



HS-PE-3027

Comparison of Two Multiplication Tasks

Multiples of Ten Task

Solve the following multiplication problems:

$$7 \times 10 = \underline{\quad}$$

$$7 \times 20 = \underline{\quad}$$

$$5 \times 50 = \underline{\quad}$$

$$40 \times 7 = \underline{\quad}$$

$$10 \times 9 = \underline{\quad}$$

$$5 \times 20 = \underline{\quad}$$

$$3 \times 20 = \underline{\quad}$$

$$30 \times 4 = \underline{\quad}$$

The Band Concert Task

The third-grade class is responsible for setting up the chairs for the spring band concert. In preparation, the class needs to determine the total number of chairs that will be needed and ask the school's engineer to retrieve that many chairs from the central storage area. The class needs to set up 7 rows of chairs with 20 chairs per row, leaving space for a center aisle. How many chairs does the school's engineer need to retrieve from the central storage area?

Levels of Demands

<p><u>Lower-level demands</u> <u>(memorization):</u></p> <ul style="list-style-type: none">• reproducing previously learned facts, rules, formulas, definitions or committing them to memory• Cannot be solved with a procedure• Have no connection to concepts or meaning that underlie the facts rules, formulas, or definitions	<p><u>Lower-level demands</u> <u>(procedures without connections):</u></p> <ul style="list-style-type: none">• are algorithmic• require limited cognitive demand• have no connection to the concepts or meaning that underlie the procedure• focus on producing correct answers instead of understanding• require no explanations
<p><u>Higher-level demands</u> <u>(procedures with connections):</u></p> <ul style="list-style-type: none">• use procedure for deeper understanding of concepts• broad procedures connected to ideas instead narrow algorithms• usually represented in different ways• require some degree of cognitive effort; procedures may be used but not mindlessly	<p><u>Higher-level demands</u> <u>(doing mathematics):</u></p> <ul style="list-style-type: none">• require complex non-algorithmic thinking• require students to explore and understand the mathematics• demand self-monitoring of one's cognitive process• require considerable cognitive effort and may involve some level of anxiety b/c solution path isn't clear



Identifying High-Quality Tasks

The purpose of the task is to teach or assess:

<input type="checkbox"/> Conceptual understanding	<input type="checkbox"/> Procedural skill and fluency	<input type="checkbox"/> Application
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Rating Scale:

- 2 - Fully Meets the Characteristic
- 1 - Partially Meets the Characteristic
- 0 - Does Not Meet the Characteristic

The mathematics task	Rating
Aligns to mathematics content standards I am teaching.	
Encourages my students to use representations.	
Provides my students with an opportunity for communicating their reasoning.	
Has multiple entry points.	
Allows for different strategies for finding solutions.	
Makes connections between mathematical concepts, between concepts and procedures, or between.	
Prompts cognitive effort.	
Is problem-based, authentic, or interesting.	

Task G

Tools available: base ten blocks, place value chart

Fill in the blank for each of the problems.

- 1) Count by 100s: 600, 700, 800, _____
- 2) Count by 5s: 165, 170, 175, 180, 185, 190, _____
- 3) Count by 10s: 700, 710, 720, 730, 740, _____
- 4) Count by 5s: 435, 440, 445, 450, 455, 460, _____

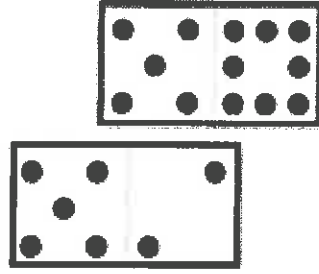
Commoncoresheets.com (2015)

Task W

Tools available: none

Choose a number between 5 and 20.

- Have students find two or more dominos that have total the target number.
- Have the student prove or explain how they know the dominos show the target.



SanGiovanni, J. (2017) Mine the Gap for Mathematical Understanding (K-2) Thousand Oaks, CA: Corwin

Task V

Tools available: hundred chart

Count the pretzels.



Which group has **one less**?



ixl.com (2017)

Task K

Tools available: Judy clocks

Choose the digital clock that shows the same time as the clock:



Mathabc.com (2015)

Task A

Tools available: none

4 Use a 1 to show a 10. Use a • to show a 1. Draw a picture of each number.

27	68
51	32

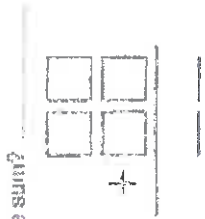
© 2012 by Pearson Education, Inc. All rights reserved.

Local Assessment, Howard County Public School System (2012)

Task R

Tools available: base ten blocks, digi-blocks

- Put one number in each empty square. The sum must be between 80 and 90.



What is the sum?



Dacey, J., Findell, C., Greenes, C., and Spungin, R. (2003) Groundworks: Reasoning about Number (2) Chicago, IL: Creative Publications

Task Z

Tools available: none

688 is the middle for each number line but each number line has different endpoints. What numbers could the ? represent on each number line?



Tell how you found the numbers for one of the number lines.

SanGiovanni, J. (2017) Mine the Gap for Mathematical Understanding (K-2) Thousand Oaks, CA: Corbett

<p>Task X</p> <p>Tools available: none</p> <p>Mike said, "721 \div 7 is the same as 700 \div 7 + 21 \div 7."</p> <p>Do you agree with Mike? Circle one: Yes No</p> <p>Why or why not?</p> <p>Adapted from Chval, Kathy, Lannin, J., and Jones, D. (2013) <i>Putting Essential Understanding of Multiplication and Division into Practice, 3-5</i>. NCTM: Reston, VA.</p>	<p>Task N</p> <p>Tools available: none</p> <p>Write the product in simplest form.</p> <p>3. $2 \times \frac{4}{10} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$ 4. $4 \times \frac{2}{5} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$</p> <p>5. $2 \times \frac{2}{3} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$ 6. $5 \times \frac{5}{12} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$</p> <p>Hands-On Standards" Fractions (2014) ETA Hand2Mind</p>
<p>Task U</p> <p>Tools available: none</p> <p>Complete the following multiplication facts in one minute or less.</p> <p>$2 \times 3 = \underline{\quad}$ $5 \times 4 = \underline{\quad}$ $10 \times 6 = \underline{\quad}$</p> <p>$4 \times 7 = \underline{\quad}$ $8 \times 10 = \underline{\quad}$ $8 \times 4 = \underline{\quad}$</p> <p>$9 \times 5 = \underline{\quad}$ $3 \times 4 = \underline{\quad}$ $5 \times 5 = \underline{\quad}$</p> <p>$6 \times 8 = \underline{\quad}$ $7 \times 9 = \underline{\quad}$ $2 \times 6 = \underline{\quad}$</p> <p>$3 \times 9 = \underline{\quad}$ $8 \times 7 = \underline{\quad}$ $9 \times 2 = \underline{\quad}$</p>	<p>Task L</p> <p>Tools available: fraction strips and pattern blocks</p> <p>These fractions are written in order from least to greatest. What are the missing numbers?</p> <p>$\frac{\square}{3} < \frac{2}{3} < \frac{2}{\square} < \frac{\square}{5} < \frac{\square}{8}$</p> <p>Use pictures, numbers, and/or words to explain your findings.</p> <p>Uncomplicating Fractions (2014) Teachers College Press and NCTM</p>

Task K

Tools available: multiplication chart

Converting Mixed Numbers to Fractions (D)

Write the improper fraction equivalent for each mixed number.

$$9 \frac{5}{9} = \frac{\quad}{\quad} \qquad 4 \frac{1}{6} = \frac{\quad}{\quad} \qquad 5 \frac{2}{6} = \frac{\quad}{\quad}$$

$$1 \frac{1}{4} = \frac{\quad}{\quad} \qquad 10 \frac{3}{6} = \frac{\quad}{\quad} \qquad 5 \frac{4}{6} = \frac{\quad}{\quad}$$

Moth-drills.com (2015)

Task W

Tools available: none

Determine the missing numbers in the following tasks. Explain your thinking for each part.

A. 18×6 is the same as $\underline{\hspace{2cm}}$ $\times 12$

B. 24×12 is the same as $6 \times \underline{\hspace{2cm}}$

C. $200 \div 6$ is the same as $100 \div \underline{\hspace{2cm}}$

D. $200 \div 6$ is the same as $\underline{\hspace{2cm}} \div 12$

Adapted from Chval, Kathy, Lemlich, J. and Jones, D (2013) Putting Essential Understanding of Multiplication and Division into Practice, 3-5. NCTM: Reston, VA.

Task H

Tools available:

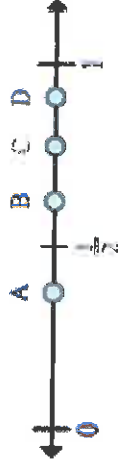
Solve each of the following. Show all your work. Check your answers with a calculator.

1. $6 \overline{) 56}$ 2. $7 \overline{) 452}$ 3. $6 \overline{) 3288}$

4. $5 \overline{) 2412}$ 5. $10 \overline{) 4630}$ 6. $16 \overline{) 4952}$

Task D

Tools available: fraction strips



5) Which letter best shows $\frac{3}{8}$?











6) Which letter best shows $\frac{5}{8}$?

Commoncoretests.com (2015)

Task M

Tools available: fraction circles

Shade the Figure with the Indicated Fraction.

11)		$\frac{4}{5}$	16)		$\frac{1}{4}$
12)		$\frac{2}{4}$	17)		$\frac{2}{5}$
13)		$\frac{2}{5}$	18)		$\frac{3}{5}$
14)		$\frac{1}{6}$	19)		$\frac{6}{8}$
15)		$\frac{1}{5}$	20)		$\frac{5}{8}$

Math-aids.com

Task A

Tools available: pattern blocks, fraction strips

Choose 2 fractions to compare. Tell which one is greater and how much greater it is and how you know.

Adapted from Small, Marian. (2013) Good Questions: Great Ways to Differentiate Mathematics Instruction. NCTM: Reston, VA.

1. On this diagram label another angle whose measure is 80° .



2.

Number of children	0	1	2	3
Number of families	13	24	36	27

Data were collected on the number of children per family in a certain village and tabulated as shown. Find the average (mean) number of children per family in the village.

3. A picture is copied onto a sheet of paper 8.5 inches by 10 inches. A 1.5 inch margin is left all around. What area in square inches does the picture cover?



Matchsticks are rectangular prisms of wood measuring approximately $\frac{1}{10}$ -inch by $\frac{1}{10}$ -inch by 2 inches.

4.

A tree trunk can be thought of as an approximate cone of wood.

The volume of a cone is found using the formula $\frac{1}{3}\pi r^2 h$, where r feet is the radius of the base of the cone and h feet is the height of the cone.

How many matchsticks can be made from a tree with a trunk with a base radius of 1 foot and a height of 80 feet?

5. Mary and Julie are holiday shopping. Julie found a pair of shoes that is discounted \$5 and then an additional 20% is taken off of the discounted price. Mary found a pair of shoes that is 80% of the original price, then she has a coupon for an additional \$5 off.

Write an expression to represent each of the discounts and determine if the expressions are equivalent.

- 6-** Mrs. Gittermann gave a quiz to each of her three math classes. Each of her classes has 12 students. When she found the mean for each class, she was surprised to see that the mean for each class was an 80%. However, looking at individual scores she found that distribution of scores in each class looked very different.

Write three sample sets of data that have different distributions of quiz scores but have class means of 80%.

8.

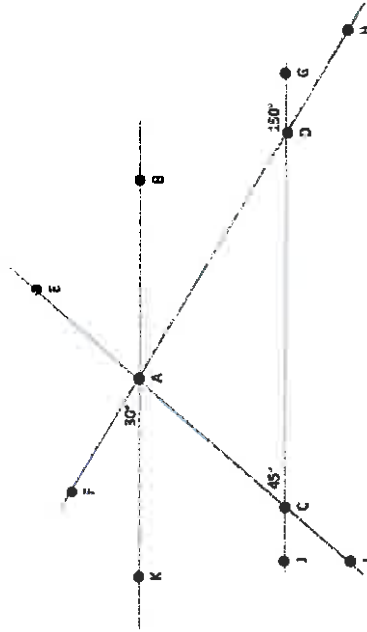
Aurora is making jewelry to sell at the craft fair.

- On Monday, Aurora was able to make 3 necklaces and 5 bracelets in 5 hours 20 minutes.
- On Tuesday, Aurora was able to make 1 necklace and 3 bracelets in 3 hours.

On Wednesday, Aurora needs to make 2 necklaces and 1 bracelet. How much time will it take her to finish?

9.

Line EB is parallel to line JG. Find the measures for all of the missing angles.



Note: This image is not drawn to scale.

Explain how you found the measure of angle CAD

Use the formula

$$P = \frac{V}{R} \text{ to calculate the value of } P \text{ when } V = 6 \times 10^6 \text{ and } R = 7.2 \times 10^8$$

- 10.** The school SGA is planning a field trip to the local amusement park. A value ride package for four people costs \$54. The SGA wants to determine how much to charge students for the field trip.

How much should each student pay?

How much does the SGA need to collect if there are 120 students attending the field trip?

High Quality Task Sort 9-12 Math

- 1.** One of these tables represents a linear relationship, one represents an exponential growth and one represents an exponential decay. Label each table correctly.

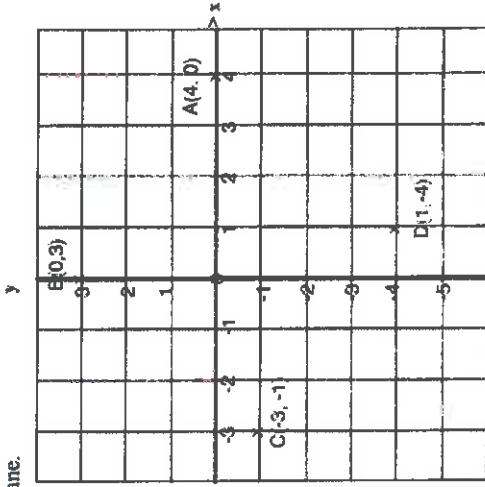
x	y
1	6
2	9
3	12
4	15

x	y
1	50
2	28
3	14
4	7

x	y
1	4
2	9
3	13.5
4	20.25

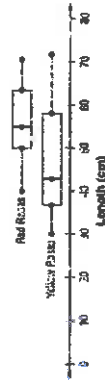
- 3.** A rectangle has length $(x + 5)$ cm and width $(x - 2)$ cm. Its area is 60 cm^2 . Write a quadratic equation, and solve it to find the length and width of this rectangle.

- 2.** Four points, A(4, 0), B(0, 3), C(-3, -1), and D(1, -4) are drawn on the x/y co-ordinate plane.



- Find the length of the line AB.
- Find the slope of the line AB.
- Join the sides of the quadrilateral ABCD. Prove that ABCD is a square.

- 4.** Jane collected some red and yellow roses. She measured the lengths of their stems, and drew the following box plots.



- Write down the median lengths of both the yellow and red roses to the nearest centimeter.
Which color rose would you buy for a 40 cm tall vase?

- On the next page are four graphs, four equations, four tables, and four rules.
Your task is to match each graph with an equation, a table and a rule.

- 5.** Write your answers in the following table.

Graph	Equation	Table	Rule
A			
B			
C			
D			

Susie is organizing the printing of tickets for a show her friends are producing. She has collected prices from several printers and these two seem to be the best.

SURE PRINT
Ticket printing
25 tickets for \$2

BEST PRINT
Tickets printed
\$10 setting up
plus
\$1 for 25 tickets

6.

Susie wants to go for the best buy

She doesn't yet know how many people are going to come.

Show Susie a couple of ways in which she could make the right decision, whatever the number.

Illustrate your advice with a couple of examples.

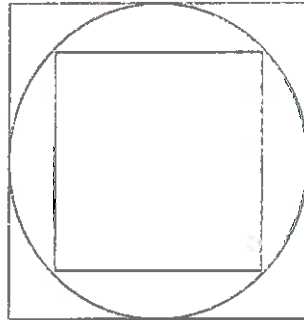
8. Dave sold 40 tickets for a concert. He sold x tickets at \$2 each and y tickets at \$3 each. He collected \$88.

Write down two equations connecting x and y .

Solve these two equations to find how many of each kind of ticket he sold.

This diagram shows a circle with one square inside and one square outside.

1. What is the ratio of the areas of the two squares?
Show your work.



Use two different function representations to identify the zeros

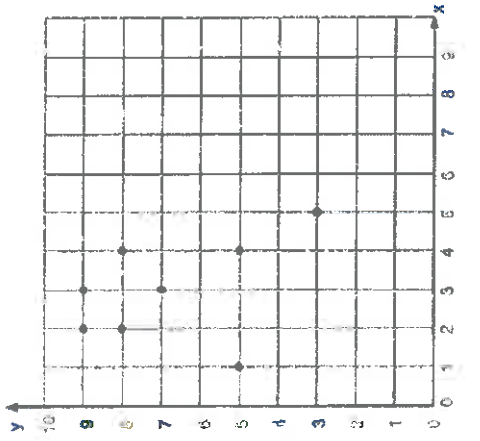
of $f(x) = x^2 + 3x - 4$.

7.

On the grid are eight points from two different functions.

A certain linear function passes through exactly four of the points shown.

A certain quadratic function passes through the remaining four points.



Write the equation for the linear function.

9.

10.

Task Planning Page

Learning Target:

Questions and Look-Fors:

Strategy	Who and What	Order

Notes:

