NEW YORK STATE
COMPONENT RETEST

MATHEMATICS A
COMPONENT 6
MODULE 1

WEDNESDAY, MAY 14, 2003

SCORING KEY
AND
RATING GUIDE

Multiple Choice Key

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

Math A Component Retest
May 2003
Component 6, Module 1

Key to Multiple-Choice Questions

(1)	4
(2)	2
(3)	3
(4)	2
(5)	1
(6)	4

Rubric

(7)

[4] $\frac{432}{2,730}$ or an equivalent answer, and appropriate work is shown, such as $\frac{9}{15} \times \frac{6}{14} \times \frac{8}{13}$.

[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] Both the total number of combinations and the number of successful combinations are determined correctly, but no probability is given.

or

[2] Appropriate work is shown, but one conceptual error is made, such as determining the probability with replacement or adding the three correct probabilities.

[1] One conceptual error and one computational error are made.

or

[1] The probability of selecting each color ball is found, but no further correct work is shown.

or

[1] $\frac{432}{2,730}$ or an equivalent answer, 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.

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 There are fifteen balls in a box. Nine are red and six are blue. Ben takes three balls from the box, one at a time, and does not put any of the balls back into the box. What is the probability he chooses a red ball first, a blue ball second, and a red ball third?

$15 = 9 + 6$
total balls in box = red balls + blue balls

$P\begin{pmatrix}\text{red ball first}\\ \text{blue ball second}\\ \text{red ball third}\end{pmatrix} = P(\text{red}) \cdot P(\text{blue}) \cdot P(\text{red})$

$= \frac{9}{15} \cdot \frac{6}{14} \cdot \frac{8}{13}$

$\frac{432}{2730} = \frac{9}{15} \cdot \frac{6}{14} \cdot \frac{8}{13}$

$P\begin{pmatrix}\text{red ball first}\\ \text{blue ball second}\\ \text{red ball third}\end{pmatrix} = \frac{432}{2730}$

SCORE POINT: 4

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]

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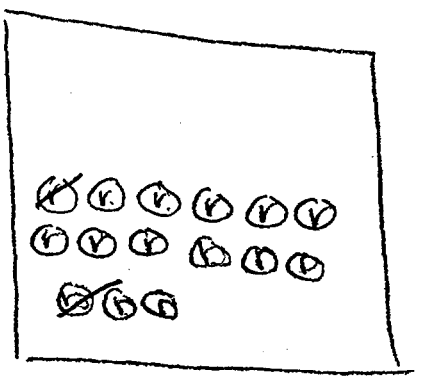


$$\frac{9}{15} \cdot \frac{6}{14} \cdot \frac{8}{13} = \frac{72}{445}$$

SCORE POINT: 3

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 There are fifteen balls in a box. Nine are red and six are blue. Ben takes three balls from the box, one at a time, and does not put any of the balls back into the box. What is the probability he chooses a red ball first, a blue ball second, and a red ball third?

15 bal

R B
9 6

$\frac{9}{15} \cdot \frac{6}{14} \cdot \frac{8}{13} = \frac{23}{230}$

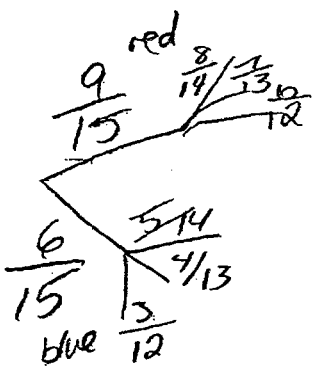
SCORE POINT: 2

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 There are fifteen balls in a box. Nine are red and six are blue. Ben takes three balls from the box, one at a time, and does not put any of the balls back into the box. What is the probability he chooses a red ball first, a blue ball second, and a red ball third?

15 b
9r 6 blue — 3 balls



rb 1st = 8/14
b 2nd = 4/13
rb 3rd = 6/12

multiply

8/14 · 4/13 · 6/12 = 192/2184

of probabi
1

192/2184 is the probability that a red ball is chosen first, a blue ball chosen second, and a red ball thi

ANS.

8/91

SCORE POINT: 1

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 There are fifteen balls in a box. Nine are red and six are blue. Ben takes three balls from the box, one at a time, and does not put any of the balls back into the box. What is the probability he chooses a red ball first, a blue ball second, and a red ball third?

15 balls
9 red
6 blue

$\frac{9}{15}$ $\frac{6}{15}$ $\frac{9}{15} = \frac{24}{15}$

SCORE POINT: 0

Rubric

(8)

[4] 18 and $\frac{12}{18}$, and appropriate work is shown, such as a sample space or tree diagram.

[3] A correct sample space or tree diagram is shown, but the number of all possible combinations is not stated, but the correct probability is stated.

or

[3] 18 and a correct sample space or tree diagram, but only the number of combinations with roast beef or pea soup is stated.

or

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

[2] An incorrect sample space or tree diagram is shown, but an appropriate number of combinations and an appropriate probability are found.

or

[2] 18 and a correct sample space or tree diagram, but no probability or an incorrect probability is found.

or

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

[1] An incomplete sample space or tree diagram is shown, and an appropriate probability is found, but the number of combinations is missing or is incorrect.

or

[1] A correct sample space or tree diagram is shown, but the number of combinations and the probability are not given, or are incorrect.

or

[1] The total number of combinations is found using the counting principle, but no further work is shown.

or

[1] 18 and $\frac{12}{18}$, but no sample space or tree diagram is shown.

[0] 18 *or* $\frac{12}{18}$, but no work is shown.

or

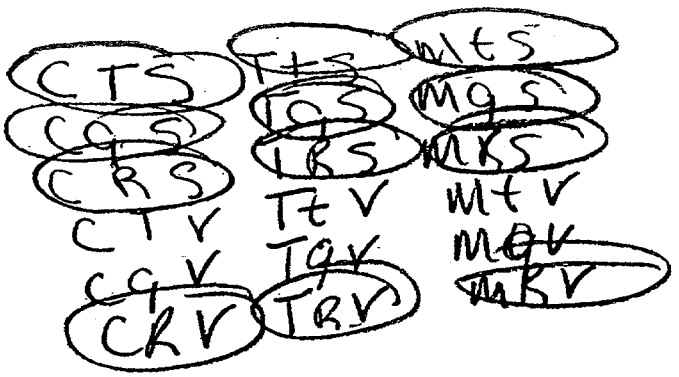
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

8 The lunch special at the local deli consists of a beverage, a sandwich, and a cup of soup for a total of $5.99. The choices are:

Beverage: coffee, tea, milk
Sandwich: tuna fish, grilled cheese, roast beef
Soup: split pea, vegetable

How many different combinations of one beverage, one sandwich, and one cup of soup are possible? Use a sample space or a tree diagram to represent all possible combinations of one beverage, one sandwich, and one cup of soup.

If a customer who is purchasing the luncheon special is randomly selected, what is the probability that the lunch contains a roast beef sandwich or a cup of split pea soup?



18

12/18

SCORE POINT: 4

8 The lunch special at the local deli consists of a beverage, a sandwich, and a cup of soup for a total of $5.99. The choices are:

Beverage: coffee, tea, milk
Sandwich: tuna fish, grilled cheese, roast beef
Soup: split pea, vegetable

How many different combinations of one beverage, one sandwich, and one cup of soup are possible? Use a sample space or a tree diagram to represent all possible combinations of one beverage, one sandwich, and one cup of soup.

If a customer who is purchasing the luncheon special is randomly selected, what is the probability that the lunch contains a roast beef sandwich or a cup of split pea soup?

C, T, Sp
T, T, Sp
M, T, Sp
C, GC, Sp
T, GC, Sp
M, GC, Sp
C, RB, Sp
T, RB, Sp
M, RB, Sp

C, T, V
T, T, V
M, T, V
C, GC, V
T, GC, V
M, GC, V
C, RB, V
T, RB, V
M, RB, V

$\frac{12}{18}$

SCORE POINT: 3

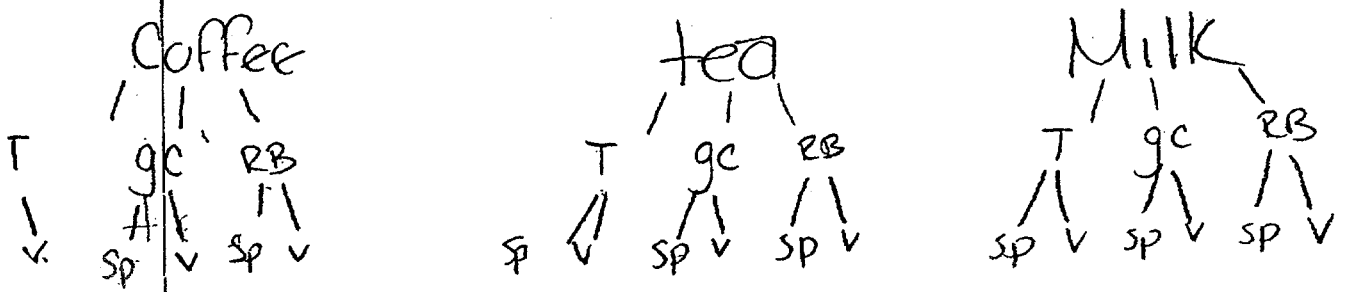
8 The lunch special at the local deli consists of a beverage, a sandwich, and a cup of soup for a total of $5.99. The choices are:

Beverage: coffee, tea, milk
Sandwich: tuna fish, grilled cheese, roast beef
Soup: split pea, vegetable

How many different combinations of one beverage, one sandwich, and one cup of soup are possible? Use a sample space or a tree diagram to represent all possible combinations of one beverage, one sandwich, and one cup of soup.

If a customer who is purchasing the luncheon special is randomly selected, what is the probability that the lunch contains a roast beef sandwich or a cup of split pea soup?

There are 18 combinations of one beverage, one sandwich and one cup of soup



$P = \left(\text{Roast Beef Sandwich}\right) \times P\left(\text{cup of split pea soup}\right)$

$P = \frac{6}{18} \times \frac{9}{18} = \frac{54}{324}$ or $\frac{1}{6}$

The probability of the lunch containg a Roast Beef sandwich of split pea soup is $\frac{54}{324}$

SCORE POINT: 2

8 The lunch special at the local deli consists of a beverage, a sandwich, and a cup of soup for a total of $5.99. The choices are:

Beverage: coffee, tea, milk
Sandwich: tuna fish, grilled cheese, roast beef
Soup: split pea, vegetable

How many different combinations of one beverage, one sandwich, and one cup of soup are possible? Use a sample space or a tree diagram to represent all possible combinations of one beverage, one sandwich, and one cup of soup.

If a customer who is purchasing the luncheon special is randomly selected, what is the probability that the lunch contains a roast beef sandwich or a cup of split pea soup?

C + S
C g S
C r S
+ + S
+ + V

~~C + S~~
~~C g S~~
~~C R S~~ x3
C + V
~~C g V~~
~~C r V~~

18

12/18

4/3

SCORE POINT: 1

8 The lunch special at the local deli consists of a beverage, a sandwich, and a cup of soup for a total of $5.99. The choices are:

Beverage: coffee, tea, milk
Sandwich: tuna fish, grilled cheese, roast beef
Soup: split pea, vegetable

How many different combinations of one beverage, one sandwich, and one cup of soup are possible? Use a sample space or a tree diagram to represent all possible combinations of one beverage, one sandwich, and one cup of soup.

If a customer who is purchasing the luncheon special is randomly selected, what is the probability that the lunch contains a roast beef sandwich or a cup of split pea soup?

24 poss. Combinat.

Coffee < tuna fish – grilled cheese, – roast beef ↑ vegetable
split pea – vegetable

Tea < tuna fish – grilled cheese – roast beef
split pea – vegetable – vegetable

Milk < tuna fish – grilled cheese – roast beef
split pea – vegetable – vegetable

$2/8 = 1/4$

SCORE POINT: 0

Rubric

(9)

[4] 12 nickels, 18 dimes, and 24 quarters, and appropriate work is shown, such as $\frac{1}{3} = \frac{x+6}{4x+6}$ or trial and error with at least three trials and appropriate checks.

[3] Appropriate work is shown, but only the number of coins for the variable is found.

or

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

[2] One conceptual error is made, but the resulting equation is solved appropriately, and the number each type of coin is found.

or

[2] A correct equation is written, but no further correct work is shown.

or

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

or

[2] The trial-and-error method is used to find a correct solution, but only two trials and appropriate checks are shown.

[1] The coins are appropriately defined in terms of a single variable, such as n, $d = n + 6$, $q = 2n$, but no further work is shown.

or

[1] 12 nickels, 18 dimes, and 24 quarters, but no work or only one trial with an appropriate check 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.

9 A jar contains nickels, dimes, and quarters. The number of quarters is twice the number of nickels, and the number of dimes is six more than the number of nickels. The probability that a coin chosen at random from the jar is a dime is $\frac{1}{3}$. How many coins of each type are in the jar?

let x = nickels
$2x$ = quarters
$x+6$ = dimes

$$\frac{x+6}{x+2x+x+6} = \frac{1}{3}$$

$$3(x+6) = x+2x+x+6$$

$$3x+18 = 4x+6$$
$$-3x \quad -6 \quad -3x \quad -6$$

$$12 = x$$

There are 12 nickels, 24 quarters, & 18 dimes.

SCORE POINT: 4

9 A jar contains nickels, dimes, and quarters. The number of quarters is twice the number of nickels, and the number of dimes is six more than the number of nickels. The probability that a coin chosen at random from the jar is a dime is $\frac{1}{3}$. How many coins of each type are in the jar?

$x =$ nickels

$2x =$ quarters

$x+6 =$ dimes

$3x+18 =$ total coins

12 nickels
24 quarters
18 nickels

$x + 2x + x + 6 = 3x + 18$

$4x + 6 = 3x + 18$

$-6 \quad -6$

$4x = 3x + 12$

$-3x \quad -3x$

$x = 12$

SCORE POINT: 3

9 A jar contains nickels, dimes, and quarters. The number of quarters is twice the number of nickels, and the number of dimes is six more than the number of nickels. The probability that a coin chosen at random from the jar is a dime is $\frac{1}{3}$. How many coins of each type are in the jar?

Let quarters = $2x \rightarrow 12-2x$
Let nickels = $x \rightarrow 6-x$
Let dimes = $6+x \rightarrow 12-x$

$2x + x = 6 + x$
$-2x \quad\quad -2x$
$x = 6 - x$

$2(6-x)$
$12-2x$

$6-x$

$6+6x$
$12-x$

SCORE POINT: 1

9 A jar contains nickels, dimes, and quarters. The number of quarters is twice the number of nickels, and the number of dimes is six more than the number of nickels. The probability that a coin chosen at random from the jar is a dime is $\frac{1}{3}$. How many coins of each type are in the jar?

quarters - $2x$
nickels - x
dimes - $6x$ - $\frac{1}{3}$

$$\frac{x}{9} = \frac{1}{3}$$

$$\frac{3x}{3} = \frac{9x}{3}$$

$$x = 3$$

$6 \times 3 = 18$

6 quarters
3 nickels =
18 - dimes

SCORE POINT: 0