Warm Up

1. Paco was asked to come to the board and simplify the expression below. If he answered the question correctly, which answer did he give?

$$(3x^2 - 3x - 4) - (x^2 + 4x - 2)$$

Ⓐ $2^7 - 2x - 2$

Ⓑ $2x - 7x - 2$

Ⓒ $2x + 7x + 2$

Ⓓ $2x^2 - 7x - 2$

2. At Junior's Smokehouse, Richard earns 10% commission on each sale of beef jerky. Today, he sold $250 worth of jerky. How much commission did Richard make today?

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$3x^2 - 3x - 4 - x^2 - 4x + 2$

$3x^2 - x^2 - 3x - 4x - 4 + 2$

$2x^2 - 7x - 2$

Ⓐ $2^7 - 2x - 2$

Ⓑ $2x - 7x - 2$

Ⓒ $2x + 7x + 2$

Ⓓ $2x^2 - 7x - 2$

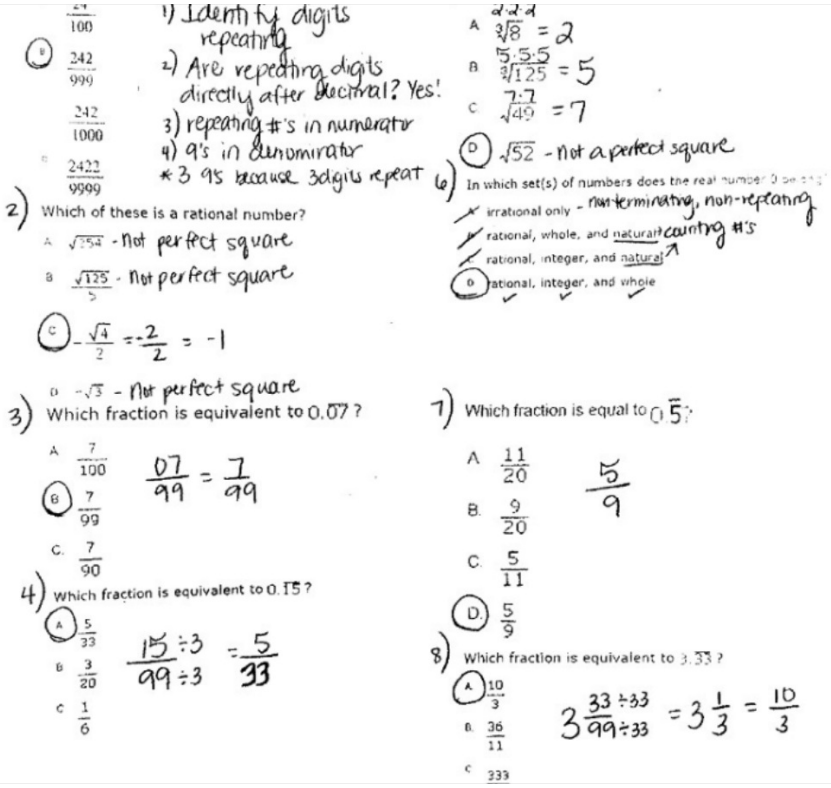
2. At Junior's Smokehouse, Richard earns 10% commission on each sale of beef jerky. Today, he sold $250 worth of jerky. How much commission did Richard make today?

10% of 250

$.10(250) = 25$

$25

Homework



$\frac{24}{100}$

B $\frac{242}{999}$

$\frac{242}{1000}$

D $\frac{2422}{9999}$

1) Identify digits repeating
2) Are repeating digits directly after decimal? Yes!
3) repeating #'s in numerator
4) 9's in denominator
* 3 9s because 3 digits repeat

2) Which of these is a rational number?

A $\sqrt{54}$ - not perfect square

B $\frac{\sqrt{125}}{5}$ - not perfect square

C $-\frac{\sqrt{4}}{2} = -\frac{2}{2} = -1$

D $-\sqrt{3}$ - not perfect square

3) Which fraction is equivalent to $0.\overline{07}$?

A $\frac{7}{100}$

B $\frac{7}{99}$ $\frac{07}{99} = \frac{7}{99}$

C. $\frac{7}{90}$

4) Which fraction is equivalent to $0.\overline{15}$?

A $\frac{5}{33}$ $\frac{15 \div 3}{99 \div 3} = \frac{5}{33}$

B $\frac{3}{20}$

C $\frac{1}{6}$

A $\sqrt[3]{8} = 2$

B $\sqrt[3]{125} = 5$

C $\frac{7 \cdot 7}{\sqrt{49}} = 7$

D $\sqrt{52}$ - not a perfect square

6) In which set(s) of numbers does the real number 0 be a 3?

irrational only - non-terminating, non-repeating

rational, whole, and natural - counting #'s

rational, integer, and natural

D rational, integer, and whole

7) Which fraction is equal to $0.\overline{5}$?

A $\frac{11}{20}$

B. $\frac{9}{20}$ $\frac{5}{9}$

C. $\frac{5}{11}$

D. $\frac{5}{9}$

8) Which fraction is equivalent to $3.\overline{33}$?

A $\frac{10}{3}$

B. $\frac{36}{11}$ $3\frac{33 \div 33}{99 \div 33} = 3\frac{1}{3} = \frac{10}{3}$

C $\frac{333}{}$

Objective: You will be able to convert repeating decimals into fractions, thus proving they are rational numbers.

Converting Repeating Decimals Into Fractions

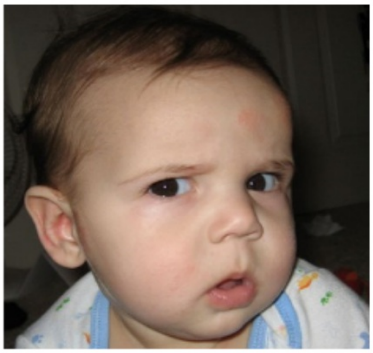
A **rational number** is any number that can be expressed in the form a/b where a and b are both integers and b is not zero.

Includes:

- **Integers**
- all **fractions and mixed numbers**
- any **decimal** that **terminates or repeats**.

Converting Repeating Decimals to Fractions

Repeating decimals are rational...are you sure?



$\frac{a}{b}$

$\frac{1}{3} \rightarrow$

$\frac{1}{3} = .\overline{3}$

$$
\begin{array}{r}
.333 \\
3\overline{)1.000} \\
-9\downarrow \\
\hline
10 \\
-9 \\
\hline
10
\end{array}
$$

Converting Repeating Decimals to Fractions

$$0.\overline{a} = \frac{a}{9}$$

$$0.\overline{bc} = \frac{bc}{99}$$

$$0.\overline{xyz} = \frac{xyz}{999}$$

Converting Repeating Decimals to Fractions

$0.\overline{8} = \frac{8}{9}$

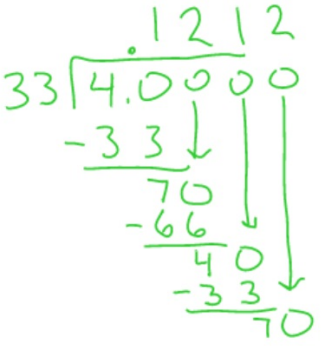
$0.\overline{8} = \frac{8}{9}$

$$
\begin{array}{r}
.888 \\
9\overline{)8.000} \\
-72 \\
\hline
80 \\
-72 \\
\hline
80
\end{array}
$$

Converting Repeating Decimals to Fractions

$$0.\overline{12}$$

$$\frac{12}{99} = \frac{4}{33}$$



Converting Repeating Decimals to Fractions

$$0.\overline{328}$$

$$\frac{328}{999}$$

$$
\begin{array}{r}
.328 \\
999\overline{)328.000} \\
-2997 \\
\hline
2830 \\
-1998 \\
\hline
8320 \\
-7992 \\
\hline
328
\end{array}
$$

Write each decimal as a fraction:

1) $0.\overline{3} = \frac{3}{9} = \frac{1(3)}{3(3)} = \frac{1}{3}$

2) $0.\overline{18} = \frac{18}{99} = \frac{2(9)}{11(9)} = \frac{2}{11}$

3) $2.\overline{2} = 2\frac{2}{9} = \frac{20}{9}$

4) $3.\overline{63} = 3\frac{63}{99} = 3\frac{7(9)}{11(9)} = 3\frac{7}{11} = \frac{40}{11}$

5) $0.2\overline{8}$ $\overset{\times 10}{\Rightarrow}$ $2.\overline{8} = 2\frac{8}{9} = \frac{26}{9} \div 10 = \frac{26}{9} \times \frac{1}{10} = \frac{26}{90} = \frac{2(13)}{2(45)} = \boxed{\frac{13}{45}}$

6) $0.9\overline{7}$ $\overset{\times 10}{\Rightarrow}$ $9.\overline{7} = 9\frac{7}{9} = \frac{88}{9} \div 10 = \frac{88}{9} \cdot \frac{1}{10} = \frac{88}{90} = \frac{2(44)}{2(45)} = \boxed{\frac{44}{45}}$

Guided Practice: Solve.

1) $.\overline{4} \times \frac{2}{3} = \frac{4}{9} \times \frac{2}{3} = \frac{8}{27}$

2) $1\frac{3}{5} \div 2.\overline{2} = 1\frac{3}{5} \div 2\frac{2}{9} = \frac{8}{5} \div \frac{20}{9} = \frac{8}{5} \cdot \frac{9}{20} = \boxed{\frac{18}{25}}$ (2(4), 5(4))

3) $1.\overline{3} + 2\frac{1}{18} = 1\frac{3}{9} + 2\frac{1}{18} = 1\frac{6}{18} + 2\frac{1}{18} = 3\frac{7}{18} = \boxed{\frac{61}{18}}$

Group Practice

1) $\overline{.5} \times \frac{1}{6} = \frac{5}{9} \times \frac{1}{6} = \boxed{\frac{5}{54}}$

2) $4\frac{1}{3} \div 0.\overline{7} = 4\frac{1}{3} \div \frac{7}{9} = \frac{13}{3} \div \frac{7}{9} = \frac{13}{\cancel{3}_{3(1)}} \cdot \frac{\cancel{9}^{3(3)}}{7} = \boxed{\frac{39}{7}}$

3) $\frac{1}{3} + 0.\overline{1} = \frac{1}{3} + \frac{1}{9} = \frac{3}{9} + \frac{1}{9} = \boxed{\frac{4}{9}}$

Individual Practice

1) $1.1\overline{3} \times \frac{1}{3}$ $\quad 11.\overline{3} \times \frac{1}{3} = 11\frac{3}{9} \times \frac{1}{3} = \frac{102}{9} \cdot \frac{1}{3} = \frac{102}{27}$

2) $2.10\overline{8} \div \frac{1}{2}$ $\quad 210.\overline{8}$

3) $.\overline{18} \div \frac{3}{4}$

Individual Practice

1. $2.\overline{3} \times \frac{1}{2}$ If your answer is given in the form $\frac{a}{b}$, with no common factors, what is the value of b?

2. $.\overline{3} + 2\frac{3}{4}$ If your answer is given in the form $\frac{a}{b}$, with no common factors, what is the value of a?

3. $4.0\overline{4} - 1\frac{2}{3}$ If your answer is given in the form $\frac{a}{b}$, with no common factors, what is the value of b?

Homework:

repeating decimal worksheet second one

B. $\frac{3}{10}$

C. $\frac{3}{8}$

D. $\frac{3}{5}$

2.
Which fraction is equivalent to $0.\overline{6}$?

A. $\frac{1}{15}$

B. $\frac{1}{6}$

C. $\frac{1}{3}$

D. $\frac{2}{3}$

3.
Which fraction is equivalent to a repeating decimal?

A. $\frac{1}{19}$

B. $\frac{1}{15}$

C. $\frac{1}{16}$

D. $\frac{1}{20}$

4.
Which number is equivalent to $2.\overline{47}$?

A. $\frac{1}{21}$

B. $2\frac{21}{50}$

C. $2\frac{19}{45}$

A plant grew $1.\overline{3}$ inches within the first month and $0.\overline{5}$ of an inch within the next month. How many total inches did the plant grow in the first two months?

A. $1\frac{1}{9}$

B. $1\frac{4}{5}$

C. $1\frac{5}{6}$

D. $1\frac{8}{9}$

5.
Which rational number is equivalent to $0.\overline{36}$?

A. $\frac{4}{9}$

B. $\frac{11}{30}$

C. $\frac{4}{11}$

D. $\frac{5}{25}$

7. CHANGE TO A REPEATING DECIMAL

a. $3.\overline{4}$

b. $.\overline{74}$

C. $.3\overline{9}$

D $.8\overline{5}$

E $1.09\overline{5}$

8.

a. $1.\overline{3} \times \frac{1}{3}$

b. $.\overline{4} + 2\frac{3}{4}$

C. $.0\overline{4} - 3.\overline{5}$ IF YOUR ANSWER IS GIVEN IN THE FORM $\frac{a}{b}$ WITH NO Common factors what is b?