

Rigor

Task Handout, Grade 8

“A social justice priority in mathematics education is to openly challenge deficit thinking and the institutional tools and practices that perpetuate static views about children and their mathematics competencies. Eliminating the deficit discourse by focusing on learning rather than labels is a key step toward a more just and equitable mathematics education.” —*National Council of Supervisors of Mathematics and TODOS: Mathematics for All*

Conceptual Understanding Task #1

Task

Consider the equation $5x - 2y = 3$. If possible, find a second linear equation to create a system of equations that has:

- Exactly 1 solution.
- Exactly 2 solutions.
- No solutions.
- Infinitely many solutions.

Bonus Question: In each case, how many such equations can you find?

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Conceptual Understanding Task #2

1. Show (prove) in detail why $(2 \cdot 3 \cdot 7)^4 = 2^4 3^4 7^4$.
2. Show (prove) in detail why $(xyz)^4 = x^4 y^4 z^4$ for any numbers x, y, z .
3. Show (prove) in detail why $(xyz)^n = x^n y^n z^n$ for any numbers x, y , and z and for any positive integer n .

Source: EngageNY.org of the New York State Education Department. Grade 8, Module 1, Topic A, Lesson 3. Available from <https://www.engageny.org/resource/grade-8-mathematics-module-1-topic-lesson-3/file/46141> accessed 26 May 2018.
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Procedural Skills and Fluency Task #1

Exercises

Find the value of x that makes the equation true.

1. $17 - 5(2x - 9) = -(-6x + 10) + 4$

2. $-(x - 7) + \frac{5}{3} = 2(x + 9)$

Source: EngageNY.org of the New York State Education Department. Grade 8, Module 4, Topic A, Lesson 6. Available from <https://www.engageny.org/resource/grade-8-mathematics-module-4-topic-lesson-6/file/47341> accessed 26 May 2018.
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Procedural Skills and Fluency Task #2

In general, if x is any number and m, n are positive integers, then

$$x^m \cdot x^n = x^{m+n}$$

because

$$x^m \times x^n = \underbrace{(x \cdots x)}_{m \text{ times}} \times \underbrace{(x \cdots x)}_{n \text{ times}} = \underbrace{(x \cdots x)}_{m+n \text{ times}} = x^{m+n}.$$

Exercise 1

$$14^{23} \times 14^8 =$$

Exercise 2

$$(-72)^{10} \times (-72)^{13} =$$

Exercise 3

$$5^{94} \times 5^{78} =$$

Source: EngageNY.org of the New York State Education Department. Grade 8, Module 1, Topic A, Lesson 2. Available from <https://www.engageny.org/resource/grade-8-mathematics-module-1-topic-lesson-2/file/46116> accessed 26 May 2018.
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Application Task #1

Task

- a. Plot the points $(5, 3)$, $(-1, 1)$, and $(2, -3)$ in the coordinate plane and find the lengths of the three segments connecting the points.
- b. Find the distance between $(5, 9)$ and $(-4, 2)$ without plotting the points.
- c. If (u, v) and (s, t) are two distinct points in the plane, what is the distance between them? Explain how you know.
- d. Does your answer to (c) agree with your calculations in parts (a) and (b)? Explain.

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Application Task #2

Task

You are a representative for a cell phone company and it is your job to promote different cell phone plans.

- a. Your boss asks you to visually display two plans and compare them so you can point out the advantages of each plan to your customers.
 - Plan A costs a basic fee of \$29.95 per month and 10 cents per text message
 - Plan B costs a basic fee of \$90.20 per month and has unlimited text messages
 - All plans offer unlimited calling
 - Calling on nights and weekends are free
 - Long distance calls are included
- b. A customer wants to know how to decide which plan will save her the most money. Determine which plan has the lowest cost given the number of text messages a customer is likely to send.

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