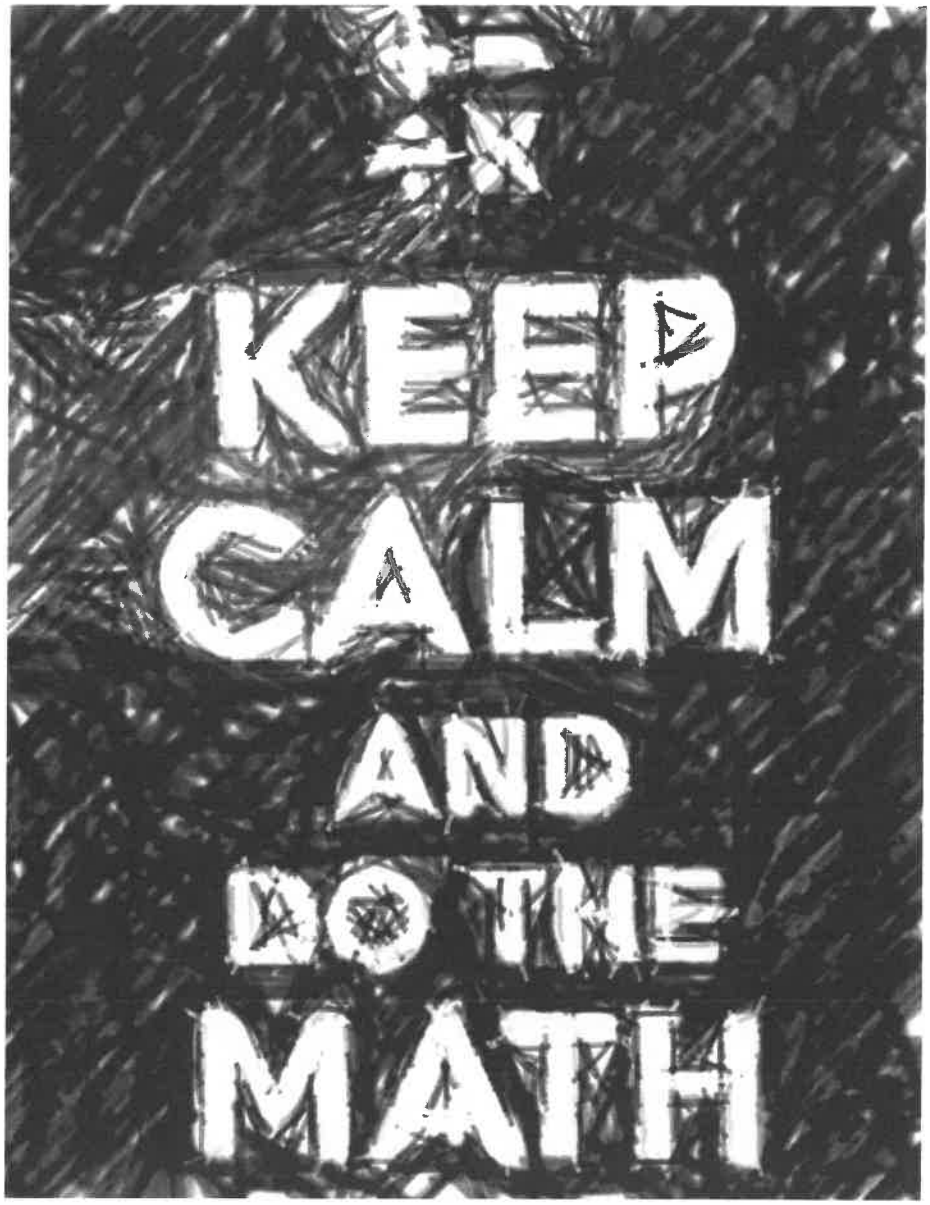
NAME: _____

Math P.A.T. Prep

Order of Operations / Ordering and Comparing in Number Lines / Finding the fraction of a Number

SOLUTIONS



St. Brendan School

Mr. Martínez

Rational Numbers: ORDER of OPERATIONS

The simplifications of two different expressions are shown below.

Expression X (CORRECT)	Expression Y (Incorrect)
$(3^2)^3 - 4^4 + 4^2 \times (-5)^2$	$2^6 \div 2^2 + (-5^2) \times 3$
$= 3^6 - 4^4 + 4^2 \times (-5)^2$	$= 2^3 + (-5^2) \times 3$
$= 729 - 256 + 16 \times 25$	$= 8 + (-25) \times 3$
$= 729 - 256 + 400$	$= 8 + (-75)$
$= 873$	$= -67$

$\frac{2^6}{2^2} = 2^{6-2} = 2^4$

B E D M A S

8. Which of the following statements about the simplifications above is true?

A. The simplifications of both expressions are correct. NOT TRUE

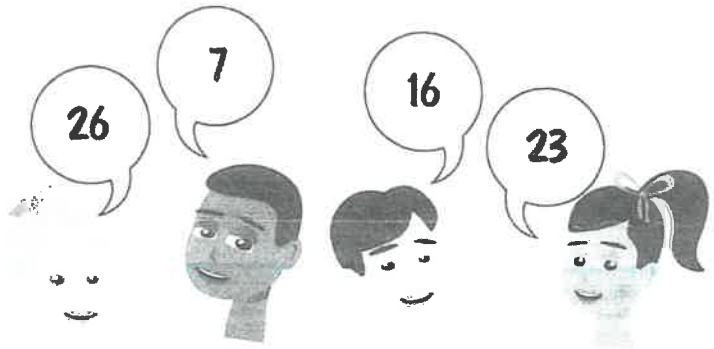
B. The simplifications of both expressions are incorrect. NOT TRUE

C. The simplification of Expression X is correct and the simplification of Expression Y is incorrect.

D. The simplification of Expression Y is correct and the simplification of Expression X is incorrect.

Each of the four students shown below simplifies the following expression.

$$4 + 3 \times 5 - 6^4 \div (4 + 2)^3 \times 2$$



Student 1 Student 2 Student 3 Student 4

Use BEDMAS

① $(4+2)^3 = 6^3$

② $6^4 \div 6^3 = 6$

So

$= 4 + 3 \times 5 - 6 \times 2$

$= 4 + 15 - 12$

$= 19 - 12 = 7$

35. Which student correctly simplified the expression?

A. Student 1

B. Student 2

C. Student 3

D. Student 4

4. Which of the following expressions is equivalent to $\frac{40 + 10}{5 \times (6 - 4)}$?

A. $40 + 10 \div 5 \times 6 - 4$

B. $(40 + 10) \div 5 \times (6 - 4)$

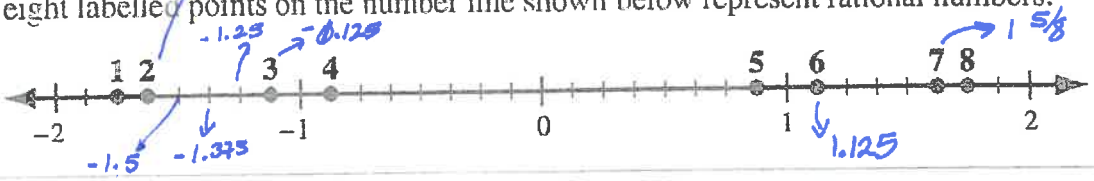
C. $40 + 10 \div (5 \times (6 - 4))$

D. $(40 + 10) \div (5 \times (6 - 4))$

• Use brackets to separate operations, and to diff. numerator from denominator

ORDERING IN NUMBER LINES
↳ COMPARING

The eight labelled points on the number line shown below represent rational numbers.



-1.625 -1.25 -0.125 1 5/8 -1.5 -1.375 1.125

Numerical Response

STRAND: NUMBER S.O.: 3

COMPLEXITY: STRATEGY

- convert fractions to mixed numbers
- convert mixed numbers to decimals

1. Match each of the following rational numbers to its corresponding point on the number line shown above.

$-1\frac{3}{4}$ is located at Point **1**. (Record in the **first** column) $-1\frac{3}{4} = -1.75$

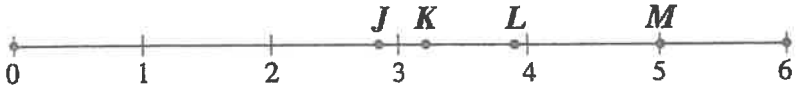
$\frac{13}{8}$ is located at Point **7**. (Record in the **second** column) $\frac{13}{8} = 1\frac{5}{8}$

1.125 is located at Point **6**. (Record in the **third** column) 1.125

−0.875 is located at Point **4**. (Record in the **fourth** column) −0.875

(Record your answer in the numerical-response section on the answer sheet.)

The letters on the number line below represent rational numbers.



1. The approximate value of $\sqrt{15}$ is represented by the letter

A. J
B. K
C. L
D. M

$\sqrt{9}$ — $\sqrt{15}$ — $\sqrt{16}$
3 4

$\sqrt{15}$ is very close to 4.

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23. Which of the following rows has the rational numbers ordered from **least** to **greatest**?

least → smallest to greatest → biggest

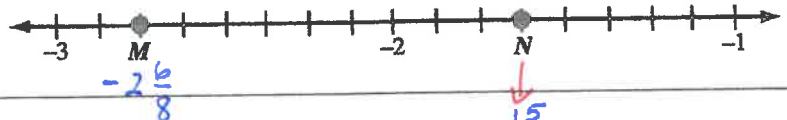
Row	Least			Greatest
A	$-\frac{5}{7}$	$-0.\overline{6}$	$\frac{2}{5}$	0.5
B.	$-0.\overline{6}$	$-\frac{5}{7}$	$\frac{2}{5}$	0.5
C.	$-\frac{5}{7}$	$-0.\overline{6}$	0.5	$\frac{2}{5}$ 0.4
D.	$-0.\overline{6}$	$-\frac{5}{7}$	0.5	$\frac{2}{5}$ 0.4

- + numbers are greater than − numbers
- smaller numbers on the negative side are further away from zero

Sam plans to graph the following rational numbers on the number line shown below.

Rational Numbers: $-2\frac{1}{4}$ -1.75 $\frac{-3}{2}$ $-2.\overline{8}$ $-1\frac{3}{5}$ $-(1.4)^2$

-2.25 -1.5 -1.6 -1.96



$-2\frac{6}{8}$ $-1\frac{5}{8}$

-2.75 -1.625

Numerical Response

6. How many of the rational numbers shown above should be graphed between Point *M* and Point *N* on the number line?

Answer: 3

(Record your answer in the numerical-response section on the answer sheet.)

The letters *P* and *Q* each represent an integer in the expression below.

$$2 \times P^3 - 6 \div Q$$

17. Which of the following values for *P* and *Q* would result in the lowest value for the expression shown above?

Row	*P*	*Q*
A.	−2	−2
B.	2	−2
C.	−2	2
D.	2	2

$2\times(-2)^3 - 6 \div (-2) = 2\times(-8) - 6 \div (-2)$ $-16 - 3 = -19$

$2\times(2)^3 - 6 \div (-2) \hookrightarrow 2\times 8 + 3 = 19$

$2\times(-8) - 6 \div 2 \hookrightarrow -16 - 3 = -19$

$2\times 8 - 6 \div 2 \hookrightarrow 16 - 3 = 13$

To get A FRACTION OF SOMETHING ⟹ Multiply!

A scientific calculator has 40 buttons, of which $\frac{1}{4}$ are white, $\frac{1}{5}$ are grey, and 4 are orange. The rest of the buttons are black.

Numerical Response

$40\left(\frac{1}{4}\right) = \frac{40}{4} = 10$ white $\quad \frac{1}{5}(40) = \frac{40}{5} = 8$ grey $\quad 4$ orange

5. How many black buttons does the calculator have?

$40 - (10 + 8 + 4) = 40 - 22 = 18$ black

Answer: 18

(Record your answer in the numerical-response section on the answer sheet.)

BEDMAS

$= 6 - \frac{1}{4} \div \frac{1}{2} - 2^3 \times 0.75$ (① 2^3)

$= 6 - \frac{1}{4} \div \frac{1}{2} - 8 \times 0.75$

$= 6 - \frac{1}{4} \times \frac{2}{1} - 8 \times 0.75$ ($\div \frac{1}{2} \to \times \frac{2}{1}$; ③ $\times$)

$= 6 - \frac{1}{2} - 6 = -\frac{1}{2}$

35. What is the value of the expression $6 - \frac{1}{4} \div \frac{1}{2} - 2^3 \times 0.75$?

A. $-\frac{1}{2}$

B. $-\frac{1}{8}$

C. $\frac{1}{8}$

D. $\frac{1}{2}$

39. Monica multiplies $-\frac{2}{3}$ by a number. If her answer is $-\frac{3}{2}$, then Monica multiplied $-\frac{2}{3}$ by

A. $-\left(\frac{3}{2}\right)^0$

B. $\left(\frac{3}{2}\right)^0$

C. $-\left(\frac{3}{2}\right)^2$

D. $\left(\frac{3}{2}\right)^2$

set-up equation

$-\frac{2}{3} \times n = -\frac{3}{2} \div -\frac{2}{3}$

$\div -\frac{2}{3} \to \times -\frac{3}{2}$

$n = \frac{3 \times 3}{2 \times 2} = \left(\frac{3}{2}\right)^2$

36. Which of the following inequalities represents the rational numbers shown above?

A. Y < Z < X

B. Y < X < Z

C. Z < X < Y

D. Z < Y < X

biggest

X: -0.054

$-3.\overline{6}$

$-3\frac{2}{3}$ ← Y: $-\frac{11}{3}$

smallest ← $-3\frac{3}{4} \to -3.75$ Z: $-\frac{15}{4}$

Variables q, r, and s represent rational numbers.

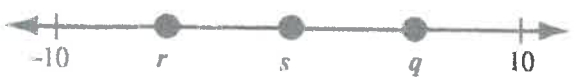
$q > r$

$s = q + 1$

22. Which of the following number lines represents the order of the three rational numbers?

A. 

B. 

C. 

D. 

- use any 3 numbers

$q = 3$

$s = q + 1 = 4$

$r = 2$

then $s > q > r$

↓ closer to 10

↓ closer to -10