He also has a box with inside dimensions of 16 inches by 12 inches by 8 inches. How many blocks will fit into Terrell's box?

$$16 + 12 + 8 = 36$$

$$\frac{36}{2} = 18$$

18 blocks

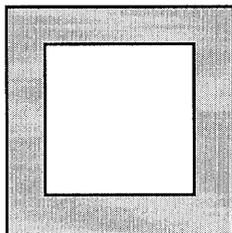
Score Point: 0

COMPONENT 5
MODULE 1

QUESTION 8

TRAINING SET

- 8 In the accompanying diagram, the length of a side of the outer square is 1.5 times the length of a side of the inner square. The perimeter of the inner square is 8 units. What is the area of the shaded region, in square units?



Sample Response:

$$\frac{8}{4} = 2$$

$$1.5 \times 2 = 3$$

$$3^2 = 9$$

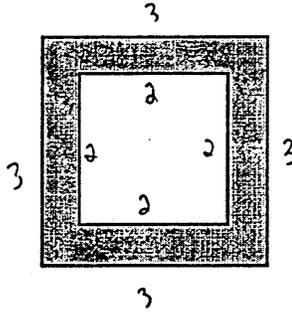
$$2^2 = 4$$

$$9 - 4 = 5$$

Rubric

- [4] 5, and appropriate work is shown, such as the method shown in the sample response.
- [3] Appropriate work is shown, but one computational error is made.
or
- [3] The areas of the outer and the inner squares are determined correctly, but no further work is shown.
- [2] Appropriate work is shown, but more than one computational error is made.
or
- [2] Appropriate work is shown, but one conceptual error is made, such as using 4 as the side of the inner square, but an appropriate answer is determined.
or
- [2] Finds dimensions of both squares correctly, but only finds one area.
- [1] Finds dimensions of both squares correctly.
or
- [1] 5, but no work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

In the accompanying diagram, the length of a side of the outer square is 1.5 times the length of a side of the inner square. The perimeter of the inner square is 8 units. What is the area of the shaded region, in square units?

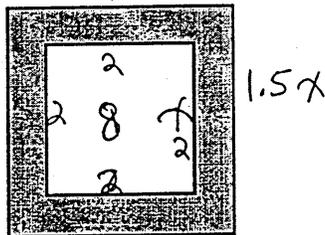


$$8 \cdot 1.5 = \frac{12}{4} = 3$$

$$3^2 - 2^2 = \boxed{5}$$

SCORE POINT: 4

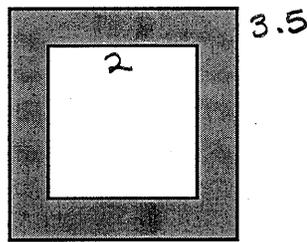
In the accompanying diagram, the length of a side of the outer square is 1.5 times the length of a side of the inner square. The perimeter of the inner square is 8 units. What is the area of the shaded region, in square units?



1. Since the perimeter of the inner ~~side~~ square is 8, the sides are 2. $P = 4 \times 2$ (perimeter of square).
2. The outside side of the square is 3 because it is 1.5 times the inner square side.
 $1.5 \times 2 = 3$.
3. The area of the inner square is 4.
 $L \times W = \text{Area}$
 $(2) \times (2) = 4$.
4. The area of the outer square is 9.
 $L \times W = \text{Area}$
 $(3) \times (3) = 9$.
5. The area of shaded region is 5 because you subtract the area of inner square ~~to~~ of outer square.
 $9 - 4 = 5$

SCORE POINT: 4

In the accompanying diagram, the length of a side of the outer square is 1.5 times the length of a side of the inner square. The perimeter of the inner square is 8 units. What is the area of the shaded region, in square units?



$$2 \times 1.5 = 3.5$$

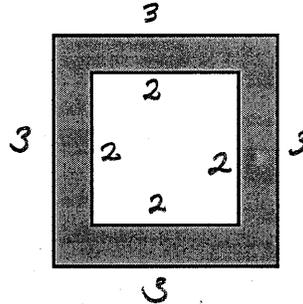
$$A \square = \frac{2^2}{4}$$

$$\text{sq. } A \square = \frac{3.5^2}{4} = 12.25$$

$$12.25 - 4 = 8.25$$

SCORE POINT: 3

In the accompanying diagram, the length of a side of the outer square is 1.5 times the length of a side of the inner square. The perimeter of the inner square is 8 units. What is the area of the shaded region, in square units?



$$\text{Perimeter of inner square} = 8$$

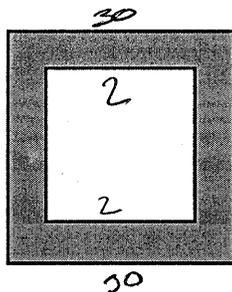
$$8/4 = 2 \text{ each side}$$

$$A = L \times W = 2 \times 2 = 4$$

$$\text{Outer } 1.5 \times 2 = 3 \quad A = 3 \times 3 = 9$$

SCORE POINT:3

In the accompanying diagram, the length of a side of the outer square is 1.5 times the length of a side of the inner square. The perimeter of the inner square is 8 units. What is the area of the shaded region, in square units?



$$\text{PERIMETER} = 8$$

$$8/4 = 2$$

$$2^2 = 4$$

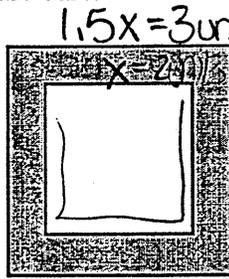
$$30^2 = 90$$

$$2 \times 1.5 = 30 \text{ OUTER SIDE}$$

$$90 - 4 = \underline{\underline{86}}$$

SCORE POINT: 2

In the accompanying diagram, the length of a side of the outer square is 1.5 times the length of a side of the inner square. The perimeter of the inner square is 8 units. What is the area of the shaded region, in square units?

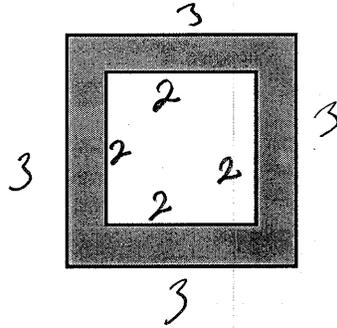


$$P = 8 \text{ units}$$
$$x = 2 \text{ units}$$
$$1.5x = 3 \text{ units}$$

$$A = lw$$
$$A = 3 \times 3$$
$$A = 9$$

SCORE POINT: 2

In the accompanying diagram, the length of a side of the outer square is 1.5 times the length of a side of the inner square. The perimeter of the inner square is 8 units. What is the area of the shaded region, in square units?



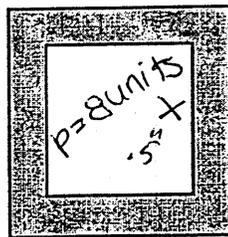
$$\frac{8}{x+x+x+x}$$

$$\frac{8}{4} = 2$$

$$1.5 \times 2 = 3$$

SCORE POINT: 1

In the accompanying diagram, the length of a side of the outer square is 1.5 times the length of a side of the inner square. The perimeter of the inner square is 8 units. What is the area of the shaded region, in square units?



$$1.5 \times X = 0.75$$

$$X = 1.5(X)$$

$$\frac{X}{1.5} = \frac{1.5X}{1.5}$$

$$X = 3.5$$

$$A = LW = 375$$

$$A = 375$$

Score Point: 0

COMPONENT 5
MODULE 1

QUESTION 9

TRAINING SET

- 9 Scientists caught and tagged 600 fish in a lake in April. In May, the scientists caught 800 fish. Of those fish, 10 were previously tagged. The ratio of previously tagged fish to the total number of fish caught in May is the same as the ratio of the number of fish caught and tagged in April to the total number of fish in the lake in April. Approximately how many fish were in the lake in April?

- 9 Scientists caught and tagged 600 fish in a lake in April. In May, the scientists caught 800 fish. Of those fish, 10 were previously tagged. The ratio of previously tagged fish to the total number of fish caught in May is the same as the ratio of the number of fish caught and tagged in April to the total number of fish in the lake in April. Approximately how many fish were in the lake in April?

Sample Response:

$$\frac{600}{t} = \frac{10}{800}$$

$$10t = 480,000$$
$$t = 48,000$$

Rubric:

[4] 48,000 and appropriate work is shown, such as the method shown in the sample response.

[3] Appropriate work is shown, but one computational error is made.

or

[3] Appropriate work is shown, but a total population is not given.

[2] The ratios $\frac{600}{t}$ and $\frac{10}{800}$ are constructed but not developed into a proportion.

or

[2] Appropriate work is shown, but more than one computational error is made.

or

[2] Appropriate work is shown, but a conceptual error is made.

[1] The ratio $\frac{600}{t}$ or $\frac{10}{800}$ is constructed, but no further work is shown.

or

[1] 48,000, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response was obtained by an obviously incorrect procedure.

Scientists caught and tagged 600 fish in a lake in April. In May, the scientists caught 800 fish. Of those fish, 10 were previously tagged. The ratio of previously tagged fish to the total number of fish caught in May is the same as the ratio of the number of fish caught and tagged in April to the total number of fish in the lake in April. Approximately how many fish were in the lake in April?

600 April
800 May 10 previously tagged

$$\frac{10}{800} = \frac{600}{x}$$

$$\frac{10}{800} = \frac{600}{x}$$

$$10x = 480000$$

$$x = 48,000$$

$$48,000 \text{ fish}$$

SCORE POINT: 4

Scientists caught and tagged 600 fish in a lake in April. In May, the scientists caught 800 fish. Of those fish, 10 were previously tagged. The ratio of previously tagged fish to the total number of fish caught in May is the same as the ratio of the number of fish caught and tagged in April to the total number of fish in the lake in April. Approximately how many fish were in the lake in April?

$$\frac{\text{P.T.F. caught in May}}{\text{C \& T in April}} = \frac{\text{fish in lake in April}}{\text{fish in lake in April}}$$

$$\frac{10}{800} = \frac{600}{X}$$

$$\frac{10X}{10} = \frac{480,000}{10}$$

$$X = 48,000$$

There were approximately 48,000 fish in the lake in April.

SCORE POINT: 4

Scientists caught and tagged 600 fish in a lake in April. In May, the scientists caught 800 fish. Of those fish, 10 were previously tagged. The ratio of previously tagged fish to the total number of fish caught in May is the same as the ratio of the number of fish caught and tagged in April to the total number of fish in the lake in April. Approximately how many fish were in the lake in April?

600 tagged April

800 caught May.

out of 800 10 were tagged

790 not tagged

80:10

$$\frac{800}{10} = \frac{x}{600}$$

$$\frac{4800}{10}$$

$$x = 480$$

SCORE POINT: 3

Scientists caught and tagged 600 fish in a lake in April. In May, the scientists caught 800 fish. Of those fish, 10 were previously tagged. The ratio of previously tagged fish to the total number of fish caught in May is the same as the ratio of the number of fish caught and tagged in April to the total number of fish in the lake in April. Approximately how many fish were in the lake in April?

600 is to TAG as 10 is to 800

$$\frac{600}{\text{TAG}} = \frac{10}{800}$$

$$\text{TAG} \times 10 = 600 \times 800$$

SCORE POINT: 3

Scientists caught and tagged 600 fish in a lake in April. In May, the scientists caught 800 fish. Of those fish, 10 were previously tagged. The ratio of previously tagged fish to the total number of fish caught in May is the same as the ratio of the number of fish caught and tagged in April to the total number of fish in the lake in April. Approximately how many fish were in the lake in April?

$$\begin{array}{l}
 600 \longrightarrow \text{tag} \\
 10 \longrightarrow 800
 \end{array}
 \qquad
 \begin{array}{l}
 \longrightarrow 600 / \text{tag} \\
 \longrightarrow 10 / 800
 \end{array}$$

$$\begin{array}{r}
 \text{tag} \times 800 \\
 10 \\
 \hline
 600 \quad \frac{600}{800} \\
 10 \times 800
 \end{array}$$

SCORE POINT: 2

Scientists caught and tagged 600 fish in a lake in April. In May, the scientists caught 800 fish. Of those fish, 10 were previously tagged. The ratio of previously tagged fish to the total number of fish caught in May is the same as the ratio of the number of fish caught and tagged in April to the total number of fish in the lake in April. Approximately how many fish were in the lake in April?

$$\begin{array}{ccc} 600 & \text{---} & 800 \\ \downarrow & & \downarrow \\ T & & 10 \\ \downarrow & & \downarrow \\ \frac{600}{T} & & \frac{10}{800} \end{array}$$

SCORE POINT: 2

Scientists caught and tagged 600 fish in a lake in April. In May, the scientists caught 800 fish. Of those fish, 10 were previously tagged. The ratio of previously tagged fish to the total number of fish caught in May is the same as the ratio of the number of fish caught and tagged in April to the total number of fish in the lake in April. Approximately how many fish were in the lake in April?

$$\frac{\cancel{7.5}}{600} = \frac{\cancel{10}}{800}$$

$$\frac{10}{800} = \frac{700}{56000}$$

56,000 fishes

SCORE POINT: 1

Scientists caught and tagged 600 fish in a lake in April. In May, the scientists caught 800 fish. Of those fish, 10 were previously tagged. The ratio of previously tagged fish to the total number of fish caught in May is the same as the ratio of the number of fish caught and tagged in April to the total number of fish in the lake in April. Approximately how many fish were in the lake in April?

48,000 fish

SCORE POINT: 1

Scientists caught and tagged 600 fish in a lake in April. In May, the scientists caught 800 fish. Of those fish, 10 were previously tagged. The ratio of previously tagged fish to the total number of fish caught in May is the same as the ratio of the number of fish caught and tagged in April to the total number of fish in the lake in April. Approximately how many fish were in the lake in April?

600

10 prev. tagged.

800

800

$100 = 1$

8:1

6:1

Score Point: 0

Scientists caught and tagged 600 fish in a lake in April. In May, the scientists caught 800 fish. Of those fish, 10 were previously tagged. The ratio of previously tagged fish to the total number of fish caught in May is the same as the ratio of the number of fish caught and tagged in April to the total number of fish in the lake in April. Approximately how many fish were in the lake in April?

600 fish tagged in April

800 fish 790 tagged May

-10

600 : _____

800 : 790

April tagged 600

610 fish
were in the lake
in April

tagged

1

600 fish in April

April

tagged

600

May

tagged

790

Score Point: 0