

8th Grade Open Response Analyzing Decimal Quotients

KY Academic Expectation 1.5: Students use mathematical ideas and procedures to communicate, reason, and solve problems.

KY Academic Expectation 2.8: Students understand various mathematical procedures and use them appropriately and accurately.

KY Core Content: Skills--Students will perform the following mathematical operations and/or procedures accurately and efficiently, and explain how they work in real-world and mathematical situations:

MA-M-1.2.1 divide rational numbers (decimals);

MA-M-1.2.2 compute large and small quantities and check for reasonable and appropriate computational results.

- a) Find the quotient for each division problem below. Round to the thousandths place, when necessary.
- b) **Classify** the quotients by marking an X in *only one* of the appropriate columns on the right (*Between 0 and 1 or Greater Than 1*).

Dividend	/	Divisor	=	Quotient	Quotient Between 0 and 1	Quotient Greater Than 1
0.47	/	1.3	=			
0.39	/	0.48	=			
0.06	/	0.15	=			
0.423	/	0.56	=			
0.089	/	0.0123	=			
0.72	/	0.46	=			
0.918	/	0.38	=			
0.716	/	0.522	=			

- c) **Evaluate** the number sentences to **determine** a rule for finding quotients between 0 and 1. **Compare** the dividend and divisor and write a true statement telling how you can *always* expect to get a quotient between 0 and 1.
- d) **Evaluate** the number sentences to **determine** a rule for finding quotients greater than 1. **Compare** the dividend and divisor and write a true statement telling how you can *always* expect to get a quotient greater than 1.
- e) Do your rules written above only apply to dividends and divisors with decimals? Or, do the rules also apply to positive whole number dividends and divisors? Give examples to **justify** your answer.

Name _____

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- a) Find the quotient for each division problem below. Round to the thousandths when necessary.
- b) **Classify** the quotients by marking an X in *only one* of the appropriate columns on the right (*Between 0 and 1* or *Greater Than 1*).

Dividend	/	Divisor	=	Quotient	Quotient Between 0 and 1	Quotient Greater Than 1
0.47	/	1.3	=			
0.39	/	0.48	=			
0.06	/	0.15	=			
0.423	/	0.56	=			
0.089	/	0.0123	=			
0.72	/	0.46	=			
0.918	/	0.38	=			
0.716	/	0.522	=			

- c) **Evaluate** the number sentences to **determine** a rule for finding quotients between 0 and 1. **Compare** the dividend and divisor and write a true statement telling how you can *always* expect to get a quotient between 0 and 1.
- d) **Evaluate** the number sentences to **determine** a rule for finding quotients greater than 1. **Compare** the dividend and divisor and write a true statement telling how you can *always* expect to get a quotient greater than 1.
- e) Do your rules written above only apply to dividends and divisors with decimals?
Or, do the rules also apply to positive whole number dividends and divisors?
Give examples to **justify** your answer.

**Rubric for
8th Grade Open Response
Analyzing Decimal Quotients**

The final score is the sum of all the points earned as stipulated below.

Part	Points	Answer
a)	0.5	Student finds at least 7 correct quotients, rounded to the thousandths place, where applicable.
b)	0.5	Student makes at least 7 correct classification marks in the chart.
c)	1	Student states that a quotient between 0 and 1 occurs whenever the dividend is less than the divisor.
d)	1	Student states that a quotient greater than 1 occurs whenever the dividend is greater than the divisor.
e)	0.5	Student states that the rules written in parts c) and d) also apply to positive whole number dividends and divisors.
	0.5	Student gives numerical examples to justify answer e).

8th Grade Open Response
Analyzing Decimal Quotients
Distinguished Response Example

- a) Find the quotient for each division problem below. Round to the thousandths place, if necessary.
- b) **Classify** the quotients by marking an X in *only one* of the appropriate columns on the right (*Between 0 and 1 or Greater Than 1*).

Dividend	/	Divisor	=	Quotient	Quotient Between 0 and 1	Quotient Greater Than 1
0.47	/	1.3	=	0.36	X	
0.39	/	0.48	=	0.813	X	
0.06	/	0.15	=	0.4	X	
0.423	/	0.56	=	0.755	X	
0.089	/	0.0123	=	7.236		X
0.72	/	0.46	=	1.565		X
0.918	/	0.38	=	2.416		X
0.716	/	0.522	=	1.372		X

- c) **Evaluate** the number sentences to **determine** a rule for finding quotients between 0 and 1. **Compare** the dividend and divisor and write a true statement telling how you can *always* expect to get a quotient between 0 and 1.

To find quotients between 0 and 1 you have to have a dividend that is less than the divisor. This makes sense, because if you use the measurement model, you are dividing something up into groups of bigger size than what you started with. Therefore you would end up with less than 1 whole amount in each group.

- d) **Evaluate** the number sentences to **determine** a rule for finding quotients greater than 1. **Compare** the dividend and divisor and write a true statement telling how you can *always* expect to get a quotient greater than 1.

To find quotients greater than 1 you have to have a dividend that is greater than the divisor.

- e) **Do your rules written above only apply to dividends and divisors with decimals? Or, do the rules also apply to positive whole number dividends and divisors? Give examples to justify your answer.**

If you think about the problem 2 divided by 6 = $1/3$ or .33, you can see that any time you use positive numbers and your dividend is less than the divisor you will get a quotient between 0 and 1. On the other hand, if you use positive whole numbers, but the dividend is *greater* than the divisor, you would get a quotient greater than 1. An example of this rule using whole numbers is: 6 divided by 2 = 3. In this case, the measurement model shows that you can take some amount and divide it into groups having a size less than what you started with, which would give you more than one group.