Nevada
DEPARTMENT
OF
EDUCATION

GRADE
7

Nevada

Instructional Materials

FOR THE

Criterion Referenced Test

Grade 7

MATHEMATICS

JAMES W. GUTHRIE
Superintendent of
Public Instruction

RORIE FITZPATRICK
Deputy Superintendent
Instructional, Research, and
Evaluative Services

DEBORAH CUNNINGHAM
Deputy Superintendent
Administrative and
Fiscal Services

STATE OF NEVADA

DEPARTMENT OF EDUCATION
700 E. Fifth Street
Carson City, Nevada 89701-5096
(775) 687-9217 · Fax: (775) 687-9101
www.doe.nv.gov

TEACHER LICENSURE
SOUTHERN NEVADA OFFICE
9890 S. Maryland Parkway
Suite 221
Las Vegas, Nevada 89183
(702) 486-6458
Fax: (702) 486-6450

SATELLITE OFFICE
ADDRESSES/MAPS
http://www.doe.nv.gov

Dear Educators,

The following materials, developed as a collaborative effort between the Nevada Department of Education and WestEd, a nonprofit research, development, and service agency, are designed to be used as part of a guided instructional activity to support student performance on items aligned to the Common Core Standards.

We have provided p-values (the proportion of students who got the item correct) for the multiple-choice items that were field tested in the 2011-2012 administration. The p-values indicate how students performed on the items. In addition, we are providing the percentage of students selecting each response option. The p-values, combined with the item-level percentages by response option, provide valuable data to the field as to what types of errors students are making. For mathematics, no p-value is reported if that item did not appear on the field test. In mathematics, some field test items have been used as a model to mirror the content being assessed and therefore the p-values are based on the field test version of the item and not the actual item as it appears in these materials. These items are indicated by an asterisk. To further understanding of constructed-response items, scoring guides and annotated student examples have been included.

While these materials can provide students with practice in answering assessment items, we believe it is critical that these materials be used to help students understand the elements of the state assessment and guide them in the use of effective strategies that will support their ability to comprehend and take a variety of assessments. If you choose, however, to use these support documents solely as a practice activity, we highly recommend that you go back over each item with students and investigate each response to better understand their knowledge of the assessment.

Vocabulary Knowledge
The Nevada Department of Education believes that students are not thoroughly being taught the content vocabulary of the Nevada Mathematics Content Standards. For example, equation, expression, coordinate, function, histogram, analyze, and justify are terms used in the assessments at grade-appropriate levels.

Students in Nevada, therefore, must have repeated experiences with **speaking, listening**, **reading**, and **writing** the vocabulary of the standards. Students should be able to use the vocabulary of the standards when they are engaged in classroom discussion, read them in assessments, and effectively use the vocabulary in their writing.

Types of Questions and Support Documents
The mathematics assessment includes two types of questions—multiple-choice questions for all grades (3 – 8 and high school) and constructed-response questions for grades 4 – 8.

To help prepare students for constructed-response questions, we have provided you with:

1. the student checklist (included in the student test booklet at grades 4 and 5)
2. the general student rubric (included in the student test booklet at grades 6 – 8)
3. item-specific rubrics
4. annotated student work

With the use of these materials, students can become familiar with the different types of questions used on the state and future assessments. They can learn to use the checklist or rubric to determine if they have answered the constructed-response questions completely. Familiarity with the tools provided as part of the assessment and the vocabulary of the standards can result in less anxiety on the part of students and teachers. (Please note that the student checklist and general rubric can be on the walls of your classroom throughout the school year. As you assign constructed-response questions, students can use these tools as they develop their answers.)

Depth of Knowledge (DOK) Levels - In addition to measuring a broad spectrum of mathematics content domains, the types of questions included in these instructional materials allow for the assessment of different levels of cognitive complexity. The Nevada Proficiency Examination Program in mathematics includes items to assess three Depth of Knowledge levels. These DOK levels are based on descriptions developed by Dr. Norman Webb and adapted for Nevada's mathematics assessments. We suggest that you engage students in question writing so they not only can recognize these levels of complexity, but can begin to formulate them as well. The following are the three DOK levels used on Nevada's mathematics assessments:

> **DOK Level 1: Recall** - Level 1 requires the recall of facts or use of basic skills. A level 1 item consists of literal recall from text, paraphrasing, or simple understanding of a single word or phrase. A level 1 item may require a simple connection between sentences, which may be considered a very basic inference.
>
> **DOK Level 2: Use of Concepts and Skills** - Level 2 requires comprehension and mental processing of text or portions of text. A level 2 item includes the engagement of some mental processing beyond recalling or reproducing a response. A level 2 item requires the application of skills and concepts. Some important concepts are covered but not in a deeply complex way.
>
> **DOK Level 3: Strategic Thinking and Problem Solving** - Level 3 requires abstract reasoning, critical thinking, and/or the application of abstract concepts to new situations.

We hope that interaction with these instructional support materials will lead to lowered anxiety and better understanding of the assessment task that is being presented to students. If you have questions about the mathematics materials or how to embed this information into your curriculum, please contact Tracy Gruber at tgruber@doe.nv.gov.

Cindy Sharp
Nevada Department of Education

Name: _____

Mathematics
Grade 7

This booklet contains mathematics questions for you to answer. There are two types of questions in this booklet. For the multiple-choice questions, you will be given four answer choices—A, B, C, and D. You are to choose the correct answer from the four choices. Each question has only one right answer. The written-response question requires you to give a written response to a question as indicated in the booklet. You will be given a separate sheet of paper to answer this question.

You may use the rubric below to help you do a good job when you are answering the written-response question.

Score	Expectation
Full Credit	Your response addresses all parts of the question clearly and correctly. You use and label the proper math terms in your answer. Your response shows all the steps you took to solve the problem.
Partial Credit	Your response addresses most parts of the question correctly. Your response does not show all of your work or does not completely explain the steps you took to solve the problem.
Minimal Credit	Your response addresses only one part of the question correctly and explains the steps you took to solve that one part. In answering the remaining parts of the question, your response is incomplete or incorrect. Your response does not show all of your work or does not explain all of the steps you took to solve the problem.
No Credit	Your response is incorrect.

1 Jeff sold one case of ice cream bars and one case of fruit bars.

- He sold $\frac{1}{6}$ of a case of ice cream bars every $\frac{2}{3}$ hour.
- He sold $\frac{1}{6}$ of a case of fruit bars every $\frac{1}{2}$ hour.

How much **more** time did it take Jeff to sell one case of ice cream bars than one case of fruit bars?

A $\frac{1}{12}$ hour

B $\frac{1}{6}$ hour

C 1 hour

D $1\frac{1}{3}$ hours

2 The table below shows the distances between different pairs of cities on a map and the actual distances between those cities.

Distance Between Cities

Distance on Map (in)	Actual Distance (mi)
3.5	11.2
8.75	28
10.25	32.8
15	48

What is the constant of proportionality that relates the distance between a pair of cities on the map to the actual distance between those cities?

A 2.2
B 2.5
C 3.2
D 7.7

3 Evie buys a coat that is marked down by 30% from the original price. After the markdown, the sale price of Evie's coat is $56.00 . What was the original price of the coat before the markdown?

A $72.80
B $80.00
C $86.00
D $95.20

Go On

4 Divide:

$$\left(-\frac{2}{7}\right) \div \left(\frac{3}{5}\right)$$

A $-\frac{10}{21}$

B $-\frac{6}{35}$

C $\frac{6}{35}$

D $\frac{10}{21}$

5 Evaluate:

$$\left[7 + 0.25\left(-\frac{2}{3} \bullet -15\right)\right] - \frac{1}{2}$$

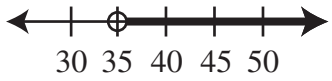
A -103
B 4
C 9
D 72

6 Clay will sell smoothies at a festival for $2 each. He pays $20 for frozen fruit and cups. The inequality below represents all of the numbers of smoothies (n) Clay could sell to earn a profit of more than $50 .

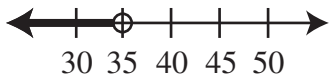
$$2n - 20 > 50$$

Which graph represents all of the numbers of smoothies Clay could sell to earn a profit of more than $50 ?

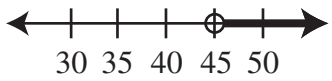
A



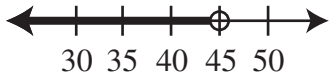
B



C

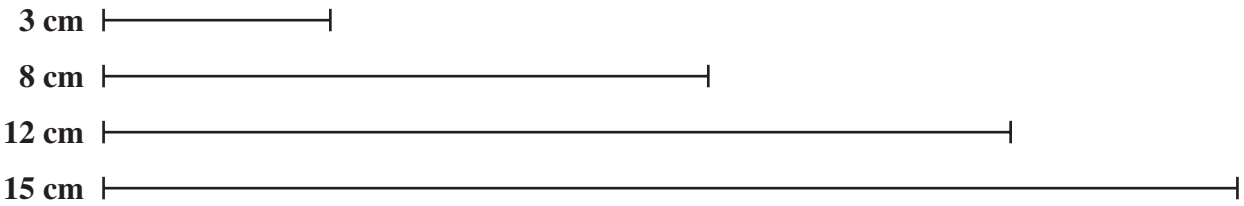


D



Go On

7 Four line segments and their lengths are shown below.



Three of the line segments will be used to form a triangle. Which lists all of the possible groups of the lengths of the line segments that could be used to form a triangle?

A 3 cm 12 cm 15 cm

B 8 cm 12 cm 15 cm

C 3 cm 8 cm 12 cm
3 cm 8 cm 15 cm

D 3 cm 8 cm 12 cm
3 cm 8 cm 15 cm
3 cm 12 cm 15 cm
8 cm 12 cm 15 cm

8 A 2-dimensional shape is created when a plane slices through a rectangular prism, as described below.

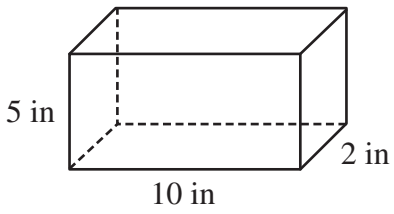
- The plane passes through two vertices on the top face of the prism and one vertex on the bottom face of the prism.
- The plane is **not** perpendicular to the bottom face of the prism.

Which of these could be the 2-dimensional shape created by the slice?

A rectangle
B rhombus
C trapezoid
D triangle

Go On

9 Brenda will paint the outside of a wooden box. The box is in the shape of a rectangular prism, as shown below.



She will not paint the bottom face of the box on which the box is sitting. What percent of the total surface area of the box will Brenda paint?

A 87.5%
B 85.7%
C 80%
D 75%

10 There are 9 boys and 7 girls in Mr. Langley's math class. Mr. Langley randomly selects a student to solve a problem on the board. A student can be selected more than once to solve a problem. The table below shows the number of times boys and girls have been selected to solve problems on the board so far.

Problem Solving

Group	Number of Times Selected
Boys	𝍸
Girls	𝍸 |

Mr. Langley randomly selects a student to solve the next problem. Which statement about the theoretical and experimental probabilities of a girl being selected to solve the next problem is true?

A The theoretical and experimental probabilities of a girl being selected to solve the next problem are equal.
B The theoretical and experimental probabilities of a girl being selected to solve the next problem have a sum of 1 .
C The theoretical probability of a girl being selected to solve the next problem is greater than the experimental probability of a girl being selected to solve the next problem.
D The theoretical probability of a girl being selected to solve the next problem is less than the experimental probability of a girl being selected to solve the next problem.

Go On

Write your answer to Question 11 on a separate sheet of paper. Be sure to answer Parts A and B.

11 Theo opens a savings account at each of two different banks.

- At bank A, he deposits $400 in an account that earns 5% simple interest.
- At bank B, he deposits $300 in an account that also earns simple interest.

Theo does not deposit any additional money or withdraw any money from the two savings accounts.

A After 1 year, Theo's bank B account has earned $4 more interest than his bank A account. What is the interest rate Theo's bank B account earns? Show your work.

B Theo keeps his money in these accounts until the total amount in each account is the same. What is the total amount in each account when the two amounts are the same? Show your work or explain your thinking.

Go On

You may want to go back and check your answers or answer questions you did not complete.

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Appendix I

Scoring Support Materials

Grade 7

MATHEMATICS

Correct Answers for Multiple-Choice Items

Item Level Data

Item Number	Strand	DOK	P-value
1	3	2	0.26
2*	3	2	0.30
3	3	2	0.24
4*	1	1	0.39
5*	1	1	0.35
6*	2	2	0.38
7	4	2	0.24
8*	4	2	0.30
9	3	2	0.19
10	5	2	0.30

P-value is the proportion of students who got the item correct

*This is an item that was developed for these Instructional Materials, and it mirrors content assessed from an item field tested in the 2011-2012 test administration. The p-value and percentages reported here are based on the p-value and percentages of the item from the 2011-2012 field test.

Percentage of Students Selecting a Given Response

A	B	C	D
15%	41%	26% ✓	18%
14%	28%	30% ✓	27%
34%	24% ✓	32%	10%
39% ✓	26%	16%	18%
20%	18%	35% ✓	26%
38% ✓	16%	35%	11%
11%	24% ✓	23%	41%
25%	16%	28%	30% ✓
19% ✓	25%	38%	18%
14%	25%	30%	30% ✓

✓ = Correct Answer

Detailed objectives for Content Standards and Depth of Knowledge (DOK) descriptions can be found on the Nevada Department of Education web site.

Version 2 #50 **I-Ref #:** **WE: Y12_MA2910** **Rpt Cat(s): 3.7.4**
Date: 1/24/12 **CCCS: 7.RP.3**

Score	Description
3	Student scores 3 points.
2	Student scores 2–2.5 points.
1	Student scores 0.5–1.5 points.
0	Student's response provides insufficient evidence of appropriate skills or knowledge to successfully accomplish the task.
Blank	No student response.

Score Points

Part A:	score 1.0 point	correct answer with correct and complete work
	OR	
	score 0.5 point	correct answer with incomplete work **OR** correct answer with no work **OR** incorrect answer due to calculation error (work must be shown) **OR** some correct procedure
Part B:	score 2.0 points	correct answer with correct and complete work or explanation
	OR	
	score 1.5 points	correct answer with incomplete work or explanation
	OR	
	score 1.0 point	correct answer with no work or explanation **OR** incorrect answer due to calculation error (work must be shown)
	OR	
	score 0.5 point	some correct procedure **OR** vague explanation only

Note: A student who does not label the total cost in **Part B** as dollars ($) cannot score a 3.

Version 2 #50 **I-Ref #:** **WE: Y12_MA2910** **Rpt Cat(s): 3.7.4**
Date: 1/24/12 **CCCS: 7.RP.3**

Correct Answers

Part A: 8%

At bank A Theo earns \$20 in interest since:

$I = Prt$

$I = 400(0.05)(1)$ **or** $400 \bullet 0.05 = 20$

$I = 20$

At bank B he earns \$4 more, or \$24. His interest rate at bank B is 8% since:

$I = Prt$

$24 = 300r(1)$

$\frac{24}{300} = r$ **or** $\frac{24}{300} = 0.08$

$0.08 = r$

or equivalent work

Part B: \$900

Determine the total number of years until the amount is the same in each account.

$400 + 400(0.05)n = 300 + 300(0.08)n$

$400 + 20n = 300 + 24n$

$100 = 4n$

$25 = n$

Then determine the amount in each account after 25 years.

$400 + 400(0.05)(25) = 400 + 500 = 900$

$300 + 300(0.08)(25) = 300 + 600 = 900$

OR

Theo deposited \$100 more in account A. Account B earns \$4 more interest each year.

$100 \div 4 = 25$

Determine the amount that will be in each account after 25 years.

$300 + 300(0.08)(25) = 300 + 600 = 900$

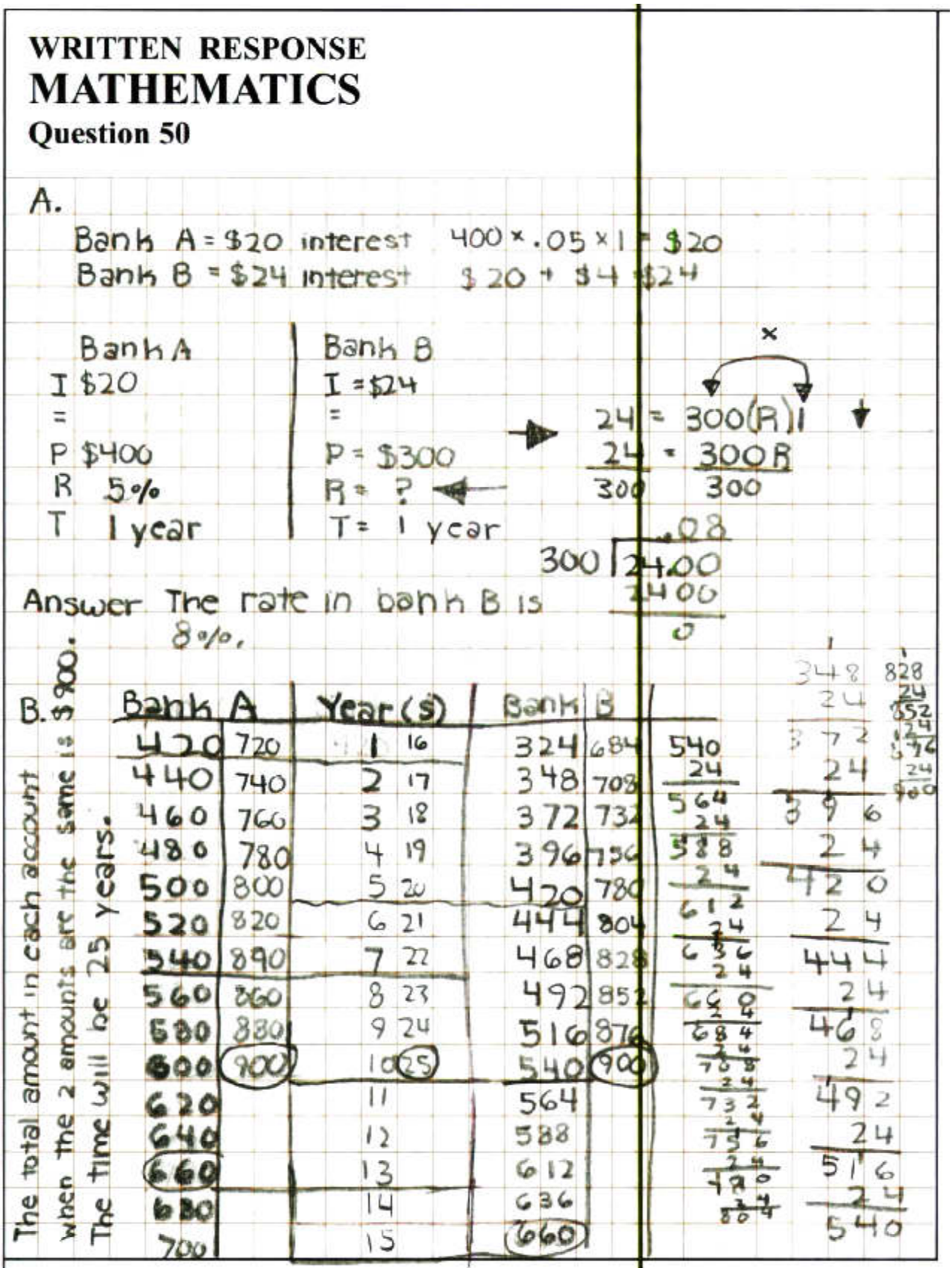
$400 + 400(0.05)(25) = 400 + 500 = 900$

Student Response Examples by Score Point

WRITTEN RESPONSE

MATHEMATICS

Question 50



Score Point: 3

The response to Part A includes a correct answer and complete work (1.0). The response to Part B includes a correct answer and complete work/explanation (2.0).

WRITTEN RESPONSE

MATHEMATICS

Question 50

Part A: → Theo has 2 bank accounts, one with $400 in it (A), and earning 5% simple interest, and another account (B) with $300 in it, earning interest at an unknown rate. After 1 year, Account B has earned $4 more interest then account A. I have to find the rate of simple interest for account B.

To find the rate of interest, I first have to find how much interest account A is making.

I = interest, P = principal, R = rate, T = time

I = PRT

400 × .05 × 1

$20.00

Now after I multiply $400(P) with .05(R) with 1(T), I get $20.00. So because account B has $4 more, it has been making $24. So to find the rate, I just sub 24 in for (I) and find (R). 24 = 300(R)(1)

24 = 300(R)×1

24 = 300R

$R = \frac{24}{300}$ → 0.08

300 | 24→0→0

2400

0

After I simplified the equation to $R = \frac{24}{300}$, I just divided. I got 0.08, which is 8%, my rate for account B.

Part B: To find when both accounts will have the same amount of money, I will write an equation to find how many years it will take. The equation is (400+20T=300+24T) 20T and 24T is the interest per year on each account. Then I solve the equation.

I find it will take 25 years. Then I solve using T=25. I get that when the accounts are equal, they will have $900 each.

400+20T = 300+24T

−20 −20

400 = 300+4T

100 = 4T

T = 25

Score Point: 3

The response to Part A includes a correct answer and complete work (1.0). The response to Part B includes a correct answer and complete work/explanation (2.0).

WRITTEN RESPONSE
MATHEMATICS
Question 50

A. The interest rate of Bank B is 8% interest.

(400)(.05)(1)
(400)(.05)=20
400+20=420

(300)(x)(1)
(300)(x)
(x)=108

300 × .08 = 2400

300 × 1 = 300

I=24

Bank A I=20
400 × 1 = 400
400 × .05 = 2000

Bank B I=24

8 / 1

B. Bank B increase $24 a year
Bank A increase $20 a year

Bank B (300)(.08)(25)

300 × 25 = 1500
6000
7500

1
7500 × .08 = 6000.00

300 + 600 = 900

Bank A (400)(.05)(25)

400 × 25 = 2000
8000
10000

400 + 500 = 900

10000 × .05 = 5000.00

It would take 25 years for the reasons. One reason is that the gap is 100 dollars and only Bank B increase by 4 more dollar than Bank A and 4 goes into 100 25 times so it would take 25 years to get the $100 dollar gap closes. This is why the x will be the same for 25 years.

Score Point: 2
The response to Part A includes a correct answer with incomplete work (0.5). The response to Part B includes a correct answer and complete work/explanation (2.0).

WRITTEN RESPONSE
MATHEMATICS
Question 50 Solve

Explain

400 × .05 = 2000 — $20 in A

300 × 8 = 2400 — 24 × 1 [8%] — $24 in B

1. First I figured out that the first bank account earned 20 dollars over one year. 2. Then I started multipling the other bank account until I got to 8. This interest rate got 4 more dollars than the first one.

Part B:

120 160
420 660
600 500
300 + 400
900 900

25 years

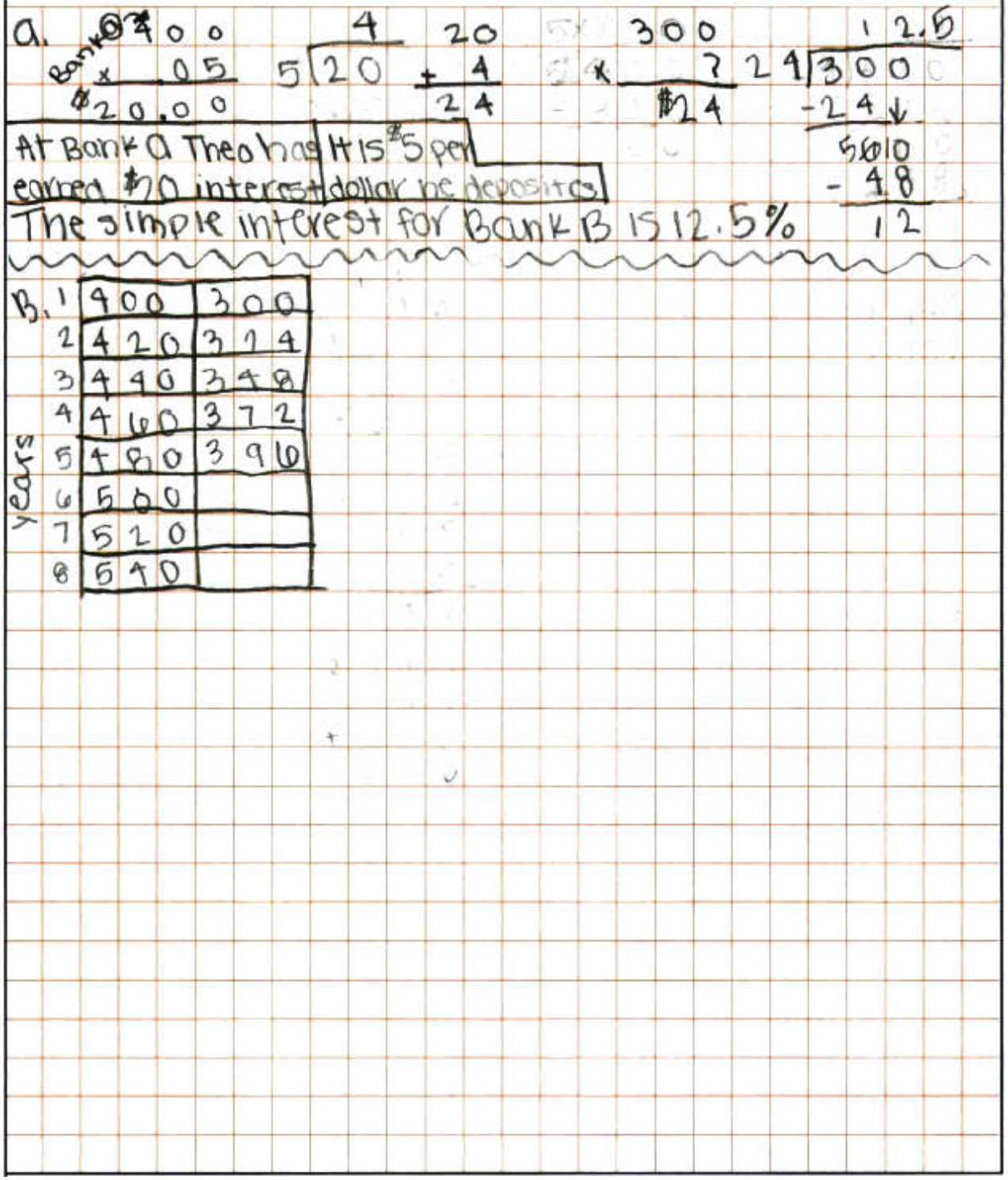
It will take 25 years for the accounts to be the same.

Score Point: 2
The response to Part A includes a correct answer with incomplete work (0.5). The response to Part B includes a correct answer with incomplete work/explanation (1.5).

WRITTEN RESPONSE

MATHEMATICS

Question 50



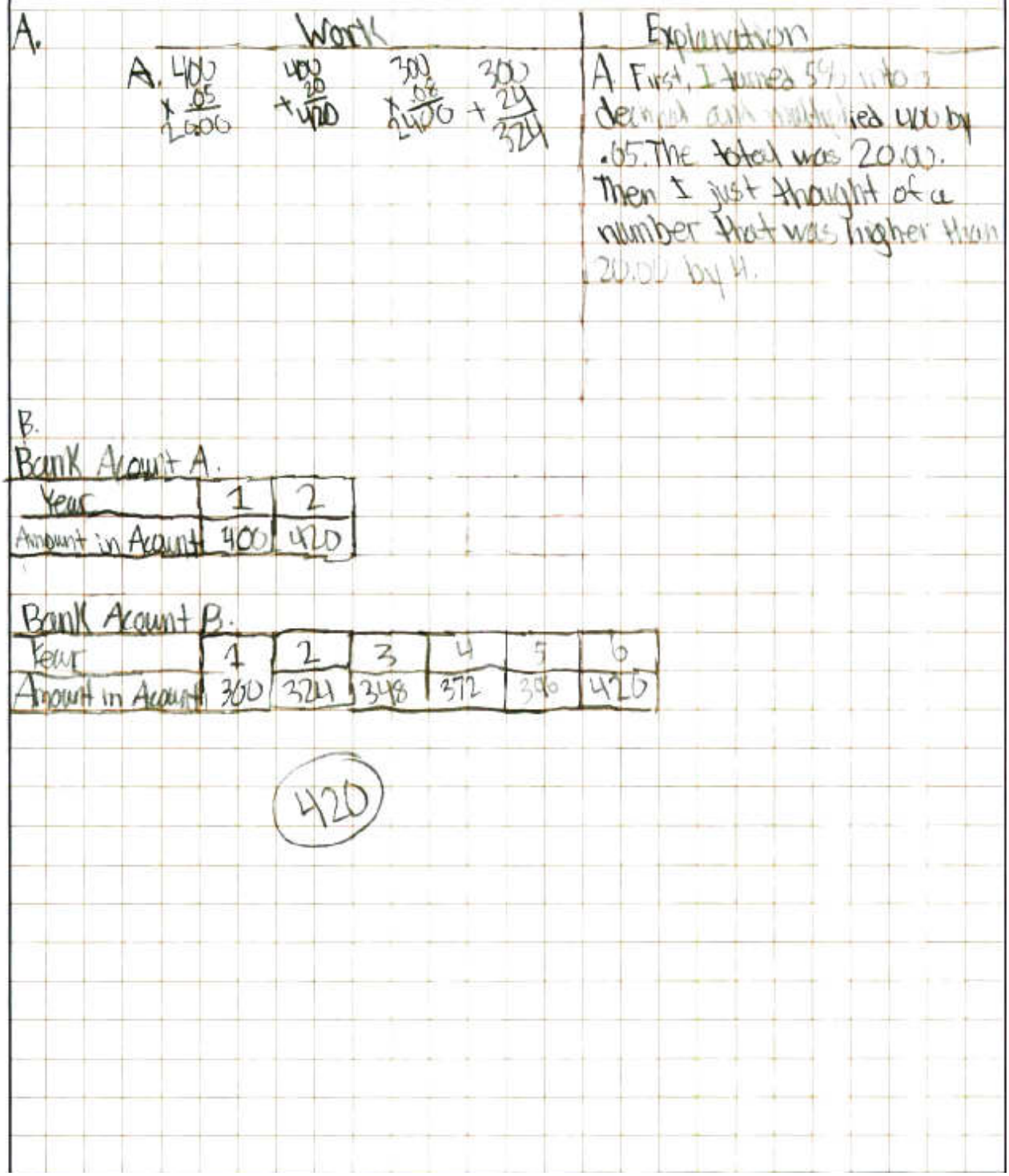
Score Point: 1

The response to Part A includes an incorrect answer but shows some correct procedure (0.5). The response to Part B includes no answer but shows some correct procedure (0.5).

WRITTEN RESPONSE

MATHEMATICS

Question 50



Score Point: 1
The response to Part A includes a correct answer with incomplete work (0.5).
The response to Part B includes an incorrect answer (0).

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Appendix II

Administrative Support Materials

Grade 7

MATHEMATICS

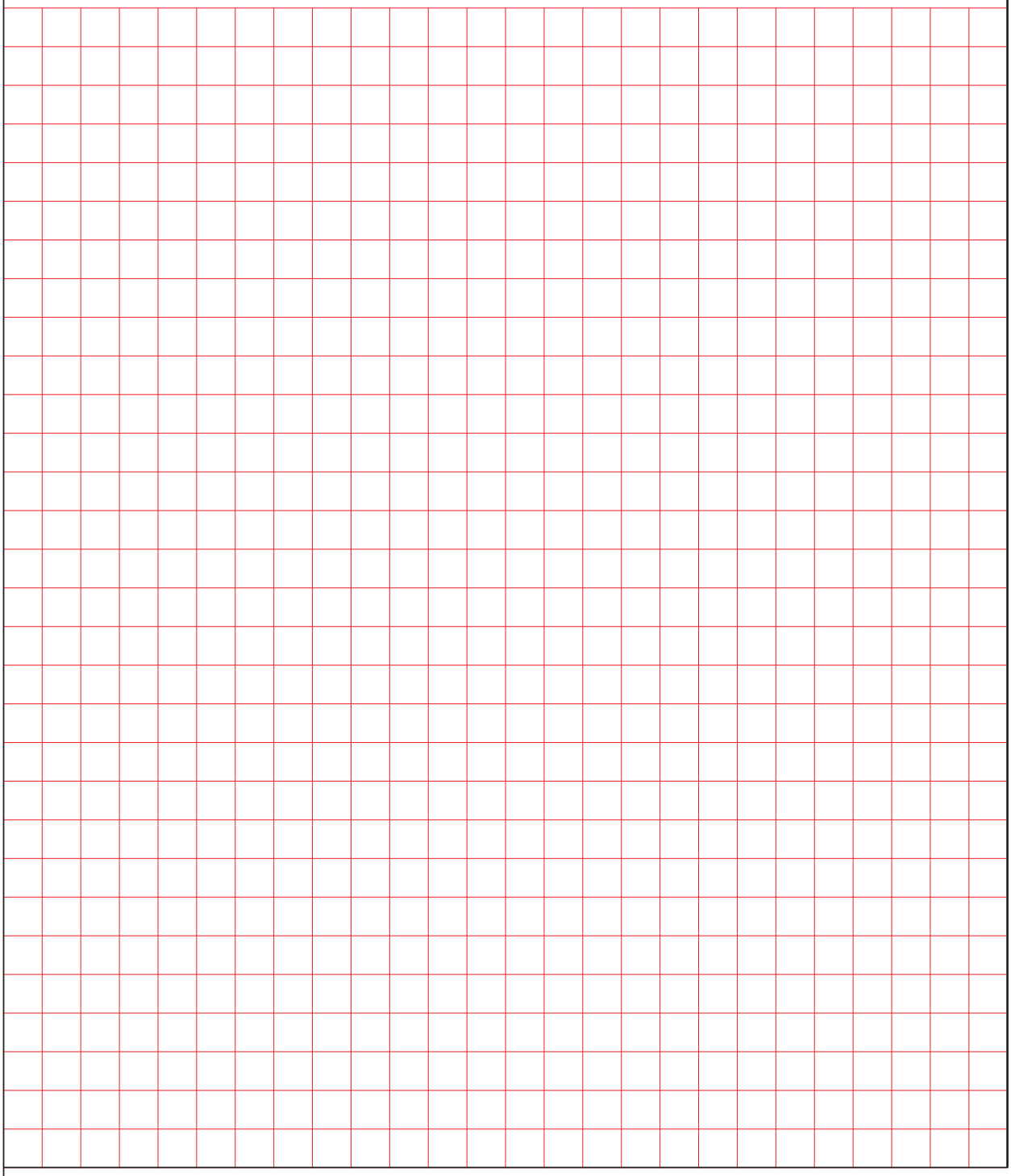
Name: _____

Answer Document

Mathematics

1.	Ⓐ Ⓑ Ⓒ Ⓓ
2.	Ⓐ Ⓑ Ⓒ Ⓓ
3.	Ⓐ Ⓑ Ⓒ Ⓓ
4.	Ⓐ Ⓑ Ⓒ Ⓓ
5.	Ⓐ Ⓑ Ⓒ Ⓓ
6.	Ⓐ Ⓑ Ⓒ Ⓓ
7.	Ⓐ Ⓑ Ⓒ Ⓓ
8.	Ⓐ Ⓑ Ⓒ Ⓓ
9.	Ⓐ Ⓑ Ⓒ Ⓓ
10.	Ⓐ Ⓑ Ⓒ Ⓓ
11.	Written Response

WRITTEN RESPONSE
MATHEMATICS



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WRITTEN RESPONSE
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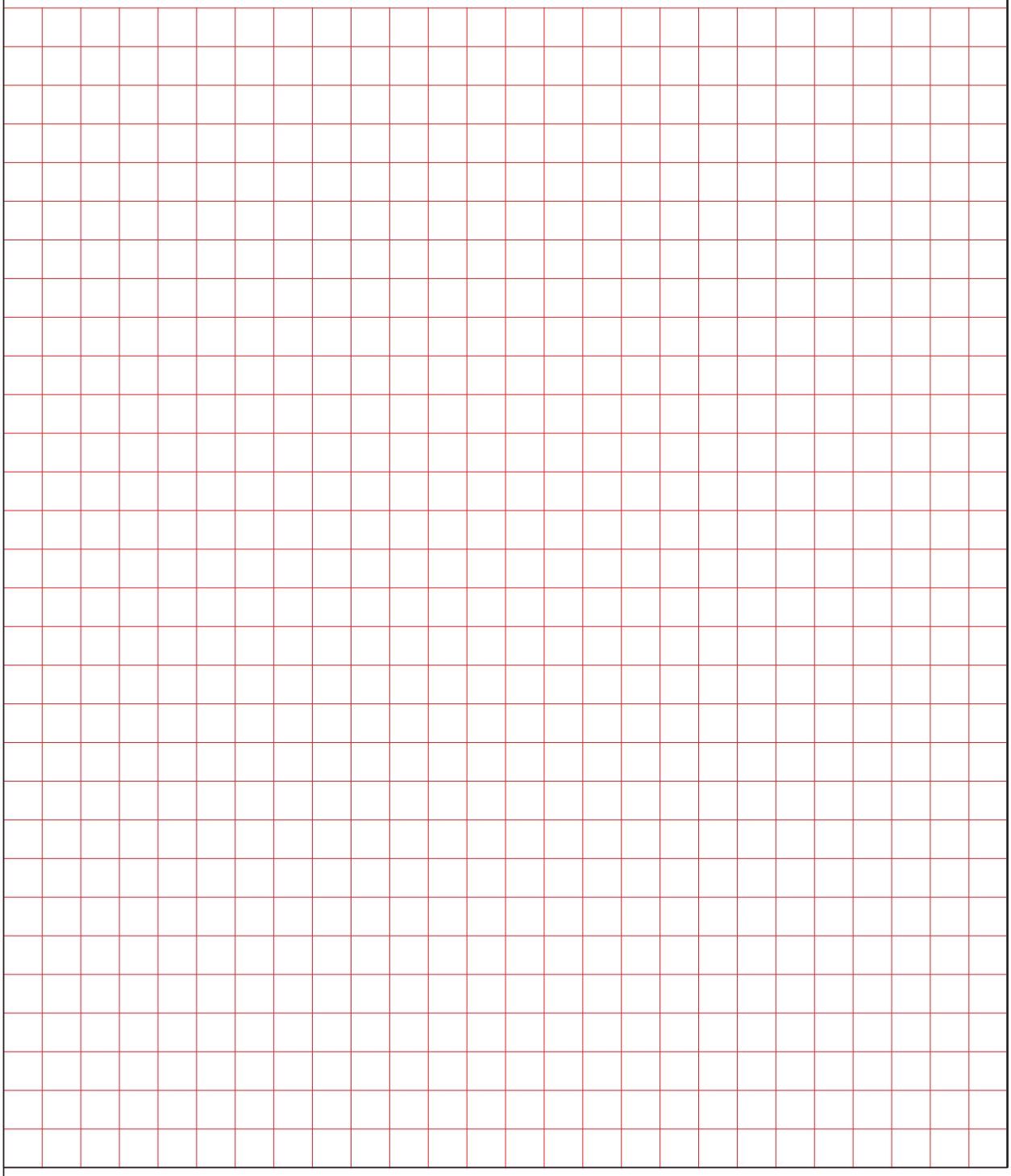

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MATHEMATICS

DO NOT WRITE IN THIS SPACE

DO NOT WRITE IN THIS SPACE STOP

Nevada Department of Education

GRADE

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James W. Guthrie
Superintendent of Public Instruction

Office of Assessment, Program Accountability, and Curriculum
775-687-9188

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