Exam Review

Chapter 3: Rational Numbers

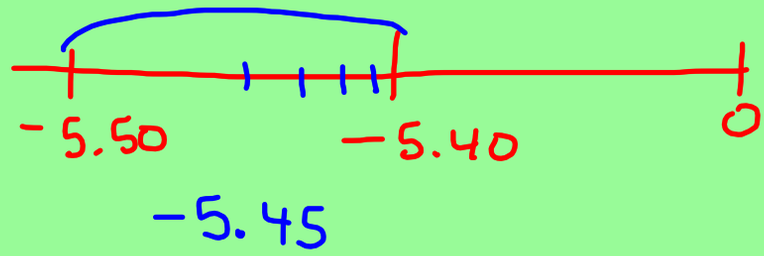
Write $\frac{4}{5}$ as a decimal.

$4 \div 5 = 0.8$

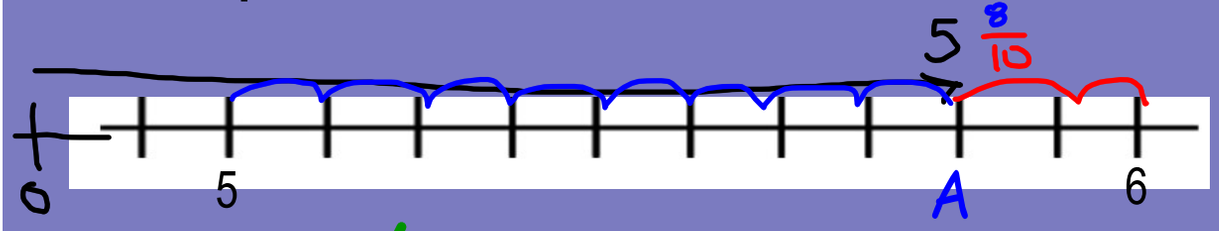
$\frac{3}{5}$ $\frac{4}{10}$

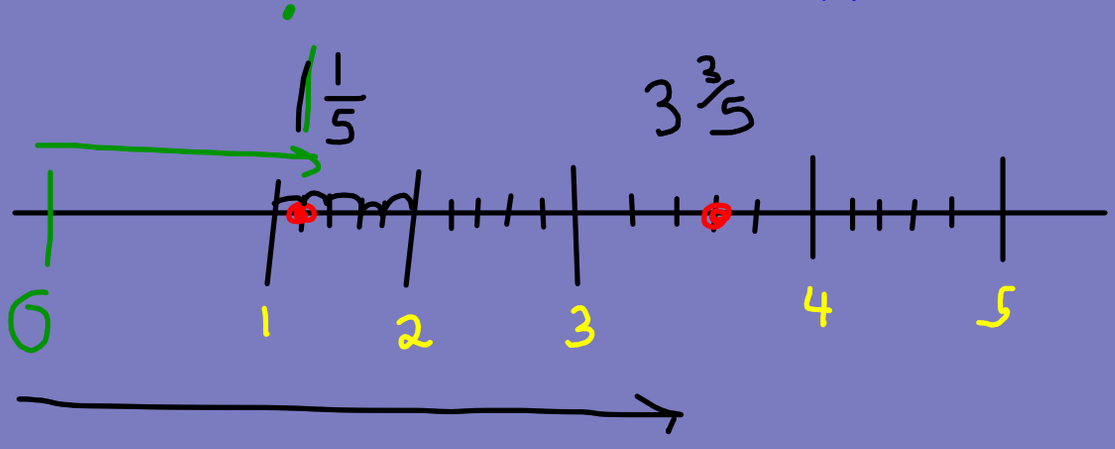
$0.6 > 0.4$

State two rational numbers between -5.40 and -5.50



Express A as a mixed fraction.





Write two equivalent fractions!

$$\frac{-8}{9} = \frac{8}{-9} = -\frac{8}{9}$$

Rational Numbers

→ any # that can be written as fraction

→ any number including decimal that repeats

$0.1\overline{33}$

→ any # that ends

The numerator is LARGER than the denominator.

Improper vs. Mixed Fractions

Improper

$\frac{7}{3}$ This is a Improper Fraction

Mixed Fraction

$2\frac{1}{3}$

Mixed Fraction

$4\frac{4}{5}$

Improper

$\frac{24}{5}$

$-5\frac{3}{7} \Rightarrow -\frac{38}{7}$

$-\frac{5}{4} = -1\frac{1}{4}$

$-3\frac{2}{5} = \frac{-17}{5}$

Arrange the numbers from least to greatest.

$$-\frac{3}{8}, \frac{5}{9}, -\frac{10}{4}, -1\frac{1}{4}, \frac{7}{10}, \frac{8}{3}$$

Change the numbers to decimals!

-0.375, 0.555..., -2.5, -1.25, 0.7, 2.666...

Least...

-2.5
-1.25
-0.375
0.555...
0.7
2.666...

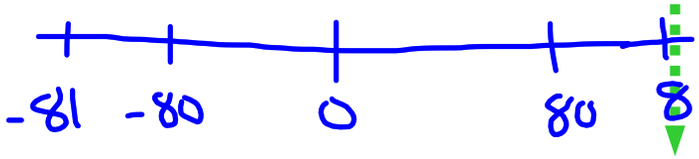
...Greatest

Which rational number is larger??

(Decimals may be used on this side.)

$\frac{-12}{15}$ $\frac{-13}{16}$

$-0.80 > -0.81$



Show your work!

(NO Decimals please!!.)

$\frac{2}{3}$ $\frac{3}{4}$

×8 ×6

$\frac{16}{24}$ $\frac{18}{24}$

Adding Fractions

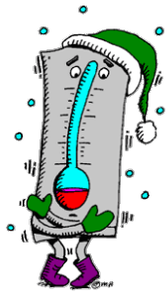
When adding fractions you need a COMMON DENOMINATOR:

1) $\frac{-5}{8} + \frac{6}{8}$

$= \frac{1}{8}$

2) $\frac{-8}{7} + \frac{-4}{7}$

$= \frac{-12}{7}$



Warm Up

Grade 9

Determine the sum of each of the following

1) $\frac{-3}{7} + \left(\frac{-3}{7}\right) =$ $\frac{-6}{7}$

2) a) 2.7 + 1.8

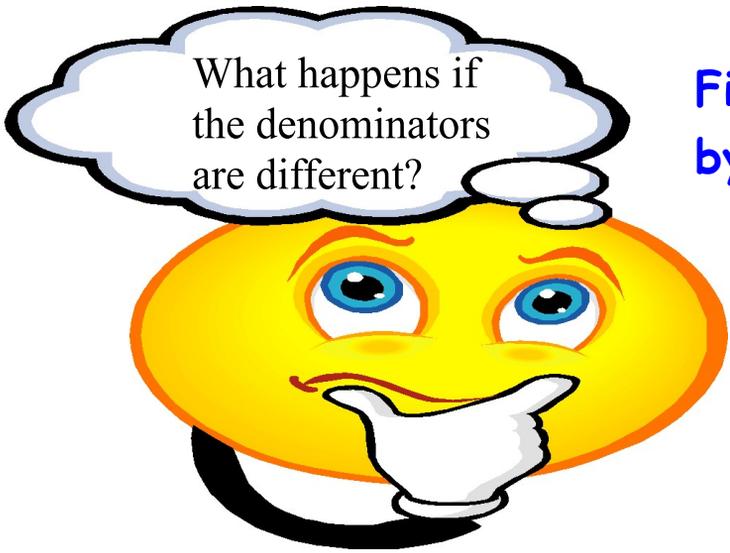
4.5

b) -3.7 + 4.5

0.8

c) 2.7 + (-8.7)

-6



Find a

by determining the LCM.

L

C

M

Find a common denominator:

$$\frac{4}{5} + \frac{8}{3}$$

$$= \frac{12}{15} + \frac{40}{15}$$

$$= \frac{52}{15}$$

Multiples

5

10

15

3

6

9

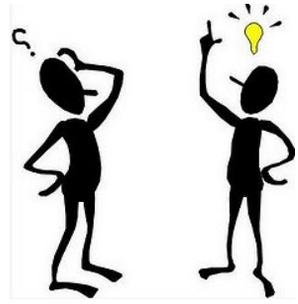
12

15

LCM

What about mixed numbers?

$$2\frac{1}{3} + 2\frac{3}{5}$$



Step 1: Write each mixed number as an improper fraction.

$$\frac{7}{3} + \frac{13}{5}$$

Step 2: Find a common denominator, and then add numerators.

$$\frac{35}{15} + \frac{39}{15} = \frac{74}{15}$$

$$= 4\frac{14}{15}$$

$$2\frac{1}{3} + 2\frac{3}{5}$$

$2 + 2 = 4$

$\frac{1}{3} + \frac{3}{5}$

$\times 5$

$\frac{5}{15} + \frac{9}{15} = \frac{14}{15}$

Practice!

1) $5\frac{7}{8} + (-3\frac{1}{2})$

$\frac{47}{8} + (-\frac{7}{2})$

$\frac{47}{8} + (-\frac{28}{8})$

2) $(-1\frac{2}{3}) + (-2\frac{1}{4})$

Section 3.3

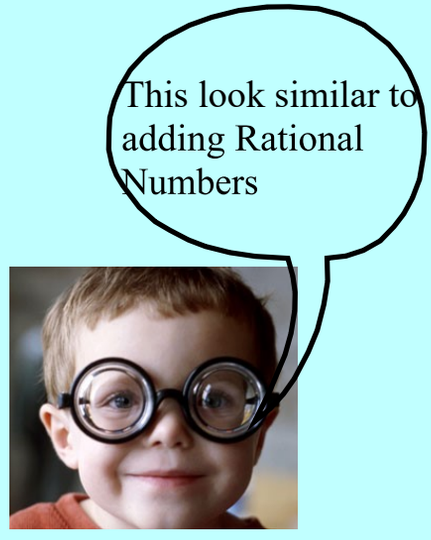
Subtracting Rational Numbers

When subtracting Rational Numbers you must have a ...

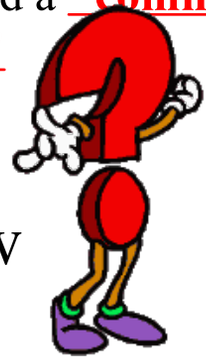
Common Denominator

Ex) $\frac{13}{7} - \frac{4}{7} =$

Same Denominators



When denominators are different you have to find a **"common denominator"**

How 

By determining the LCM

Lowest Common Multiple

(of the denominators)

Subtracting Rational Numbers in Mixed Number Form

$$3\frac{1}{5} - 2\frac{7}{10}$$

STEP 1) Write each mixed number as an inproper fraction

$$\frac{16}{5} - \frac{27}{10}$$

STEP 2) Find common denominators and then subtract like before

$$\frac{32}{10} - \frac{27}{10}$$

$$\frac{5}{10} = \frac{1}{2}$$

STEP 3) Reduce all fractions

$$3\frac{1}{5} - 2\frac{7}{10}$$

$3 - 2 = 1$

$\frac{1}{5} - \frac{7}{10}$

$\frac{2}{10} - \frac{7}{10}$

$= -\frac{5}{10}$

$1 - \frac{5}{10} = \frac{10}{10} - \frac{5}{10} = \frac{5}{10} = \frac{1}{2}$

Multiplying Rational Numbers

What rules do we use to multiply integers?

Indicate if the answer will be **negative** or **positive**. How do you know?

(-4) x 3 = (-)

(-3) x (-6) = (+)

2 x 8 = (+)

(+) (-) = (-)

Copy down

When multiplying **integers**, we use the following rules:

(a negative #) x (a positive #) = (a negative #)

a negative # x a negative # = a positive #

a positive # x a positive # = a positive #

Copy down

So, when the signs are opposite,
the product is negative

and

when the signs are the same,
the product is positive!

Now, let's take a look at Fractions.

What rules do we use to multiply fractions?

Evaluate the following expression.

$$\frac{6}{5} \times \frac{8}{7} = \frac{6 \times 8}{5 \times 7} = \frac{48}{35}$$

How did you get your answer?

When multiplying fractions, we use this rule:

Multiply the numerator by the numerator
then
Multiply the denominator by the denominator

** Then, of course, REDUCE!! (if possible)

Multiplying Rational Numbers in Fraction Form

Determine the product:

$$\left(-\frac{11}{7}\right)\left(-\frac{21}{44}\right)$$

The signs are the same, so the product is positive!

Look for common factors in the numerators and denominators.

First, we simplify:

$$= \left(\frac{-1}{1}\right)\left(\frac{-3}{4}\right) = \frac{3}{4}$$

Our rule for multiplying fractions is:
numerator by numerator
denominator by denominator

So, our new expression, looks like this:

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

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

Multiplying Rational Numbers in mixed number Form

Determine the product.

$$\left(2\frac{2}{3}\right)\left(-1\frac{3}{4}\right)$$

The signs are different,
so the product is negative!
Write the mixed numbers as improper fractions:

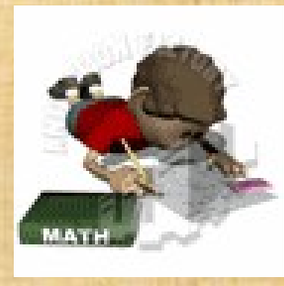
$$= \left(\frac{8}{3}\right)\left(-\frac{7}{4}\right)$$

$$= \left(\frac{{}^{2}\cancel{8}}{3}\right)\left(-\frac{7}{\cancel{4}_{1}}\right)$$

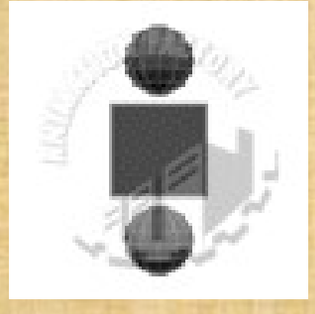
$$= \frac{(2)(-7)}{(3)(1)}$$

$$= \frac{-14}{3}$$

$$= -4\frac{2}{3}$$



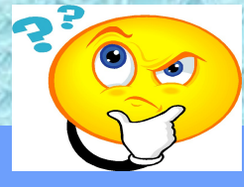
Dividing Fractions

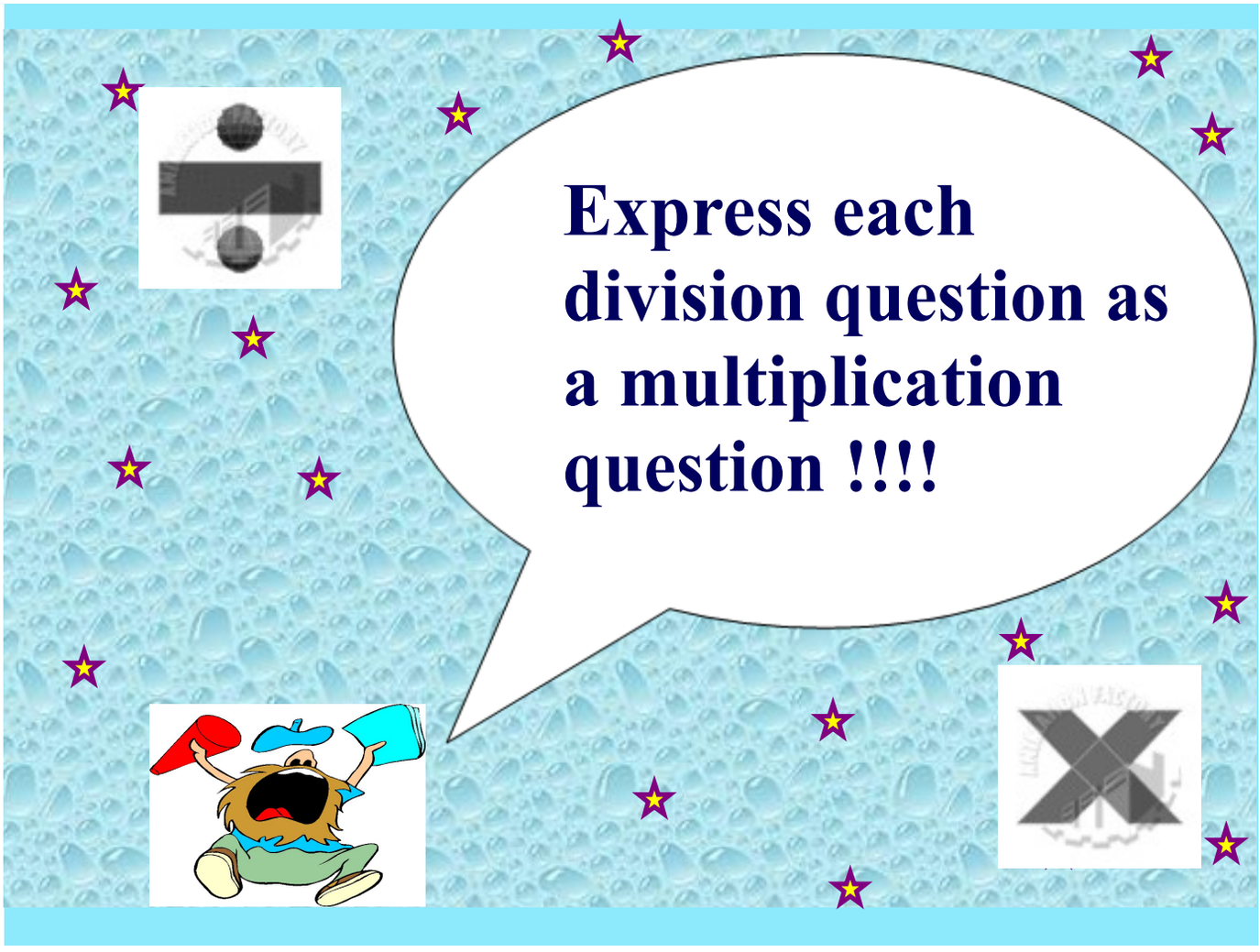


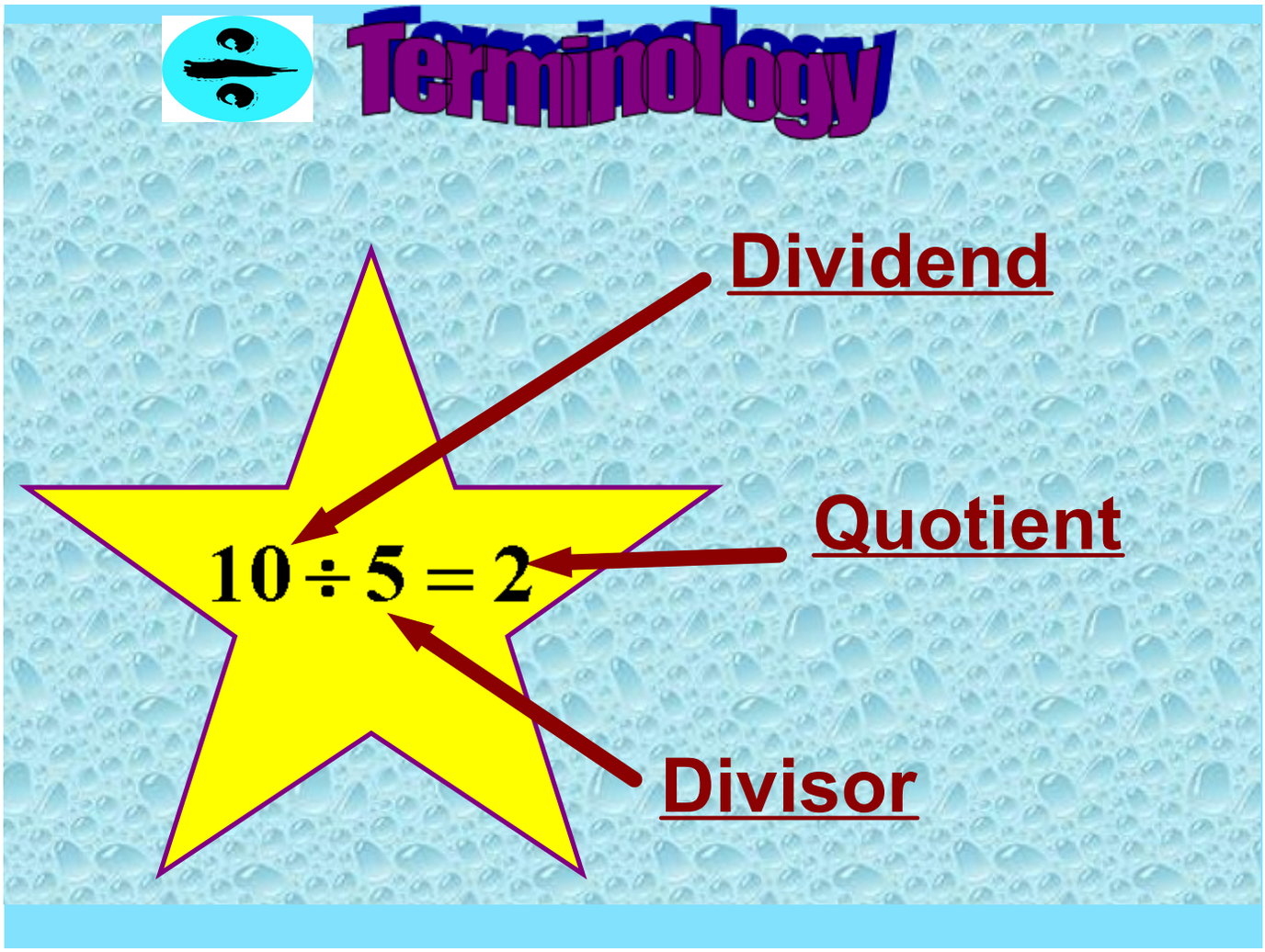
Reciprocal

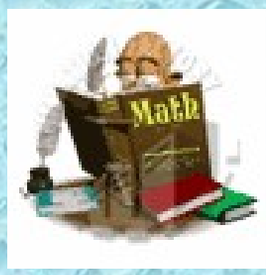
- Every non-zero fraction has a reciprocal.
- Fractions with a denominator of "0" are undefined. $\left(\frac{6}{0}\right)$
- To find the reciprocal of a fraction, you simply flip the fraction !!

$\frac{4}{5}$ $\frac{5}{4}$




Express each division question as a multiplication question !!!!


Terminology
Dividend
Quotient
Divisor
10 ÷ 5 = 2



Express division as

multipication by multiplying

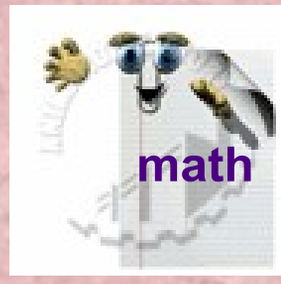
the dividend by the reciprocal

of the divisor !!

$$\frac{4}{5} \div \frac{1}{3} =$$

$$\frac{4}{5} \times \frac{3}{1} = \frac{12}{5}$$

Try These !!



#1

$$\frac{4}{5} \div \frac{7}{8} =$$

$$\frac{4}{5} \times \frac{8}{7} = \frac{32}{35}$$

#3

$$2\frac{1}{4} \div 5 =$$

$\frac{9}{4} \div \frac{5}{1}$

$\frac{9}{4} \times \frac{1}{5} = \frac{9}{20}$

Determine the missing number in the division statement.

Dividend Missing

$(\_\_) \div 4 = 3$

Think:
Division is the inverse of **Multiplication.**

What # goes in the blank?

Any division statement can be written as an equivalent multiplication.

OR

$(\_\_) = x$

To Solve for Missing Dividend
take Divisor X Quotient

Now with Rational #s

You Try

A) $(\ \ ) \div \left(\frac{5}{11}\right) = \frac{3}{7}$

B) $\_\_\_\_ \div 12.6 = 4.2$

$15 \div 5 = 3$

$\square = 5 \times 3$

$(\ ) \div \frac{2}{5} = \frac{15}{4}$

$\square = \frac{2}{5} \times \frac{15}{4}$

$= \frac{30}{20}$

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

$15 \div \square = 5$

$\square = 15 \div 5$

$\frac{4}{5} \div ( ) = \frac{6}{10}$

$\square = \frac{4}{5} \div \frac{6}{10}$

$= \frac{\cancel{4}^{2}}{\cancel{5}_{1}} \times \frac{\cancel{10}^{2}}{\cancel{6}_{3}}$

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

Determine the missing number in the division statement.

Divisor Missing Decimals

$15 \div (\_\_) = -5$

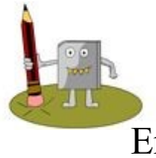
Think:
Quotient is negative thus the BLANK must be what sign? _____

What # goes in the blank?

To solve for missing Divisor
take Dividend ÷ Quotient

OR

$15 = -5 \times (\_\_)$



Erase to see

$15 = -5 \times (\_\_)$

or

Multiply by the reciprocal

reciprocal of -5 is $\frac{1}{-5}$

You Try

1) $-2.5 \div \_\_\_ = 5$

2) $1.16 \div \_\_\_ = 0.2$

What about fractions???

Determine the missing number in the division statement.

Divisor Missing &Fractions

$\left(\frac{-6}{7}\right) \div (\quad) = \frac{18}{49}$

The Quotient is Positive

Thus the divsor is _____

Divsor = Dividend ÷ Quotient

$(\quad) = \left(\frac{-6}{7}\right) \div \frac{18}{49}$

Use the strategy of multilpying by the reciprocal

$(\quad) = \left(\frac{-6}{7}\right) \times \frac{49}{18}$

Simplify

$(\quad) = \left(\frac{\cancel{-6}^{\,1}}{\cancel{7}_{\,1}}\right) \times \frac{\cancel{49}^{\,7}}{\cancel{18}_{\,3}}$

$(\quad) = \left(\frac{-7}{3}\right)$

Section 3.6

Order of Operations with Rational Numbers

Remember from operations

"BEDMAS".....order of

In the order that they appear

Recall

Evaluate the following

1) $(-5) - 3[18 \div (-3)]^2$

$-5 - 3[-6]^2$

$-5 - 3(36)$

$-5 - 108$

$= -113$

Using the Order of Operations with Decimals

Evaluate the following:

It is no difference with decimals....follow BEDMAS

With decimals you may need to round your final answers

1) $(-1.3) + 0.8 \div (-0.2) \times 5$

$= (-1.3) + (-4) \times 5$

$= (-1.3) + -20$

$= -21.3$

2) $(-3.6) - 1.7 \div [0.6 - (-0.8)]^2$

$= (-3.6) - 1.7 \div [1.4]^2$

$= (-3.6) - 1.7 \div 1.96$

$(-3.6) - 0.867346938$

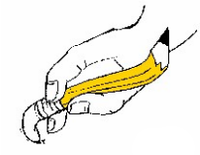
$= (-3.6) - 0.867346938$

$= -4.467346939$

this number does not terminate

Using the Order of Operations with Fractions

Remember fractions are just numbers



erase to see solutions

1) $\left(-\frac{3}{5}\right)\left(\frac{2}{5}\right)-\left(\frac{7}{30}\right)\div\left[\frac{1}{2}+\left(-\frac{1}{6}\right)\right]$

$=\left(-\frac{3}{5}\right)\left(\frac{2}{5}\right)-\left(\frac{7}{30}\right)\div\left[\frac{3}{6}+\left(-\frac{1}{6}\right)\right]$

$=\left(-\frac{3}{5}\right)\left(\frac{2}{5}\right)-\left(\frac{7}{30}\right)\div\left[\frac{2}{6}\right]$

$=\left(-\frac{6}{25}\right)-\left(\frac{7}{30}\right)\div\left[\frac{1}{3}\right]$

$=\left(\frac{-6}{25}\right)-\left(\frac{7}{30}\right)\times\frac{3}{1}$

$=\frac{-6}{25}-\frac{21}{30}$

÷3

$=\frac{-6}{25}-\frac{7}{10}$

$=\frac{-12}{50}-\frac{35}{50}$

$=\frac{-47}{50}$

=

Step 1) BRACKETS

- find common denominator then add the #s in brackets

Common Denominator = 6

Reduce sum if possible

Step 2) Multiply next

Step 3) Divide next

- multiply by the reciprocal of the divisor.

$\left(\frac{7}{30}\right)\div\left[\frac{2}{6}\right]=\left(\frac{7}{30}\right)\times\left[\frac{6}{2}\right]$

reduce at this point to work with smaller fractions

Subtract.....find common denominator

Do we need more practice?

1) Erase to reveal answer

$$\left(-1\frac{3}{4}\right)-\left(-3\frac{1}{2}+5\right)\left(-3\frac{1}{2}+5\right)$$

$$\left(\frac{-7}{4}\right)-\left(\frac{-7}{2}+\frac{5}{1}\right)\left(\frac{-7}{2}+\frac{5}{1}\right)$$

Remember to switch mixed to improper fractions

$$\left(\frac{-7}{4}\right)-\left(\frac{-7}{2}+\frac{10}{2}\right)\left(\frac{-7}{2}+\frac{10}{2}\right)$$

Make common denominators inside brackets

Complete Brackets

$$\left(\frac{-7}{4}\right)-\left(\frac{3}{2}\right)\left(\frac{3}{2}\right)$$

Multiply

$$\left(\frac{-7}{4}\right)-\left(\frac{9}{4}\right)$$

$$\frac{-16}{4}$$

Divide

$$=-4$$

4.

$$\left(-\frac{1}{2}\right)^2 - \left(-\frac{2}{3}\right) \div \left[\frac{1}{3} + \left(-\frac{3}{12}\right)\right]$$

Please erase to reveal answer

$$= \left(-\frac{1}{2}\right)^2 - \left(-\frac{2}{3}\right) \div \left[\frac{4}{12} + \left(-\frac{3}{12}\right)\right]$$

$$= \left(-\frac{1}{2}\right)^2 - \left(-\frac{2}{3}\right) \div \left[\frac{1}{12}\right]$$

$$= \left(-\frac{1}{4}\right) - \left(-\frac{2}{3}\right) \div \left[\frac{1}{12}\right]$$

$$= \left(-\frac{1}{4}\right) - \left(-\frac{2}{3}\right) \times \frac{12}{1}$$

$$= \left(-\frac{1}{4}\right) - \left(-\frac{2}{\cancel{3}_1}\right) \times \frac{\cancel{12}^4}{1}$$

$$= \left(-\frac{1}{4}\right) - \left(\frac{-8}{1}\right)$$

$$= \left(-\frac{1}{4}\right) - \left(\frac{-32}{4}\right)$$

$$= \frac{31}{4}$$

Class / Homework

Page 144 & 145

-If the question deals with fractions you must work with fractions (no calculator)
-As soon as you see a decimal you can use a calculator

#2 *(without calculator)*
3(c,d)
#5 (a,c)
#7(a,b,c) *(without calculator)*
#10(b,c) *(without calculator)*
#14 (b, d)

#18(ac)
#19(b,d)
#21 *(without calculator)*
#23a,c,d,g