Assessing Your Assessment Practices: Do They Measure Up to Support Student Learning?

Diane J. Briars, President
National Council of Teachers of Mathematics
dbriars@nctm.org

2014 Indianapolis Regional Conference and Exposition
October 31, 2014

Teaching and Learning Beliefs Survey

SD = Strongly Disagree   **D** = Disagree   **A** = Agree   **SA** = Strongly Agree

Belief	SD	D	A	SA
1. Assessment is something that is done *to* students.				
2. Stopping teaching to review and take practice tests improves students' performance on high-stakes tests.				
3. The primary purpose of assessment is to inform and improve the teaching and learning of mathematics.				
4. Multiple data sources are needed to provide an accurate picture of teacher and student performance.				
5. Assessment is a process that should help students become better judges of their own work, assist them in recognizing high-quality work when they produce it, and support them in using evidence to advance their own learning.				
6. The primary purpose of assessment is accountability for students through report card marks or grades				
7. A single assessment can provide adequate data for making important decisions about students and teachers.				
8. Classroom assessment consists of tests and quizzes that occur after instruction.				
9. Mathematical understanding and processes can be measured through the use of a variety of assessment strategies and tasks.				
10. Ongoing review and distributed practice within effective instruction are productive test preparation strategies.				
11. Assessment is an ongoing process that is embedded in instruction to support student learning and make adjustments to instruction.				
12. Only multiple-choice and other "objective" paper-and-pencil tests can measure mathematical knowledge reliably and accurately.				

PARCC Elementary Prototype and Sample Tasks

Grade 3: Fluency

Click on all the equations that are true.

- [ ] 8 x 9 = 81
- [ ] 54 ÷ 9 = 24 ÷ 6
- [ ] 7 x 5 = 25
- [ ] 8 x 3 = 4 x 6
- [ ] 49 ÷ 7 = 56 ÷ 8

Grade 4: Deer in the Park

Write your answers to the following problem in your answer booklet

The perimeter of the rectangular state park shown is 42 miles.
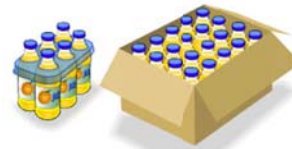
State Park

8 miles

A ranger estimates that there are 9 deer in each square miles of the park.

If this estimate is correct, how many total deer are in the park? Explain your answer using numbers, symbols, and words.

Grade 4: Ordering Juice Drinks

Julian makes and sells juice drinks. The juice drinks are sold in six-packs and boxes.

A six-pack has 6 juice drinks and costs $2.
A box has 20 juice drinks and costs $7.

The Friendly Corner Store placed this order:

24 juice drinks packaged in six-packs
200 juice drinks packaged in boxes

Fill in the blanks to complete the order receipt.

| Order receipt		
	Number of packages	Total cost
Six-packs		$[ ].00
Boxes		$[ ].00
	Total	$[ ].00

Grade 5: Mr. Edmund's Pencil Box

Mr. Edmunds shared 12 pencils among his four sons as follows:

- A an received $\frac{1}{3}$ of the pencils.
- B ll received $\frac{1}{4}$ of the pencils.
- Carl received more than 1 pencil.
- David received more pencils than Carl.

Part A
On the number line, represent the fraction of the total number of pencils that was given to both Alan and Bill combined. Use the button s on the right to increase or decrease the number of equal sections on the number line.

0 ——————————— 1

More Tick Marks

Fewer Tick Marks
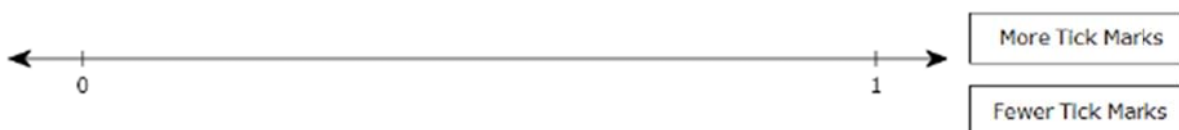
Part B
What fraction of the total number of pencils did Carl and David **each** receive? Justify your answer.

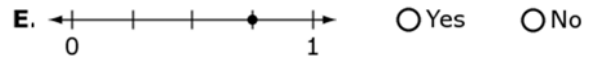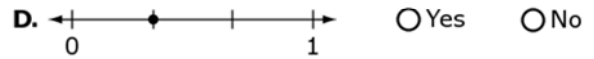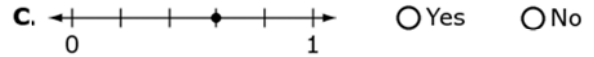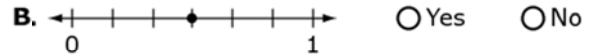# SBAC Prototype Elementary Assessment Tasks

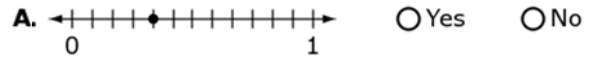## Grade 3: Fractions 1

43044

Look at point *P* on the number line.

P

0   1

Look at number lines A – E. Is the point on each number line equal to the number shown by *P*? Choose Yes or No.

A. 0 ——— 1   ○ Yes   ○ No

B. 0 ——— 1   ○ Yes   ○ No

C. 0 ——— 1   ○ Yes   ○ No

D. 0 ——— 1   ○ Yes   ○ No

E. 0 ——— 1   ○ Yes   ○ No

Grade 4: Fractions 2a

43328

Jared is testing how much weight a bag can hold. He plans to put juice bottles into three bags. He wants each bag to have a total weight within the given range.

- Drag juice bottles into each bag so that the weight is within the given range.

- Leave the bag empty if the given range is not possible using juice bottles.

$3\frac{5}{8}$ lb

Delete ✖

Between 6 lb and 7 lb   **Between 10 lb and 11 lb**   **Between 14 lb and 15 lb**

Grade 4: Fractions 2b

43051

Five friends ordered 3 large sandwiches.

James ate $\frac{3}{4}$ of a sandwich.

Katya ate $\frac{1}{4}$ of a sandwich.

Ramon ate $\frac{3}{4}$ of a sandwich.

Sienna ate $\frac{2}{4}$ of a sandwich.

How much sandwich is left for Oscar?

1	2	3
4	5	6
7	8	9
0	.	/

Grade 4: Rectangle 2

43023

A rectangle is 6 feet long and has a perimeter of $20\frac{1}{3}$ feet.

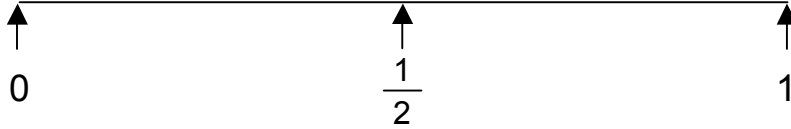What is width of this rectangle? Explain how you solved this problem.

Fractions

This problem gives you the chance to:
• show the position of fractions on a number line
• compare the sizes of fractions

Here is a number line.

$$0 \qquad\qquad \frac{1}{2} \qquad\qquad 1$$

1. Mark the position of the two fractions $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

2. Explain how you decided where to place $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

_____

_____

_____

3. Which of the two fractions, $\frac{2}{3}$ or $\frac{2}{5}$, is nearer to $\frac{1}{2}$? _____

   Explain how you figured it out.

_____

_____

_____

_____

6

Fved Fractions

Fractions

This problem gives you the chance to:
• show the position of fractions on a number line
• compare the sizes of fractions

T1

$\frac{2}{-15} \quad \frac{15}{-\frac{12}{3}}$

$\boxed{\frac{1}{2}=\frac{5}{30}} \quad \boxed{\frac{2}{5}=\frac{12}{30}} \quad \frac{2}{3}=\frac{20}{30}$

Here is a number line.

0     $\frac{2}{5}$ $\frac{1}{2}$ $\frac{2}{3}$ 1

1. Mark the position of the two fractions $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

2. Explain how you decided where to place $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

I divided the line into $\frac{3}{3}$'s and where the second line was was where I put the $\frac{2}{3}$'s mark. Then I did the same for the $\frac{2}{5}$'s.

3. Which of the two fractions, $\frac{2}{3}$ or $\frac{2}{5}$, is nearer to $\frac{1}{2}$? $\frac{2}{5}$

Explain how you figured it out.

I found a denomenator that 3,5,and 2 could go into evenly and that number was 30. $\frac{1}{2}=\frac{5}{30}$, $\frac{2}{5}=\frac{12}{30}$, $\frac{2}{3}=\frac{20}{30}$. Then I did $\frac{15}{30}-\frac{12}{30}=\frac{3}{30}$, next I did $\frac{20}{30}-\frac{15}{30}=\frac{5}{30}$. The difference $\frac{3}{30}$ is smaller than $\frac{5}{30}$ and the smaller number means it is closer to $\frac{1}{2}$ which = $\frac{5}{30}$.
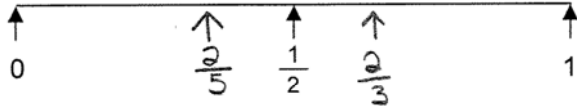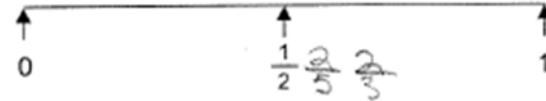

Fractions

This problem gives you the chance to:
• show the position of fractions on a number line
• compare the sizes of fractions

T3

Here is a number line.

0      $\frac{1}{2}$ $\frac{2}{5}$ $\frac{2}{3}$ 1

1. Mark the position of the two fractions $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

2. Explain how you decided where to place $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

Because looks like more than to me. And the both are bigger than

3. Which of the two fractions, $\frac{2}{3}$ or $\frac{2}{5}$, is nearer to $\frac{1}{2}$? $\frac{2}{5}$

Explain how you figured it out.

Because if someone cut a pie into 5th's and you took 2 pices would be smaller than if you could take 2 pices out of 3. And the smaller one would go next to 1/2 since 1/2 is smaller than both fractions.

Fractions

L

This problem gives you the chance to:
- show the position of fractions on a number line
- compare the sizes of fractions

Here is a number line.
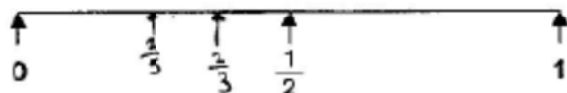
1. Mark the position of the two fractions $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

2. Explain how you decided where to place $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

   I decided to put it there because $\frac{2}{3}$ and $\frac{2}{5}$ are both smaller than $\frac{1}{2}$. Of course, I didn't put it too close to the zero, for other fractions go there.

3. Which of the two fractions, $\frac{2}{3}$ or $\frac{2}{5}$, is nearer to $\frac{1}{2}$? ___$\frac{2}{5}$ is nearer.___

   Explain how you figured it out.

   If the denominator is smaller, the bigger it is. $\frac{2}{3}$'s denominator is smaller than $\frac{2}{5}$'s, so it is bigger.

$\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{5}$

Fractions

S1

This problem gives you the chance to:
- show the position of fractions on a number line
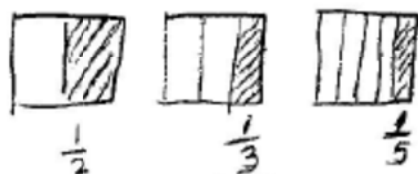- compare the sizes of fractions

Here is a number line.
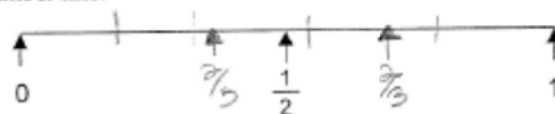
1. Mark the position of the two fractions $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

2. Explain how you decided where to place $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

   I divided the line into 3rd's first then took the 2/3's line and then I divided it into 5th's and then took the 2/5's line mark.

3. Which of the two fractions, $\frac{2}{3}$ or $\frac{2}{5}$, is nearer to $\frac{1}{2}$? __2/5__

   Explain how you figured it out.

   I used the common denominator and then I took the one that was closer to half of the common denominator, 30

$\frac{2}{3}$ $\frac{2}{5}$ $\frac{20}{30}$

$\frac{?}{30}$

Fractions

This problem gives you the chance to:
- show the position of fractions on a number line
- compare the sizes of fractions

S2

Here is a number line.

1. Mark the position of the two fractions $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

2. Explain how you decided where to place $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

   I knew that 2/3 is more than half and that 2/5 is less than half.

3. Which of the two fractions, $\frac{2}{3}$ or $\frac{2}{5}$, is nearer to $\frac{1}{2}$? __2/3__

   Explain how you figured it out.

   Because 2/3 is 6 6½ or something like that

Fractions

This problem gives you the chance to:
- show the position of fractions on a number line
- compare the sizes of fractions

N

Here is a number line.

1. Mark the position of the two fractions $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

2. Explain how you decided where to place $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

   I knew where to put it because 2 is bigger than 1.

3. Which of the two fractions, $\frac{2}{3}$ or $\frac{2}{5}$, is nearer to $\frac{1}{2}$? __2/2__
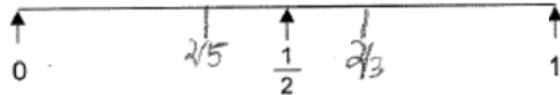
   Explain how you figured it out.

   3 is smaller than 5.

Fractions

This problem gives you the chance to:
• show the position of fractions on a number line
• compare the sizes of fractions

Here is a number line.

0    $\frac{2}{5}$ $\frac{1}{2}$ $\frac{2}{3}$ 1

1. Mark the position of the two fractions $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

2. Explain how you decided where to place $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

   $\frac{2}{5}$ is less than half and 2/3 is more

3. Which of the two fractions, $\frac{2}{3}$ or $\frac{2}{5}$, is nearer to $\frac{1}{2}$? $\frac{2}{5}$
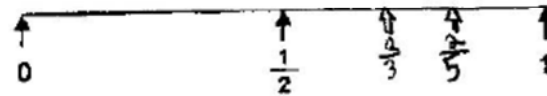
Explain how you figured it out.

   I divided the line in thirds and fifths and then mesured the length

Fractions

This problem gives you the chance to:
• show the position of fractions on a number line
• compare the sizes of fractions

Here is a number line.

0   2/5 $\frac{1}{2}$ 2/3   1

1. Mark the position of the two fractions $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

2. Explain how you decided where to place $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

   I divided the line 1st into 3 parts. I marked at the end of 2/3. I did the same with 2/5, Except divided into 5parts

3. Which of the two fractions, $\frac{2}{3}$ or $\frac{2}{5}$, is nearer to $\frac{1}{2}$? _____

Explain how you figured it out.

   2/5 I drew one big rectangle and divided it into 3 horizontal parts. In each smaller rectangle I divided it into 2,3,and 5 parts, I shade ½ 2/3 and 2/5 2/5 was closer to ½ than 2/3 was.
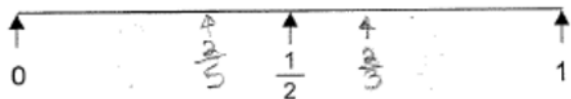
Fractions

This problem gives you the chance to:
• show the position of fractions on a number line
• compare the sizes of fractions

Here is a number line.

1. Mark the position of the two fractions $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

2. Explain how you decided where to place $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

   Well $\frac{2}{3}$ is almost a whole or past a half and so I put that near 1, and $\frac{2}{5}$ is not a half so I put that right near $\frac{1}{2}$.

3. Which of the two fractions, $\frac{2}{3}$ or $\frac{2}{5}$, is nearer to $\frac{1}{2}$? They an equal distance

   Explain how you figured it out.

   They are an equal distance because $\frac{2}{2}$ that is half and $\frac{1}{2}{3}$ that is half, so they are an equal distance to one-half.

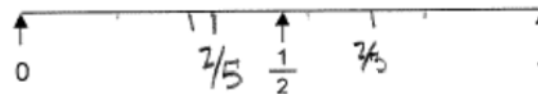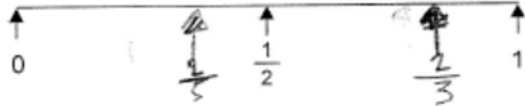
Fractions

This problem gives you the chance to:
• show the position of fractions on a number line
• compare the sizes of fractions

Here is a number line.

1. Mark the position of the two fractions $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

2. Explain how you decided where to place $\frac{2}{3}$ and $\frac{2}{5}$ on the number line.

   For $\frac{2}{3}$ I divided the line in 3 and put $\frac{2}{3}$ at the en of the second third. For $\frac{2}{5}$ I divided $0-\frac{1}{2}$ in fifths and put $\frac{2}{5}$ at .4 since

3. Which of the two fractions, $\frac{2}{3}$ or $\frac{2}{5}$, is nearer to $\frac{1}{2}$? $\frac{2}{5}$

   Explain how you figured it out.

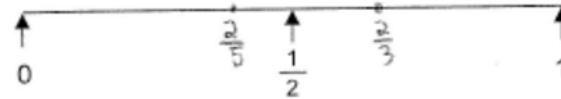   because if you conver the fractions into percents $\frac{2}{5}$ is 40% and $\frac{2}{3}$ is 66.6 percent. 40 is closer to 50 than 66 is.

PARCC Middle Grades Prototype and Sample Tasks

Grade 7: TV Sales

A store is advertising a sale with 10% off all items in the store. Sales tax is 5%.

Part A
A 32-inch television is regularly priced at $295.00. What is the total price of the television, including sales tax, if it was purchased on sale? Fill in the blank to complete the sentence. Round your answer to the nearest cent.

<p style="text-align:center">The total cost of the television is $_____.</p>

Part B

Adam and Brandi are customers discussing how the discount and tax will be calculated.

Here is Adam's process for finding the total cost for any item in the store.

- Take 10% off the original price.
- Then, add the sales tax to the discounted price.

Adam represents his process as:

$$T = 0.9p + 0.05(0.9p)$$
$$\underbrace{\text{sale price}} + \underbrace{\text{sales tax}}$$

Here is Brandi's process for finding the total cost for any item in the store.

- Determine the original price of the item, including sales tax.
- Then, take 10% off.

Brandi represents her process as:

$$T = 1.05p - 0.10(1.05p)$$
$$\underbrace{\substack{\text{T.V. price} \\ \text{plus tax}}} - \underbrace{\substack{10\% \text{ off} \\ \text{discount}}}$$

In both equations, T represents the total cost of the television and p represents the regular price.

Are they both correct? Use the properties of operations to justify your answer.

Grade 7: Proportional Relationships

Part A

Each row of the table identifies a line containing a pair of points. Indicate whether each line represents a proportional relationship between x and y.

You may use the graphing tool by selecting two points. The line containing the two points will be automatically drawn. You can reset the tool by clicking "Start Over".

Be sure to indicate whether each line represents a proportional relationship or not by selecting the appropriate box in the table.

Line	Proportional Relationship	Not a Proportional Relationship
Line 1 containing (1,3) and (2,3)		
Line 2 containing (1,2) and (2, 4)		
Line 3 containing (3,1) and (6, 2)		
Line 4 containing (0,2) and (5,4)		
Line 5 containing (4,4) and (5,5)		
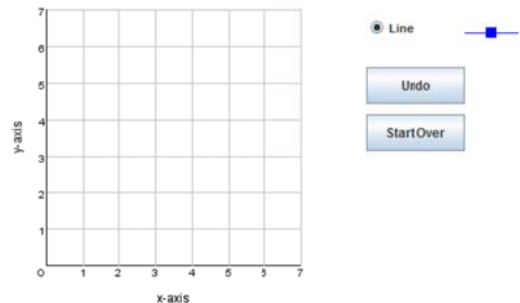
Part B

For the lines in Part A that do not represent a proportional relationship, explain why they do not.

For *each line* in Part A that does not represent a proportional relationship, describe how you would change the coordinates of one of the two given points on the line to create a proportional relationship.

SBAC Middle Grades Sample Tasks

Grade 6: Sandbags 1	Grade 6: Sandbags 2
43026	**43027**
Jamal is filling bags with sand. All of the bags are the same size. Each bag must weigh less than 50 pounds. One sand bag weighs 57 pounds and another sand bag weighs 41 pounds. Explain whether Jamal can pour sand from one bag into the other so that the weight of each bag is less than 50 pounds.	Claire is filling bags with sand. All the bags are the same size. Each bag must weigh less than 50 pounds. One sand bag weighs 58 pounds, another sand bag weighs 41 pounds, and another sand bag weighs 53 pounds. Explain whether Claire can pour sand between sand bags so that the weight of each bag is less than 50 pounds.

Grade 6: Expressions 1	Grade 7: Integer Expressions
43047	**42960**

Grade 6: Expressions 1

43047

Look at each expression. Is it equivalent to
$36x + 24y$?

Select Yes or No for expressions A – C.

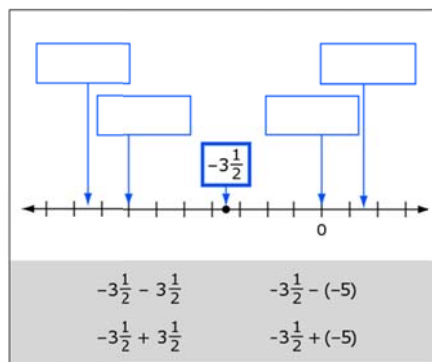**A.** $6(6x + 4y)$ ○ Yes   ○ No

B. $30(6x - 6y)$ ○ Yes   ○ No

C. $12(x + 2y + 2x)$ ○ Yes   ○ No

Grade 7: Integer Expressions

42960

The point on the number line shows the location of $-3\frac{1}{2}$.

Move each expression into a box to show its correct location on the number line.

$-3\frac{1}{2} - 3\frac{1}{2}$ $-3\frac{1}{2} - (-5)$

$-3\frac{1}{2} + 3\frac{1}{2}$ $-3\frac{1}{2} + (-5)$

Grade 7: Calculator

42933

42961

Different states have different sales tax rates. Three states have online calculators to compute sales tax on a purchase. Use the following steps to match each calculator with the correct state.

- Select Calculator A, B, or C.
- Enter a purchase price.
- Then select "Find Sales Tax" to compute the sales tax for that purchase price.

You may use the calculators as many times as you need to solve the problem to the right.

Different states and their sales tax rates are shown.

Drag each calculator into the correct row to show which state can use it to calculate sales tax.

Select a Calculator
○ Calculator A
○ Calculator B
○ Calculator C

Purchase Price

[ ]

Find Sales Tax

Calculator	Purchase Price	Sales Tax

	State	Sales Tax Rate	Calculator
Calculator A	Illinois	6.250%	
	Indiana	7.000%	
Calculator B	Kansas	6.300%	
	Maine	5.000%	
Calculator C	Maryland	6.000%	
	Minnesota	6.875%	

Cereal

This problem gives you the chance to:
- use ratios in context

Here is some information on the side of two boxes of cereal.

Tasty Oats

12 grams of protein in 100 grams of cereal

Cornbits

5 grams of protein in 45 grams of cereal

1. How many grams of Tasty Oats cereal will give you 9 grams of protein?

_____ grams

Show your work.

2. Which cereal, Tasty Oats or Cornbits, has the higher ratio of protein?

_____

Explain how you figured it out.

_____

_____

_____

_____

_____

_____

7

Here is some information on the side of two boxes of cereal.

> ## Tasty Oats
> 12 grams of protein in 100 grams of cereal

> ## Cornbits
> 5 grams of protein in 45 grams of cereal

1. How many grams of Tasty Oats cereal will give you 9 grams of protein? ___75___ grams

   Show your work.

   $12/100 = 8.\overline{33}$

   $9 * 8.\overline{33} = 75$

2. Which cereal, Tasty Oats or Cornbits, has the higher ratio of protein? ___Tasty oats___

   Explain how you figured it out.

   Tasty Oats is $\frac{12}{100}$ and Cornbits is $\frac{5}{45}$. So Tasty oats is $\frac{12}{100} = .12$ and Cornbits is $\frac{5}{45} = .11$ and .12 is higher then .11

Here is some information on the side of two boxes of cereal.

> ## Tasty Oats
> 12 grams of protein in 100 grams of cereal

> ## Cornbits
> 5 grams of protein in 45 grams of cereal

1. How many grams of Tasty Oats cereal will give you 9 grams of protein? ___89___ grams

   Show your work.

   $100 \div 9 = 11.\overline{1}$

   $100 - 11.1 = 88.\overline{89}$

2. Which cereal, Tasty Oats or Cornbits, has the higher ratio of protein? ___Cornbits___

   Explain how you figured it out.

   I figured this out because $100 \div 12$ is $8.\overline{3}$ and $45 \div 5$ is 9, and 9 is higher than 8.3.

Here is some information on the side of two boxes of cereal.

Tasty Oats

12 grams of protein in 100 grams of cereal

Cornbits

5 grams of protein in 45 grams of cereal

1. How many grams of Tasty Oats cereal will give you 9 grams of protein? _75_ grams

Show your work.

$12\overline{)100}$ 1 gram of protein = 8⅓ grams cereal

2. Which cereal, Tasty Oats or Cornbits, has the higher ratio of protein? _Cornbits_

Explain how you figured it out.

Cornbits has a Ratio of 9 While Tasty Oats only has 8⅓. I figured This out by dividing the grams of cereal by grams of protein, Then took the higher one.

Here is some information on the side of two boxes of cereal.

Tasty Oats

12 grams of protein in 100 grams of cereal

Cornbits

5 grams of protein in 45 grams of cereal

1. How many grams of Tasty Oats cereal will give you 9 grams of protein? _75_ grams

Show your work.

$100 \div 12 = 8.\overline{3}$

$8.\overline{3} \times 9 = 75g$

$100 \div 12 \cdot 9 = 75g$

2. Which cereal, Tasty Oats or Cornbits, has the higher ratio of protein? _Cornbits_

Explain how you figured it out.

Cornbits because for each gram of protien there is a 11.25 grams a cereal.

Here is some information on the side of two boxes of cereal.

> **Tasty Oats**
>
> 12 grams of protein in 100 grams of cereal

> **Cornbits**
>
> 5 grams of protein in 45 grams of cereal

1. How many grams of Tasty Oats cereal will give you 9 grams of protein? _____75_____ grams

   Show your work.

   $\frac{12}{100}$ = .12 grams of protein per gram of cereal

   $\frac{9}{12}$ = 75 $\frac{12}{100}$ = .12 = $\frac{9}{75}$

2. Which cereal, Tasty Oats or Cornbits, has the higher ratio of protein?

   _____Tasty Oats_____

   Explain how you figured it out.

   I converted each ratio into a decimal. Tasty Oats had 0.12 grams, and Cornbits had 0.11 grams, which is less than 0.12.

Here is some information on the side of two boxes of cereal.

> **Tasty Oats**
>
> 12 grams of protein in 100 grams of cereal

> **Cornbits**
>
> 5 grams of protein in 45 grams of cereal

1. How many grams of Tasty Oats cereal will give you 9 grams of protein? _____75_____ grams

   Show your work.

   100 ÷ 12 · 9

   8.3 · 9 = 75 grams of cereal

2. Which cereal, Tasty Oats or Cornbits, has the higher ratio of protein?

   _____Tasty Oats_____

   Explain how you figured it out.

   Because they have more protein for how many grams. If you were to do 45+45 which equals 90 you'll only have 10 grams. But with Tasty Oats you've got 12.

Here is some information on the side of two boxes of cereal.

Tasty Oats

(12) grams of protein in 100 grams of cereal

Cornbits

5 grams of protein in 45 grams of cereal

1. How many grams of Tasty Oats cereal will give you 9 grams of protein? _____25_____ grams

Show your work.

$12 \cdot 8 = 100$

$225 \div 25 = 9$

$9 \cdot 25 = 225$

2. Which cereal, Tasty Oats or Cornbits, has the higher ratio of protein?

_____Corn bits_____

Explain how you figured it out.

Well, I did 100 ÷ 12, wich gave me 8, then, I did 45 ÷ 5, wich gave me 9. 9 is greater than 8, So you would be getting more protein in a smaller dose of cereal.

Here is some information on the side of two boxes of cereal.

Tasty Oats

12 grams of protein in 100 grams of cereal

Cornbits

5 grams of protein in 45 grams of cereal

1. How many grams of Tasty Oats cereal will give you 9 grams of protein? _____72_____ grams

Show your work.

$100 \div 12 = 8$

1 gram protein = 8 grams cereal

$1 \cdot 9 = 8 \cdot 9$

$9 = 72$

2. Which cereal, Tasty Oats or Cornbits, has the higher ratio of protein?

_____Tasty Oats_____

Explain how you figured it out.

$45 \div 5 = 9$

For every 8 grams of Tasty Oats there is 1 gram of protein. For every 9 grams of Cornbits there is 1 gram of protein. If you have 72 grams of each cereal you'll have 9 grams of protein in Tasty Oats and 8 in Cornbits.

Here is some information on the side of two boxes of cereal.

Tasty Oats

12 grams of protein in 100 grams of cereal

Cornbits

5 grams of protein in 45 grams of cereal

1. How many grams of Tasty Oats cereal will give you 9 grams of protein?   ___75___ grams

Show your work.

$$\frac{12g^{protein} = 100g^{cereal}}{\div 4 \qquad \div 4}$$
$$\frac{3}{} \qquad \frac{25}{}$$
$$\frac{*3}{9} : \frac{*3}{75}$$

2. Which cereal, Tasty Oats or Cornbits, has the higher ratio of protein?

$10_g^{protein}$ 90_{grams} Tasty Oats

Explain how you figured it out.

It is Tasty Oats because for each gram of protein in Tasty Oats
equals 8⅓ grams of cereal. And for Combits the ratio is 1:9.
So Tasty Oats has a better ratio for protein than Cornbits. Also
Cornbits has 11.11 grams of protein per 100 grams of cereal &
Tasty Oats has 12 grams of protein per 100 grams of cereal.

Here is some information on the side of two boxes of cereal.

Tasty Oats

12 grams of protein in 100 grams of cereal

Cornbits

5 grams of protein in 45 grams of cereal

1. How many grams of Tasty Oats cereal will give you 9 grams of protein?   ___75___ grams

Show your work.

$$100 \div 12 = 8\frac{1}{3}$$
$$8.\overline{3} \times 9$$

2. Which cereal, Tasty Oats or Cornbits, has the higher ratio of protein?

Tasty Oats

Explain how you figured it out.

The Tasty Oats gave you one gram of
protein per 8.3 grams of cereal. The Cornbits
give you one gram of protein per 9
grams of cereal. I figured out Tasty Oats in #1, and
Cornbits is 45÷5 =9g of cereal per 1g of protein.

HS Algebra 1/Math 11: Functions

A portion of the graph of a quadratic function f(x) is shown in the xy - plane. Selected values of a linear function g(x) are shown in the table.

f(x) (2, 9) — vertex
(0, 5)
(-1, 0)   (5, 0)
O   x
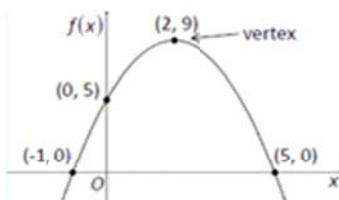
x	g(x)
-4	7
-1	1
2	-5
5	-11

For each comparison below, use the drop-down menu to select a symbol that correctly indicates the relationship betweeen the first and the second quantity.

First Quantity	Comparison	Second Quantity
The y-coordinate of the y-intercept f(x)	▼	The y-coordinate of the y-intercept g(x)
f(3)	▼	g(3)
Maximum value of f(x) on the interval -5 ≤ x ≤ 5	▼	Maximum value of g(x) on the interval -5 ≤ x ≤ 5
$\frac{f(5) - f(2)}{5 - 2}$	▼	$\frac{g(5) - g(2)}{5 - 2}$

HS Algebra 1/Math II: Michelle's Conjectures

Michelle wanted to investigate the effect on the vertex of the graph of $f(x) = x^2 + 6x$ when $f(x)$ is replaced by $f(x + k)$.

Michelle graphed functions of the form $f(x + k)$ for $k = 1, 2, 3$ and 4. For each of the functions she graphed, the x-coordinate of the vertex was negative and different for each value of k, but the y-coordinate of the vertex was the same for each value of k. Michelle made three conjectures based on her results.

1. The x-coordinate of the vertex depends on the value of k.
2. The x-coordinate of the vertex is negative for all values of k.
3. The y-coordinate of the vertex is independent of the value of k.

Determine if each of Michelle's three conjectures are true. Justify each answer.

Water Tank

42968

Two water tanks are shown. Tank A is a rectangular prism and Tank B is a cylinder. The tanks are not drawn to scale.

Tank A is filled with water to the 10-meter mark.

Click Tank A to change the water level. The volume of water that leaves Tank A is transferred to Tank B, and the height of the water in Tank B is shown.

Drag one number into the box to show the approximate radius of the base of Tank B.

Tank A — 10, 8, 6, 4, 2, 0 Meters; 8 m; 8 m

Tank B — 10, 8, 6, 4, 2, 0 Meters; ☐ m

0 1 2 3 4 5 6 7 8 9
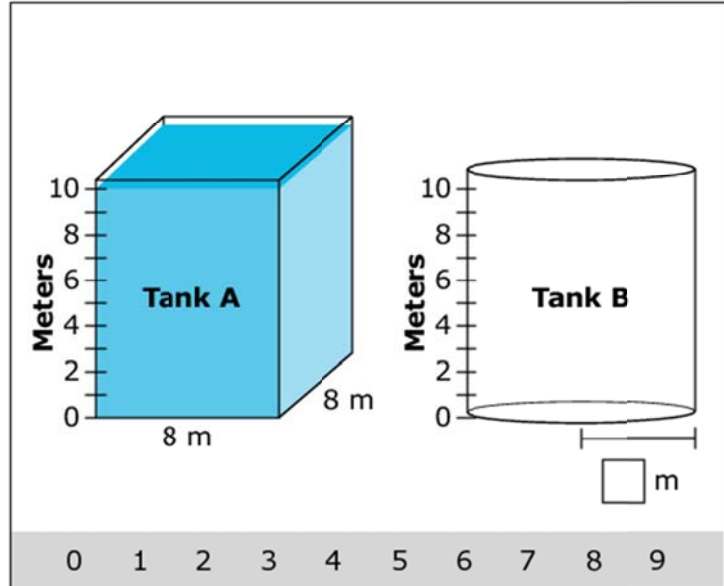
Two-Second Rule

43060

The "two-second rule" is used by a driver who wants to maintain a safe following distance at any speed. A driver must count two seconds from when the car in front of him or her passes a fixes point, such as a tree, until the driver passes the same fixed point. Drivers use this rule to determine the minimum distances to follow a car traveling at the same speed. A diagram representing this distance is shown.

following distance
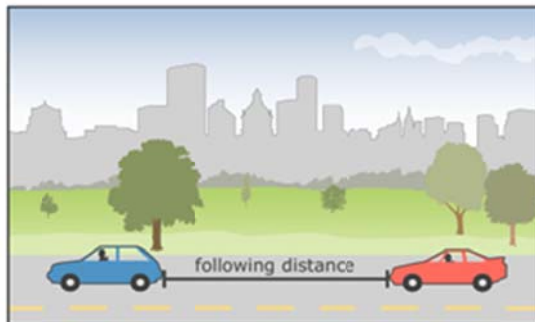
As the speed increases, the minimum following distance also increases. Explain how the "two-second rule" leads to a great minimum following distance as the speed of cars increases. As part of your explanation, include the minimum following distances in feet, for cars traveling at 30 miles per hour and 60 miles per hour.

Interpret a Distance vs. Time Graph, Grade 12 NAEP, 2009
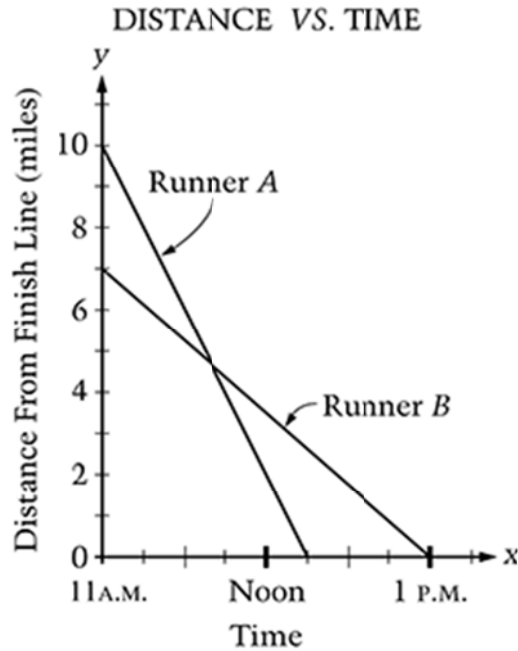
DISTANCE VS. TIME

9. The graph above shows distance versus time for a race between runners A and B. The race is already in progress, and the graph shows only the portion of the race that occurred after 11 A.M.

   The table on the next page lists several characteristics of the graph. Interpret these characteristics in terms of what happened during this portion of the race. Include times and distances to support your interpretation. (A sample interpretation of the y-intercepts is given in the table.)

Characteristic of Graph	Interpretation in Terms of the Race
y-intercepts	At 11 A.M. Runner A is 10 miles from the finish line and Runner B is 7 miles from the finish line.
Slopes	
Point of intersection	
x-intercepts	

Interpret a Distance vs. Time Graph, Grade 12 NAEP, 2009

Student A

Characteristic of Graph	Interpretation in Terms of the Race
y-intercepts	At 11 A.M. Runner *A* is 10 miles from the finish line and Runner *B* is 7 miles from the finish line.
Slopes	runner A is mouing 8 mph while runner B moves at 3.5 mph
Point of intersection	The two runners are the same distance from the finish line at 1145 and they are both 5 miles away
x-intercepts	runner at finisns the race at 12:15 while runner B finishes at 1

Student B

Characteristic of Graph	Interpretation in Terms of the Race
y-intercepts	At 11 A.M. Runner *A* is 10 miles from the finish line and Runner *B* is 7 miles from the finish line.
Slopes	Runner A took about an hour and 15 minutes to run 10 miles while runner B took 2 hours to run 7 miles.
Point of intersection	At about 1145 both runners were about 4.8 miles from the finish line.
x-intercepts	At 12:15 runner A is 0 miles from the finish line and at 1:00 pm runner B is 0 miles from the finish line.

Interpret a Distance vs. Time Graph, Grade 12 NAEP, 2009

Student C

Characteristic of Graph	Interpretation in Terms of the Race
y-intercepts	At 11 A.M. Runner *A* is 10 miles from the finish line and Runner *B* is 7 miles from the finish line.
Slopes	Slopes show the speed of the runners. Runner A travels 10 miles In 1½ hour for a speed of 4 mph, while Runner B travels 7 miles in 2 hours for a speed of 3½ mph.
Point of intersection	The spot where Runner A passes Runner B.
x-intercepts	The time at which the runners finish the race. Runner A finishes at 12:15 p.m. and Runner B finishes at 1 p.m.

Student D

Characteristic of Graph	Interpretation in Terms of the Race
y-intercepts	At 11 A.M. Runner *A* is 10 miles from the finish line and Runner *B* is 7 miles from the finish line.
Slopes	Speeds of running
Point of intersection	When A caught up to B
x-intercepts	when A & B finished the race

Interpret a Distance vs. Time Graph, Grade 12 NAEP, 2009

Student E

Characteristic of Graph	Interpretation in Terms of the Race
y-intercepts	At 11 A.M. Runner A is 10 miles from the finish line and Runner B is 7 miles from the finish line.
Slopes	Runner A is traveling at a faster rate than runner B.
Point of intersection	At a little under 5 miles they meet each other.
x-intercepts	Runner A wins over Runner B

Student F

Characteristic of Graph	Interpretation in Terms of the Race
y-intercepts	At 11 A.M. Runner A is 10 miles from the finish line and Runner B is 7 miles from the finish line.
Slopes	Runner A: Had a Steeper negative slope= moving at a faster pace Runner B: Had a slower pace shown by the less steep slope.
Point of intersection	This is when the crossed paths on the course and their paces ran into eachother.
x-intercepts	When they each crossed the finish line.

Interpret a Distance vs. Time Graph, Grade 12 NAEP, 2009

Student G

Characteristic of Graph	Interpretation in Terms of the Race
y-intercepts	At 11 A.M. Runner *A* is 10 miles from the finish line and Runner *B* is 7 miles from the finish line.
Slopes	Runner A slope is $\frac{10}{6}$ $\frac{Rise}{run}$ Runner B slope is $\frac{7}{8}$ $\frac{rise}{run}$
Point of intersection	(3,4)
x-intercepts	Runner A 12:10 P.M. Runner B 1 P.M.

Student H

Characteristic of Graph	Interpretation in Terms of the Race
y-intercepts	At 11 A.M. Runner *A* is 10 miles from the finish line and Runner *B* is 7 miles from the finish line.
Slopes	Runers A and B moving to the finsh line.
Point of intersection	4.5 when Runers A mouc into Runners B.
x-intercepts	were Runners A and B starter at 12:05 and at 1.