

## Today's Learning Goal(s):

By the end of the class, I will be able to:

- a) multiply, divide, add and subtract  
integers AND fractions (rational numbers)

MPM 2DI

## 0.1 Arithmetic Necessities

Date: Feb. 4/16

**Note:** WITHOUT using a calculator,  
you should be able to get every question on this sheet correct.

## Review A

Discuss the rules for multiplying/dividing integers.

Same signs: result is + 4.2 Different signs: result is -

Ex. 1 Evaluate.

a) $+4 \times (+7)$	b) $-4(-2)$	c) $+4(-9)$	d) $-4(6)$
$= 28$	$= +8$	$= -36$	$= -24$

**Note:** The above are NOT considered to be "double signs".

e) $(-1)^2$	f) $(-1)^3$	g) $(-1)^4$ odd vs. even	h) $(-5)^2$	i) $-5^2$
$= (-1)(-1)$ $= +1$	$= (-1)(-1)(-1)$ $= -1$	$= 1$	$= (-5)(-5)$ $= 25$	$= -5 \cdot 5$ $= -25$

## Review B

A method for adding/subtracting (combining) integers. *Discuss "integer attitudes".*

**Note:** These rules are NOT for multiplying/dividing!

Ex. 2 Evaluate.

a) $+4 + 7$	b) $-4 - 2$	c) $+4 - 9$	d) $-2 + 6$
$= +11$	$= -6$	$= -5$	$= +4$

**Note:** The examples below ARE referred to as "double signs".

e) $+4 + (-9)$	f) $-3 - (-7)$
$= +4 - 9$	$= -3 + 7$
$= -5$	$= +4$

Review C

Does it matter where the sign is?

Are all three questions below the same?

Ex. 3 Evaluate.

a)  $\frac{-20}{4} + 3$

$= -5 + 3$

$= -2$

b)  $\frac{20}{-4} + 3$

$= -5 + 3$

$= -2$

c)  $-\frac{20}{4} + 3$

$= -5 + 3$

$= -2$

Review D Multiplying and Dividing Fractions

Method

1. Use the integer "sign rules" to establish the sign of the final answer.
2. Convert any mixed numbers  $\left(2\frac{3}{4}\right)$  to improper fractions.  $\left(\frac{11}{4}\right)$
3. Convert  $\div$  questions by "Multiplying by the RECIPROCAL" (\*All in the same step)
4. **REDUCE FIRST** by dividing both the numerator and denominator by any common factors.
5. Multiply across. i.e.  $\frac{\text{numerator} \times \text{numerator}}{\text{denominator} \times \text{denominator}}$

Recall: **Do NOT find a common denominator!** (It is not necessary for multiplying and dividing.)

Ex. 4 Evaluate. [Discuss form with the class; level fraction bars]

a)  $\frac{-3}{7} \times \frac{6}{5}$  x: 2 3

$$= -\frac{3}{5} \times \frac{3}{7}$$

$$= -\frac{9}{35}$$

b)  $1\frac{1}{3} \times \frac{9}{10}$

$$= \frac{24}{15} \times \frac{9}{10}$$

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

$$= \frac{6}{5}$$

c)  $-\frac{5}{6} \div \left(\frac{-10}{8}\right)$

$$= +\frac{5}{6} \times \frac{8}{10}$$

$$= \frac{2}{3}$$

d)  $\frac{1}{6} \div 2\frac{2}{3}$

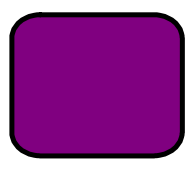
$$= \frac{1}{6} \times \frac{3}{4}$$

$$= \frac{1}{8}$$

e)  $\frac{4}{5} \times \frac{-14}{11} \times \frac{10}{9} \times \frac{-22}{7} \times \frac{3}{8}$

$$= -\frac{4}{3}$$

$$\frac{-36960}{27720}$$



Review E **Adding and Subtracting Fractions**

Method

1. Convert any mixed numbers  $\left(-5\frac{3}{7}\right)$  to improper fractions.  $\left(\frac{-38}{7}\right)$
2. Determine the lowest common denominator (LCD), and produce equivalent fractions for the ones given.
3. Simplify, and express your final answer in lowest terms.

Recall: **Never add the denominators** numerators only.

Ex. 5 Evaluate. [Discuss form with the class; level fraction bars]

$$\begin{aligned} \text{a) } \frac{3}{-7} + \left(\frac{-2}{7}\right) \\ = \frac{-3}{7} - \frac{2}{7} \\ = \frac{-5}{7} \end{aligned}$$

$$\begin{aligned} \text{b) } \frac{7}{10} + \frac{2}{15} \\ = \frac{21}{30} + \frac{4}{30} \\ = \frac{25}{30} \quad 2 \div 5 \\ = \frac{5}{6} \end{aligned}$$

$$\begin{aligned} \text{c) } 1\frac{1}{4} + 2\frac{1}{2} \\ = \frac{5}{4} + \frac{5}{2} \\ = \frac{5}{4} + \frac{10}{4} \quad \times 2 \\ = \frac{15}{4} \end{aligned}$$

$$\begin{aligned} \text{d) } -1\frac{1}{5} + 2 \\ = \frac{-6}{5} + \frac{2}{1} \\ = \frac{-6}{5} + \frac{10}{5} \\ = \frac{4}{5} \end{aligned}$$

$$\begin{aligned} \text{e) } \frac{-6-9}{2-12} \\ = \frac{-15}{-10} \quad 2 \div 5 \\ = \frac{3}{2} \end{aligned}$$

$$\begin{aligned} \text{f) } \frac{4-6}{8-(-2)} \\ = \frac{-2}{8+2} \\ = \frac{-2}{10} \quad \div 2 \\ = \frac{-1}{5} \end{aligned}$$

$$\begin{aligned} \text{g) } \frac{-12-(-4)}{-3+(-1)} \\ = \frac{-12+4}{-3-1} \\ = \frac{-8}{-4} \\ = 2 \end{aligned}$$

$$\begin{aligned} \text{h) } \frac{-1}{3} + \left(\frac{1}{-2}\right) \div \frac{-1}{4} \\ = \frac{-1}{3} + \left(-\frac{1}{2}\right) \times \left(\frac{-4}{1}\right) \\ = \frac{-1}{3} + \frac{2}{1} \\ = \frac{-1}{3} + \frac{6}{3} \\ = \frac{5}{3} \end{aligned}$$

Show divisibility rules on next page.  
Students should download from the class website.

Knowing a few simple rules will help you put fractions into lowest terms.  
 You already know most of these!

Ex.  $\frac{72}{111}$

Number Divisible by	Divisibility Tests
2 ✓	if the number is even
✗ 3	sum of the digits divisible by 3
4	last two digits divisible by 4
5 ✓	if the number ends in 0 or 5
✗ 6	the number is even and divisible by 3
8	last three digits divisible by 4
✗ 9	the sum of digits divisible by 9
10 ✓	the last digit must be zero

		Divisible By							
Number	2	3	4	5	6	8	9	10	
1. 49,863	×	✓	×						
2. 28,020									
3. 31,415			✗						
4. 29,687									
5. 92,145									
6. 68,360									

if number divides evenly.     if a remainder

Today's Entertainment:

Sign and return the cover sheet with email address PRINTED.

Complete any unfinished examples.

On a separate sheet of paper:

Complete Worksheet 1.11: #7, 9-12

**Note: I always expect you to write the question,  
then show the steps to the answer. This is 2DI !!**

Wkst 7a)  $1\frac{3}{4} \times \frac{1}{2}$   
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*If time, discuss number sets using a Venn diagram.  
(or remind me tomorrow)*

$\{\dots, -2, -1, 0, 1, 2, \dots\}$

