

# EXPRESSIONS AND EQUATIONS ITEMS: OVERVIEW

## Resources:

Attached you will find **practice items** for **Expressions and Equations**. These practice items are packaged so that you will have weekly items to use in your classroom as bell ringers or engagement items. Three items per day have been provided for this domain and should take no more than fifteen minutes of classroom instruction.

The purpose of using these practice items daily is to be able to formatively assess student understanding and any misconceptions they may have in this domain. Being able to gather evidence of student learning and misconceptions in the moment, will give you the flexibility to change your instruction to meet their needs. As the instructional decision-maker, you are able to adjust your methods for whole class or small groups to address student misconceptions and move them toward proficiency.

The practice items represent a variety of standards from the **Expressions and Equations** domain. **Three weeks of practice items** have been selected for this domain. Because there is only three weeks, every standard may not be addressed.

The goal is for you to have a total of 10 weeks of practice items that represent the 5 domains in 8<sup>th</sup> grade. We would like for you to use these items for a 10 week period between the time you receive them and the end of January. If used daily for student and teacher practice, in accordance with our recommendations or tips, the outcome will be an improvement in ACT ASPIRE test scores.

At the end of each weekly packet, you will find an answer key for your use. **Although answer keys are provided, students should explain their thinking during the discussion of the practice item.**

A separate resource available to you is tasks addressing each of the domains. These tasks require students to think about an efficient strategy to solve the problem, show their work and justify their reasoning. This is the ultimate goal for what we want students to be able to do.

## Recommendations or Tips:

When administering the practice items, please allow students to read through the daily items to see if they have any questions about vocabulary or what the problem is asking them to do prior to engagement. Taking the time to do these things now, will help to ensure that students are familiar with vocabulary and the different question types before the actual test.

## Providing Feedback to Students:

Since the purpose of the test practice items is to assess student understanding, it is not enough just to give the practice items as bell ringers or engagement items. **A key part of the process for advancing student thinking, is to debrief the practice items and provide specific feedback on the student thinking and performance.** This can be done during the sharing out process by asking effective questions. It is difficult to make student thinking and understanding visible by just giving **multiple choice** questions and determining whether their response is correct or incorrect. Asking questions similar to the ones below can help students verbalize the reasoning for their choices:

- To get the correct solution, what concept do you have to be aware of?
- Why are the answer choices you did not choose incorrect?

- What strategy did you use to solve the problem? Why did you use that particular strategy?
- Is there another strategy that you could use to solve the problem?

The above questions can be used with **short response** and **constructed response** also. Other questions to consider when prompting students to verbalize or justify their thinking are:

**Monitoring as students work:**

- What is the problem asking you to find?
- How would you start the problem? How did you start the problem?
- What else do you need to do?

**During debriefing:**

- What did the problem ask you to do?
- What information do you see in the problem?
- What did you do first to solve this problem?
- Who else started this same way?
- What did you do next?
- Who started a different way?
- What are some strategies that you heard today that you would like to try when solving a similar problem in the future?

**Answer Key:**

The information above is intended to help teachers assess student understanding of the mathematical idea(s) in each problem. Also provided is an Answer Key for each set of items. While it is important for students to get the answer correct, **it is equally important for them to understand how their thinking leads or does not lead to a correct solution.** Incorrect solutions set the stage for teachable moments!!!!

Name \_\_\_\_\_

Date \_\_\_\_\_

**Set 2 - Standard(s): 7.EE.1, 7.EE.2, 8.EE.5, 8.EE.6**

NAEP Questioning Tool, North Carolina

**Day 1 Items**

1. While she was on vacation, Tara sent 14 friends either a letter or a postcard. She spent \$3.84 on postage. If it costs \$0.20 to mail a postcard and \$0.33 to mail a letter, how many letters did Tara send? Show what you did to get the answer.
  
2. Kim made soup which contains 75 total ounces of beans.
  - The soup has two kinds of beans, black and red.
  - There are 4 times as many ounces of black beans as red beans.How many ounces of red beans are in the soup?
  - a. 5
  - b. 12
  - c. 15
  - d. 19
  
3. Last week Maureen earned \$288.00 (before taxes) for working 40 hours. This week Maureen worked 29 hours at the same rate of pay. How much did Maureen earn (before taxes) this week?
  - a. \$72.00
  - b. \$72.50
  - c. \$203.00
  - d. \$208.80
  - e. \$397.24

- NAEP Questioning Tool - <http://nces.ed.gov/nationsreportcard/nqt/>, SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 20011,2013 Mathematics Assessment.
- <http://www.ncpublicschools.org/docs/accountability/testing/releasedforms/g8mathpp.pdf>, North Carolina Department of Public Instruction

Name \_\_\_\_\_

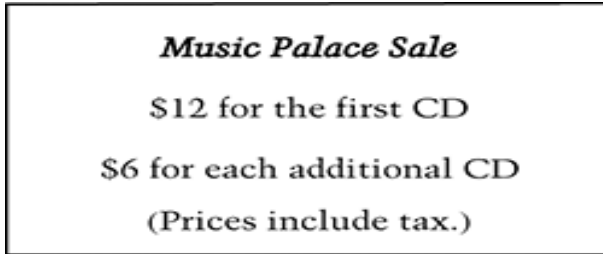
Date \_\_\_\_\_

**Set 2 - Standard(s): 8.EE.5, 8.EE.6**

NAEP Questioning Tool, Smarter Balance, Massachusetts

**Day 2 Items**

1. The Music Palace is having a sale.



Write an expression that shows how to calculate the cost of buying  $n$  CD's at the sale.

2. The price,  $c$ , in dollars, of a winter coat that Jamal wants to buy has been discounted 20%. The expression below can be used to find the discounted price, in dollars, of the coat.

$$1c - 0.20c$$

Which of the following expressions shows another way to determine the discounted price, in dollars, of the coat?

- a.  $0.80c$
  - b.  $1.20c$
  - c.  $80c$
  - d.  $120c$
3. A line contains the points  $(4, 2)$  and  $(0, -1)$ . What is the equation of the line?
    - a.  $y = 2x - 6$
    - b.  $y = \frac{3}{4}x - 1$
    - c.  $y = \frac{1}{4}x + 1$
    - d.  $y = \frac{4}{3}x - \frac{10}{3}$

- NAEP Questioning Tool - <http://nces.ed.gov/nationsreportcard/ngt/>, SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011,2013 Mathematics Assessment.
- [https://www.smarterbalanced.org/wp-content/uploads/2015/11/G8\\_Practice\\_Test\\_Scoring\\_Guide\\_Math.pdf](https://www.smarterbalanced.org/wp-content/uploads/2015/11/G8_Practice_Test_Scoring_Guide_Math.pdf), © Smarter Balanced Assessment Consortium, 2013 Descriptions of the operation of the Test Delivery System, Test Information Distribution Engine, and related systems are property of the American Institutes for Research® (AIR) and are used with permission of AIR.
- <http://www.doe.mass.edu/mcas/> - Massachusetts Department of Elementary and Secondary Education, *Permission is hereby granted to copy for non-commercial educational purposes any or all parts of this document. Please credit the "Massachusetts Department of Elementary and Secondary Education."*

Name \_\_\_\_\_

Date \_\_\_\_\_

**Set 2 - Standard(s): 8.EE.5, 8.EE.6**

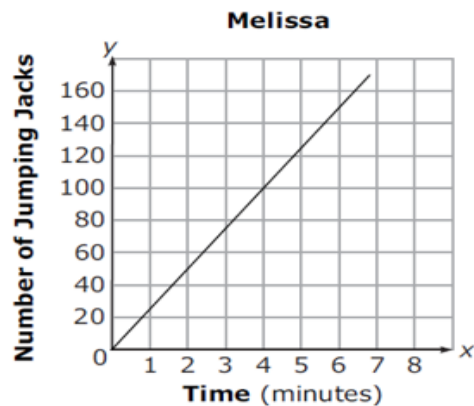
North Carolina, Massachusetts, Engage NY

**Day 3 Items**

1. Alicia and Melissa did jumping jacks. The table below shows the number of jumping jacks that Alicia had done in the different amounts of time.

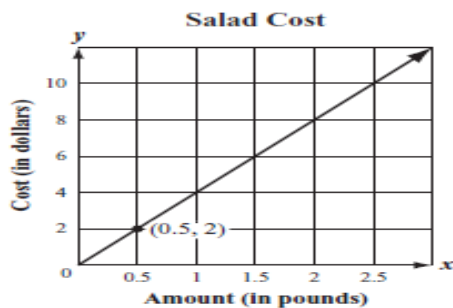
<b>Alicia</b>	<b>Time (minutes)</b>	1	2	3	4	5	6	7	8
	<b>Jumping Jacks</b>	30	60	90	120	150	180	210	240

The graph below shows the number of jumping jacks Melissa had done in different amounts of time.



Which choice best describes the difference between the rates at which the girls did jumping jacks?

- a. Melissa did 6 more jumping jacks per minute than Alicia.
  - b. Alicia did 6 more jumping jacks per minute than Melissa.
  - c. Melissa did 5 more jumping jacks per minute than Alicia.
  - d. Alicia did 5 more jumping jacks per minute than Melissa.
2. The graph below represents  $y$ , the cost in dollars of  $x$  pounds of salad at a salad bar.



What is the unit rate for the cost of a salad at the salad bar?

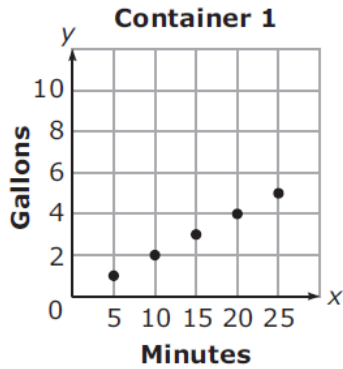
- a. \$0.50 per pound
- b. \$1.00 per pound
- c. \$2.00 per pound
- d. \$4.00 per pound

**Set 2 - Standard(s): 8.EE.5, 8.EE.6 (Continued)**

North Carolina, Massachusetts, Engage NY

**Day 3 Items**

3. Rain is flowing into two containers at different rates. The figure below shows the volume of water in each container at different times.



**Container 2**

Minutes	Gallons
5	2
10	4
15	6
20	8
25	10

What is the difference in the rate of change between the two containers?

- a.  $\frac{1}{5}$  gallon per minute
- b.  $\frac{3}{5}$  gallon per minute
- c.  $\frac{5}{2}$  gallons per minute
- d.  $\frac{15}{2}$  gallons per minute

- <http://www.ncpublicschools.org/docs/accountability/testing/releasedforms/g8mathpp.pdf>, North Carolina Department of Public Instruction
- <http://www.doe.mass.edu/mcas/> - Massachusetts Department of Elementary and Secondary Education, *Permission is hereby granted to copy for non-commercial educational purposes any or all parts of this document. Please credit the "Massachusetts Department of Elementary and Secondary Education."*

Name \_\_\_\_\_

Date \_\_\_\_\_

**Set 2 - Standard(s): 8.EE.5, 8.EE.6**

NAEP Questioning Tool, Massachusetts

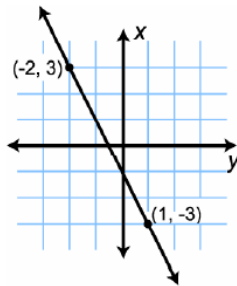
**Day 4 Items**

1. What is the slope of the line represented by the equation below?

$$y = \frac{1}{3}x + 4$$

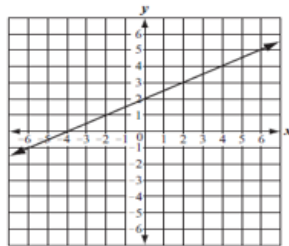
- a.  $\frac{1}{4}$
- b.  $\frac{1}{3}$
- c. 3
- d. 4

2. Find the slope of the line on the graph below.



- a. -2
- b.  $-\frac{1}{2}$
- c.  $-\frac{1}{3}$
- d. -3

3. The graph below shows a relationship between x and y.



Which of the following equations best represents this relationship?

- a.  $y = 2x$
- b.  $y = x + 2$
- c.  $y = \frac{1}{2}x + 2$
- d.  $y = 2x + \frac{1}{2}$

• NAEP Questioning Tool - <http://nces.ed.gov/nationsreportcard/ngt/>, SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011, 2013 Mathematics Assessment.

- <http://www.doe.mass.edu/mcas/> - Massachusetts Department of Elementary and Secondary Education, *Permission is hereby granted to copy for non-commercial educational purposes any or all parts of this document. Please credit the "Massachusetts Department of Elementary and Secondary Education."*

Name \_\_\_\_\_

Date \_\_\_\_\_

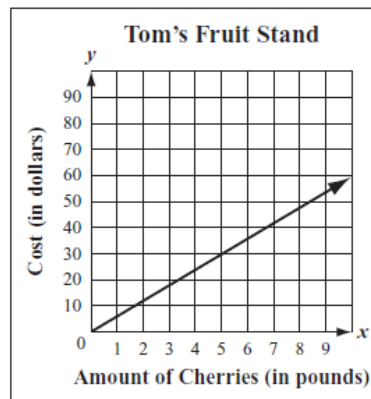
**Set 2 - Standard(s): 8.EE.5, 8.EE.6**

Massachusetts, NAEP Questioning Tool, Engage NY

**Day 5 Items**

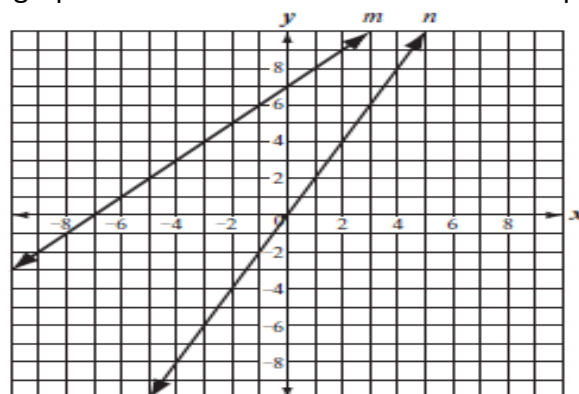
1. Julia and Tom each have a fruit stand. The information in the boxes below can be used to determine the costs, in dollars, of cherries at the two fruit stands.

**Julia's Fruit Stand**  
 $y = 4.5x$ ,  
 where  $y$  equals the total cost, in dollars, of  $x$  pounds of cherries



Based on the information, which of the following statements **best** compares the costs of cherries at the two fruit stands?

- a. Cherries cost \$1.50 more per pound at Julia's Fruit Stand than at Tom's Fruit Stand.
  - b. Cherries cost \$2.50 more per pound at Julia's Fruit Stand than at Tom's Fruit Stand.
  - c. Cherries cost \$1.50 more per pound at Tom's Fruit Stand than at Julia's Fruit Stand.
  - d. Cherries cost \$2.50 more per pound at Tom's Fruit Stand than at Julia's Fruit Stand.
2. Amanda graphed line  $m$  and line  $n$  on a coordinate plane, as shown below.



Which of the following statements is true?

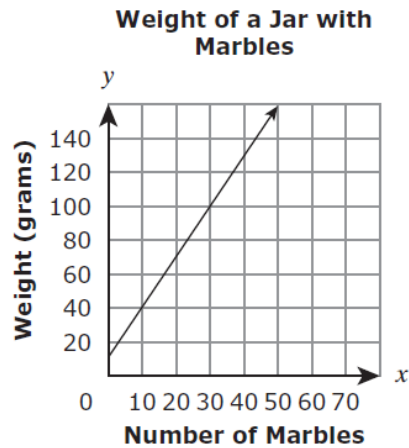
- a. The slope of line  $m$  is greater than the slope of line  $n$ .
- b. The slope of line  $n$  is greater than the slope of line  $m$ .
- c. The  $x$ -intercept of line  $m$  is greater than the  $x$ -intercept of line  $n$ .
- d. The  $y$ -intercept of line  $n$  is greater than the  $y$ -intercept of line  $m$ .



**Set 2 - Standard(s): 8.EE.5, 8.EE.6 (Continued)**

Massachusetts, NAEP Questioning Tool, Engage NY

**Day 5 Items**



3. What does the  $y$ -intercept represent?
- The weight of each marble
  - The weight of the jar by itself
  - The number of marbles when the weight is 0 grams
  - The number of marbles when the weight is 10 grams

Accessed 10/24/16

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- <https://www.engageny.org/resource/new-york-state-common-core-sample-questions>, Engage NY

**Set 2 - Standard(s): 7.EE.1, 7.EE.2, 8.EE.5, 8.EE.6**

NAEP Questioning Tool, North Carolina

**Day 1 Items - KEY**

1. 8 letters,  $.20(6) + .33(8) = \$3.84$
2. C
3. D

**Set 2 - Standard(s): 8.EE.5, 8.EE.6**

NAEP Questioning Tool, Smarter Balance, Massachusetts

**Day 2 Items - KEY**

1.  $12 + 6(n - 1)$  or  $6n + 6$
2. A
3. B

**Set 2 - Standard(s): 8.EE.5, 8.EE.6**

North Carolina, Massachusetts, Engage NY

**Day 3 Items - KEY**

1. D
2. D
3. A

**Set 2 - Standard(s): 8.EE.5, 8.EE.6**

NAEP Questioning Tool, Massachusetts

**Day 4 Items - KEY**

1. B
2. A
3. C

**Set 2 - Standard(s): 8.EE.5, 8.EE.6**

Massachusetts, NAEP Questioning Tool, Engage NY

**Day 5 Items - KEY**

1. C
2. B
3. B