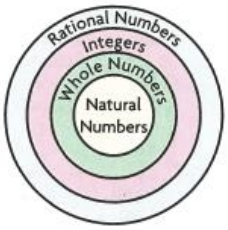
2.1 Introduction to Rational Numbers

NUMBER SETS

Set	Definition	Examples	Symbol
Natural Numbers	the counting numbers		
Whole Numbers	the counting numbers and zero		
Integers	positive and negative whole numbers		
Rational Numbers 	-numbers that can be written in the form $\frac{a}{b}$ where *a* and *b* are integers and $b \neq 0$ - numbers that either *repeat* or *terminate* in their decimal form		
Irrational Numbers	- numbers that do not *repeat* or *terminate* in their decimal form		

Ex. 1. Simplify each rational number to a positive or negative fraction in lowest terms.

a) $\frac{-2}{4}$ **b)** $\frac{-9}{-12}$ **c)** $-\frac{-8}{10}$ **d)** $-\frac{-14}{-21}$

Ex. 2. Rewrite the following rational numbers as positive or negative *fractions* in $\frac{a}{b}$ form.

a) 4 **b)** 0 **c)** $-3\frac{7}{8}$ **d)** $-1\frac{4}{5}$

Ex. 3. Rewrite the following rational numbers as *decimals* (terminating or repeating).

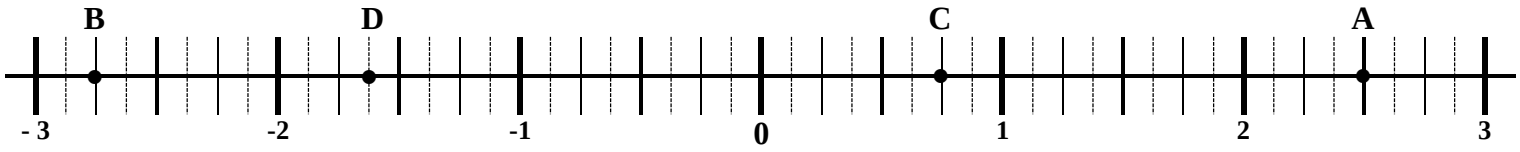
a) $1\frac{1}{4}$ **b)** $\frac{2}{3}$ **c)** $\frac{2}{-5}$ **d)** $-1\frac{1}{6}$

Ex. 4. Rewrite the following rational numbers as positive or negative *fractions* in $\frac{a}{b}$ form.

a) 0.55 **b)** -2.8 **c)** $0.\overline{3}$ **d)** $-4.\overline{7}$

Ex. 5. Identify the values represented by: **i)** **A** and **B** in decimal form

ii) **C** and **D** in simplified fraction form



Ex. 6. Place < , >, or = to make true statements. Explain how you know each statement is true.

a) $-2.5 \quad -1.25$

b) $\frac{3}{-5} \quad \frac{-8}{10}$

c) $-2 \quad \frac{-21}{10}$

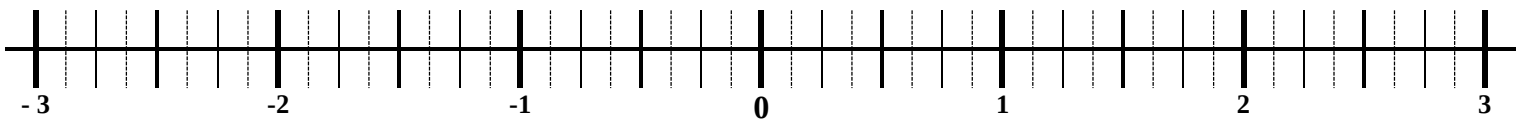
d) $-2.\overline{6} \quad -\frac{-8}{-3}$

Ex. 7. Write and use a mathematical expression to determine the rational number which is:

a) $1\frac{5}{6}$ more than $-3\frac{1}{4}$

b) 3.1 less than -5.5

Ex. 8. Graph each rational number on the number line: **A** $\frac{3}{4}$, **B** $-\frac{3}{2}$, **C** $\frac{14}{-16}$, **D** $-\frac{9}{4}$, **E** $\frac{-2}{-8}$, **F** $1\frac{1}{8}$

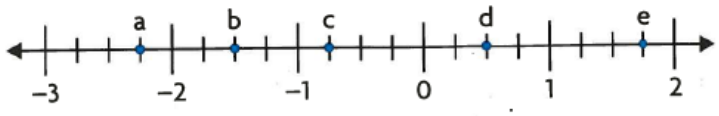


HW: #1 to 6

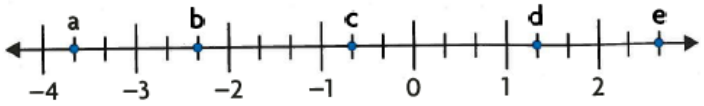
#7 to 13 on lined paper

2.1 Introduction to Rational Numbers Homework

1. Identify the values represented by a, b, c, d, and e, in decimal form.

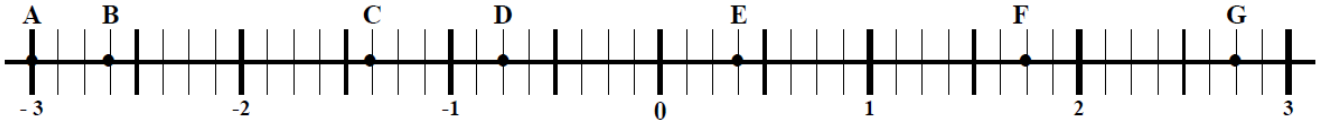


2. Identify the values represented by a, b, c, d, and e, as quotients of two integers. ($\frac{a}{b}$ form)



3. Identify the values represented by **A**, **B**, **C**, **D**, **E**, **F** and **G** in simplified fraction form if necessary.

A. **B.** **C.** **D.** **E.** **F.** **G.**



4. Simplify each rational number to a positive or negative fraction in lowest terms.

a) $\frac{5}{-10}$ **b)** $\frac{10}{-15}$ **c)** $\frac{-12}{-30}$ **d)** $\frac{-6}{15}$

e) $-\frac{-6}{11}$ **f)** $-\frac{54}{-81}$ **g)** $-\frac{-14}{-25}$ **h)** $-\frac{-15}{-35}$

5. Express each rational number as a positive or negative mixed number in lowest terms.

a) $-\frac{8}{5}$ **b)** $\frac{-10}{-8}$ **c)** $-\frac{-17}{-2}$ **d)** $-\frac{-30}{4}$

6. Express each mixed number as an improper fraction in lowest terms.

a) $-4\frac{1}{2}$ **b)** $7\frac{1}{3}$ **c)** $-8\frac{2}{5}$ **d)** $-1\frac{6}{8}$

Complete #7 to #13 on lined paper.

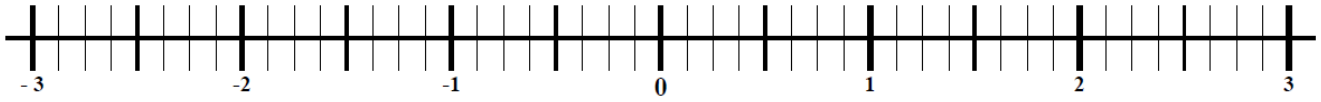
7. Rewrite the following rational numbers as fractions in lowest terms.

a) -0.35 **b)** 4.025 **c)** -11.6 **d)** $-0.\overline{27}$ **e)** $4.\bar{3}$ **f)** $-6.\bar{8}$

8. Rewrite the following rational numbers as decimals using long division.

a) $\frac{7}{8}$ **b)** $-3\frac{6}{11}$ **c)** $1\frac{1}{15}$ **d)** $\frac{4}{-7}$

9. Graph each rational number on the number line: **A** 0.5, **B** $-\frac{1}{4}$, **C** $-\frac{-5}{-2}$, **D** $2\frac{3}{8}$, **E** -2.75, **F** $\frac{12}{4}$, **G** $-\frac{30}{16}$



10. Order the following numbers from least to greatest. π, $\sqrt{\frac{49}{4}}$, $3.515253\ldots$, $3.\bar{1}$, $-\frac{26}{-8}$, 3.1, $\sqrt{15}$

11. From the numbers listed in **#10**, state with reasons the numbers that are irrational.

12. Compare each pair of rational numbers using the < or > signs.

a) $\frac{7}{4}$ $\frac{-5}{4}$ **b)** $-3.\bar{3}$ $-\frac{5}{3}$ **c)** $\frac{8}{6}$ $-\frac{5}{-3}$

d) -0.7 $\frac{-16}{20}$ **e)** $-3\frac{1}{6}$ $\frac{110}{-30}$ **f)** $-\frac{-24}{20}$ $1\frac{3}{5}$

13. Write and use a mathematical expression to determine the rational number which is:

a) 18 more than –6 **b)** 6 less than 3.5 **c)** 7 greater than –7.8

d) $\frac{1}{2}$ more than $-\frac{7}{2}$ **e)** $1\frac{1}{2}$ less than $\frac{1}{3}$ **f)** 8.5 fewer than –4.9

Answers

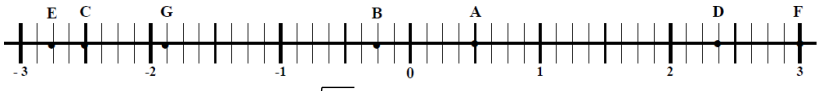
1. a) -2.25 **b)** -1.5 **c)** -0.75 **d)** 0.5 **e)** 1.75 **2. a)** $-\frac{11}{3}$ **b)** $-\frac{7}{3}$ **c)** $-\frac{2}{3}$ **d)** $\frac{4}{3}$ **e)** $\frac{8}{3}$

3. A -3, **B** $-2\frac{5}{8}$, **C** $-1\frac{3}{8}$, **D** $-\frac{3}{4}$, **E** $\frac{3}{8}$, **F** $1\frac{3}{4}$, **G** $2\frac{3}{4}$ **4. a)** $-\frac{1}{2}$ **b)** $-\frac{2}{3}$ **c)** $\frac{2}{5}$ **d)** $-\frac{2}{5}$ **e)** $\frac{6}{11}$ **f)** $\frac{2}{3}$ **g)** $-\frac{14}{25}$ **h)** $-\frac{3}{7}$

5. a) $-1\frac{3}{5}$ **b)** $1\frac{1}{4}$ **c)** $-8\frac{1}{2}$ **d)** $7\frac{1}{2}$ **6. a)** $-\frac{9}{2}$ **b)** $\frac{22}{3}$ **c)** $-\frac{42}{5}$ **d)** $-\frac{7}{4}$ **7. a)** $-\frac{7}{20}$ **b)** $4\frac{1}{40}$ **c)** $-11\frac{3}{5}$ **d)** $-\frac{3}{11}$ **e)** $4\frac{1}{3}$ **f)** $-6\frac{8}{9}$

8. a) 0.875 **b)** $-3.\overline{54}$ **c)** $1.0\bar{6}$ **d)** $-0.\overline{571428}$

9.



10. $3.1, 3.\bar{1}, \pi, \frac{26}{8}$ *or* $3\frac{1}{4}$ *or* $3.25, \sqrt{\frac{49}{4}}$ *or* $3\frac{1}{2}$ *or* $3.5, 3.515253\ldots, \sqrt{15}$ *or* $\doteq 4$

11. $\pi = 3.141592\ldots$, $3.515253\ldots$ and $\sqrt{15} = 3.872983\ldots$ are irrational numbers because they do not terminate or repeat as decimals.

12. a) > **b)** < **c)** < **d)** > **e)** > **f)** < **13. a)** 12 **b)** –2.5 **c)** –0.8 **d)** –3 **e)** $-1\frac{1}{6}$ **f)** –13.4

2.2 Multiplying and Dividing Rational Numbers

Rules : i) Simplify signs.
ii) Convert all mixed numbers to improper fractions and give all whole numbers a denominator of 1.
iii) If dividing, remember "**KCI R**aiders".
iv) Reduce by dividing out common factors in the numerator and denominator.
v) Multiply numerators and multiply denominators.
vi) Reduce the final answer to lowest terms if necessary.

Ex. 1. Evaluate.

a) $\frac{-7}{8} \times \frac{3}{-14}$ **b)** $2\frac{1}{4} \div \frac{-3}{8}$ **c)** $\frac{-8}{-9} \times \frac{-3}{5} \div (-40)$

d) $-1\frac{5}{9} \div 2\frac{1}{3} \div \frac{-4}{-9}$ **e)** $-1\frac{1}{4} \div \frac{7}{-8} \div (-1.25)$

Ex. 2. Evaluate.

a) $-3.5(-0.6)$ **b)** $\frac{8.6}{-0.2}$ **c)** $-\frac{-0.45}{-0.009}$

Ex. 3. Evaluate.

a) $\left(-\frac{1}{4}\right)^2$ **b)** $-\left(-\frac{2}{5}\right)^4$ **c)** $\left(-1.\bar{3}\right)^3$

HW: PART A: #1-11
PART B: #1,2; PART B: #3-5 on lined paper

2.2 Multiplying and Dividing Rational Numbers Homework

PART A: Evaluate.

1. $\frac{3}{5}\times\frac{5}{-8}$ **2.** $\frac{5}{6}\div\left(-\frac{2}{3}\right)$ **3.** $-\frac{-2}{-3}\times\frac{-6}{7}$ **4.** $-\frac{3}{8}\div\frac{-5}{-4}$

5. $\frac{2}{-3}\times(-6)$ **6.** $-2\frac{1}{4}\times\left(-3\frac{1}{3}\right)$ **7.** $\frac{-4}{-5}\div(-4)$ **8.** $1\frac{2}{3}\div\left(-2\frac{1}{5}\right)$

9. $-\frac{2}{3}\times\frac{1}{-2}\times\frac{-6}{5}$ **10.** $\left(\frac{-3}{4}\right)\left(1\frac{1}{5}\right)\div\left(-1\frac{4}{5}\right)$ **11.** $(-1.75)\div\left(-1\frac{1}{5}\right)\div\left(-\frac{5}{9}\right)$

Answers

1. $-\frac{3}{8}$ **2.** $-1\frac{1}{4}$ **3.** $\frac{4}{7}$ **4.** $-\frac{3}{10}$ **5.** 4 **6.** $7\frac{1}{2}$ **7.** $-\frac{1}{5}$ **8.** $-\frac{25}{33}$ **9.** $-\frac{2}{5}$ **10.** $\frac{1}{2}$ **11.** $-2\frac{5}{8}$

PART B: Show all work. Complete **#3**, **4** and **5** on lined paper.

1. Evaluate.

a) $-2(9.5)$ **b)** $\dfrac{0.08}{-0.5}$ **c)** $-0.65(-10.1)$ **d)** $\dfrac{-3.046}{0.04}$

2. Without evaluating, determine which expressions are equivalent to $\dfrac{3}{4}\times\dfrac{5}{8}$.

a) $\dfrac{3}{4}\div\dfrac{8}{5}$ **b)** $-\dfrac{3}{4}\left(\dfrac{-5}{-8}\right)$ **c)** $\dfrac{3}{-4}\times\left(-\dfrac{5}{8}\right)$ **d)** $\dfrac{-3}{4}\div\dfrac{-8}{5}$

---

3. Evaluate. Express simplified final answers as mixed numbers if applicable.

a) $-\dfrac{4}{7}\times\dfrac{21}{-8}$ **b)** $\dfrac{2}{5}\div\left(-\dfrac{5}{8}\right)$ **c)** $\dfrac{-2}{\frac{5}{8}}$ **d)** $\dfrac{\frac{-2}{5}}{8}$

e) $\left(\dfrac{5}{-12}\right)\left(-\dfrac{-8}{-15}\right)$ **f)** $\dfrac{15}{16}\div\left(-1\dfrac{1}{24}\right)$ **g)** $-2\dfrac{1}{2}(-1.6)$ **h)** $0.\bar{5}\div\left(-8.\bar{3}\right)$

i) $-4\dfrac{2}{3}\div\dfrac{7}{-12}\div(-3)$ **j)** $-2\dfrac{2}{6}\div\left(1\dfrac{1}{12}\right)\left(-5\dfrac{1}{5}\right)$ **k)** $\dfrac{15}{-16}\times 3.2\div\left(-1.\overline{6}\right)$

4. Evaluate.

a) $\left(-\dfrac{2}{3}\right)^2$ **b)** $\dfrac{-2^2}{3}$ **c)** $-\left(-\dfrac{3}{4}\right)^2$ **d)** $(-0.5)^5$ **e)** $-\left(-1\dfrac{2}{3}\right)^3$

5. Evaluate. Express simplified final answers as mixed numbers if applicable.

a) $\left(\dfrac{3}{4}\right)\left(-\dfrac{2}{3}\right)^3$ **b)** $\left(-1\dfrac{1}{2}\right)^2\div(-3)^2$ **c)** $\left(-\dfrac{3}{4}\right)^3\div\left(-\dfrac{1}{2}\right)^4\left(-4\dfrac{2}{3}\right)$

Answers

1. a) -19.0 **b)** -0.16 **c)** 6.565 **d)** -76.15 **2. a, c, d**

3. a) $1\frac{1}{2}$ **b)** $-\frac{16}{25}$ **c)** $-3\frac{1}{5}$ **d)** $-\frac{1}{20}$ **e)** $\frac{2}{9}$ **f)** $-\frac{9}{10}$ **g)** 4 **h)** $-\frac{1}{15}$ **i)** $-2\frac{2}{3}$ **j)** $11\frac{1}{5}$ **k)** $1\frac{4}{5}$

4. a) $\frac{4}{9}$ **b)** $-\frac{4}{3}$ **c)** $-\frac{9}{16}$ **d)** $-\frac{1}{32}$ **e)** $\frac{125}{27}$ **5. a)** $-\frac{2}{9}$ **b)** $\frac{1}{4}$ **c)** $31\frac{1}{2}$

2.3 Adding and Subtracting Rational Numbers

Rules for adding or subtracting:

i) Eliminate brackets and double signs, making sure all denominators are positive.
ii) Convert all mixed fractions to improper fractions and give all whole numbers a denominator of 1.
iii) Find the lowest common denominator, LCD**.**
iv) Add or subtract the numerators only. Keep the denominator the same.
v) Reduce the final answer to lowest terms if possible. (Simplify.)

Ex. 1. Evaluate.

a) $-\frac{3}{8}-\frac{7}{8}$ **b)** $-\frac{5}{6}+1\frac{1}{2}$ **c)** $\frac{-2}{3}-\left(-1\frac{1}{5}\right)$ **d)** $\sqrt{\frac{9}{100}}-\sqrt{\frac{16}{25}}$

d) $\frac{2}{-3}+\left(-\frac{3}{5}\right)+\frac{-7}{-10}$ **e)** $-3.25-\left(-1\frac{1}{3}\right)+\frac{5}{6}-2$

Ex. 2. Evaluate.

a) $5.6-(-3.2)$ **b)** $-4.5+7.8$ **c)** $-8.9-(-4)$

Ex. 3. The daily changes in selling price for a particular stock during a week were $-\$2.78$, $-\$5.45$, $\$0.38$, $\$1.38$, and $\$2.12$. If the selling price was $\$58.22$ at the start of the week determine:

i) the weekly change in the selling price **ii)** the selling price at the end of the week

HW: PART A: #1-11; PART B: #1,2; PART B: #3-5 on lined paper

2.3 Adding and Subtracting Rational Numbers Homework

PART A: Evaluate.

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

2. $-\frac{2}{3}+3$

3. $-0.\bar{6}+\left(-\frac{3}{5}\right)$

4. $-\frac{1}{4}+\frac{-1}{2}$

5. $\frac{3}{8}-\left(-\frac{1}{4}\right)$

6. $-\frac{3}{5}+\frac{1}{-10}$

7. $-1\frac{2}{3}-\left(-2\frac{1}{2}\right)$

8. $-\frac{-2}{-3}+\frac{-6}{5}$

9. $\sqrt{\frac{1}{9}}-\sqrt{\frac{121}{36}}-\sqrt{\frac{49}{81}}$

10. $\frac{1}{-6}-\frac{3}{-4}+\frac{-1}{3}$

11. $\left(-1\frac{3}{4}\right)+(-1.2)-\left(-2\frac{1}{2}\right)$

Answers

1. $-\frac{1}{3}$ **2.** $2\frac{1}{3}$ **3.** $-1\frac{4}{15}$ **4.** $-\frac{3}{4}$ **5.** $\frac{5}{8}$ **6.** $-\frac{7}{10}$ **7.** $\frac{5}{6}$ **8.** $-1\frac{13}{15}$ **9.** $-2\frac{5}{18}$ **10.** $\frac{1}{4}$ **11.** $-\frac{9}{20}$

PART B: Show all work. Complete **#3**, **4** and **5** on lined paper.

1. Evaluate.

a) $2.5-7.3$ **b)** $-4.2+(-2.8)$ **c)** $-3.64-(-72.9)$

d) $-(-9.37)+5.98$ **e)** $-2.5+(-8.5)+3.68-(-1.2)$

2. Without evaluating, determine which expressions are equivalent to $-\frac{1}{4}+\frac{7}{3}-\frac{2}{11}$.

a) $\frac{4}{-16}-\left(-2\frac{3}{9}\right)+\left(-\frac{18}{99}\right)$ **b)** $-0.25+2.\bar{3}-0.\overline{18}$ **c)** $\frac{-2}{8}-\left(\frac{-7}{-3}\right)+\left(-\frac{-6}{33}\right)$

---

3. Evaluate. Express simplified final answers as mixed numbers if applicable.

a) $\frac{4}{-3}+\frac{1}{3}$ **b)** $\frac{6}{8}+\left(-\frac{5}{4}\right)$ **c)** $\frac{-6}{-5}+\frac{-3}{2}$ **d)** $-\frac{3}{5}-\left(-\frac{9}{3}\right)$

e) $-\frac{-1}{2}+\frac{3}{-10}$ **f)** $-1-\left(-\frac{-13}{-7}\right)$ **g)** $-1\frac{1}{5}+\left(-3\frac{1}{4}\right)$ **h)** $-5\frac{2}{3}+3.75$

i) $-\frac{2}{5}+\frac{1}{-6}-2.\bar{6}$ **j)** $-2+\frac{16}{3}-3\frac{8}{9}$ **k)** $1-\sqrt{1\frac{9}{16}}+\sqrt{\frac{49}{64}}$ **l)** $-\left(2\frac{1}{4}\right)^2+1.5^3$

4. The temperature at Moosonee, Ontario on December 25th at 5:00 a.m. was -22.3° C in 2017 and -14.4° C in 2018. How much warmer was the temperature on Christmas Day in 2018?

5. On Canada Day, Maya spent 5/12 of her day sleeping, 1/9 of her day eating and 3/8 of her day doing chores. What fraction of Maya's day is left for other activities and how much time does she have for these activities to the nearest minute?

Answers

1. a) -4.8 **b)** -7.0 **c)** 69.26 **d)** 15.35 **e)** -6.12 **2. a, b**

3. a) -1 **b)** $-\frac{1}{2}$ **c)** $-\frac{3}{10}$ **d)** $2\frac{2}{5}$ **e)** $\frac{1}{5}$ **f)** $\frac{6}{7}$ **g)** $-4\frac{9}{20}$ **h)** $-1\frac{11}{12}$ **i)** $-3\frac{7}{30}$ **j)** $-\frac{5}{9}$ **k)** $\frac{5}{8}$ **l)** $-1\frac{11}{16}$

4. 7.9° C **5.** $\frac{7}{72}$, 2 hours and 20 minutes

2.4 Order of Operations with Rational Numbers

Ex. 1. Evaluate by following the order of operations.

a) $-1\frac{5}{6}-\frac{3}{4}\left(\frac{-8}{9}\right)$

b) $-\frac{4}{7}\times\left(-6\frac{1}{4}-\frac{-3}{8}\right)$

c) $\dfrac{\frac{-5}{8}+\left(\frac{3}{4}\right)^2}{\left(\frac{1}{2}-\frac{2}{3}\right)^2}$

Ex. 2. Evaluate by substitution.

a) $ab+2c \quad if \quad a=-\frac{2}{3},\ b=-\frac{1}{8},\ c=-1\frac{1}{2}$

b) $4c(a-b) \quad if \quad a=-1.3,\ b=2.6,\ c=-0.5$

HW: #1, 2; #3, 4 on lined paper

2.4 Order of Operations with Rational Numbers Homework

1. Evaluate by following the order of operations.

a) $-3.2(4.2-10)$ **b)** $-1.9+0.12\div(-0.4)$

c) $8.9-3.6^2$ **d)** $2(-0.4)^3$

2. Evaluate each expression for the given values.

a) $(x+y)(x-y)$ when $x=1.8$ and $y=-3.2$ **b)** $\frac{x}{y}+\frac{y}{x}$ when $x=-1\frac{1}{2}$ and $y=2\frac{1}{4}$

---

3. Evaluate by following the order of operations.

a) $\frac{1}{-4}+\frac{2}{3}\div\frac{5}{6}$ **b)** $-2\frac{1}{4}\div\left(1\frac{3}{4}-5\frac{1}{2}\right)$ **c)** $-12\times\frac{1}{4}\left(\frac{1}{3}-\frac{4}{5}\right)$

d) $\frac{3}{5}+\left(-\frac{2}{3}\right)\left[-\frac{3}{4}\div\left(-\frac{1}{2}\right)\right]$ **e)** $-\left(-2\frac{1}{4}\right)^2+1.5^3$ **f)** $-2+3.6\ (0.\bar{3})^2$

4. The formula to convert temperatures between degrees Fahrenheit and degrees Celsius is $C=\frac{5}{9}(F-32)$. Apply the formula to convert the following.

a) Miami, Florida's high of $98.6^\circ F$ to degrees Celsius

b) Anchorage, Alaska's low of $-31^\circ F$ to degrees Celsius

Answers

1. a) 18.56 **b)** -2.2 **c)** -4.06 **d)** -0.128 **2. a)** -7.0 **b)** $-\frac{13}{6}$ *or* $-2\frac{1}{6}$

3. a) $\frac{11}{20}$ **b)** $\frac{3}{5}$ **c)** $\frac{7}{5}$ *or* $1\frac{2}{5}$ **d)** $-\frac{2}{5}$ **e)** $-\frac{27}{16}$ *or* $-1\frac{11}{16}$ **f)** $-\frac{8}{5}$ *or* $-1\frac{3}{5}$ **4. a)** $37^\circ C$ **b)** $-35^\circ C$

2.5 Order of Operations with Rational Numbers Continued

Ex. 1. Evaluate.

a) $-1\frac{1}{6} - \frac{-1}{-14}\left(-\frac{4}{5} + \frac{1}{3}\right)$

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

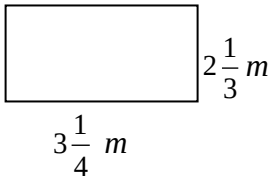
Ex. 2. Evaluate.

a) $\frac{a+c}{b}$ *if* $a = -\frac{2}{3}$, $b = \frac{1}{8}$ and $c = -1\frac{1}{2}$

b) $(x+y)(x-y)$ *if* $x = 1.2$ and $y = -0.5$

Ex. 3. Determine the perimeter and area of the rectangle shown.

.



HW: #1, 2; #3, 4 on lined paper

2.5 Order of Operations with Rational Numbers Continued Homework

1. Evaluate by following the order of operations.

a) $6.4 - 4.2 \times 1.5$

b) $-2.83 - (-3.28) + (-8.91) + 4.56$

c) $-4.6 + 2(8.9 - 9.8)$

d) $(-3.1)(-4) - (0.4)^3 \div (-0.2)^2$

2. Evaluate each expression for the given values.

a) $(2xy)^2$ when $x = -0.5$ and $y = 1.2$

b) $-x^2 - 3x - 1$ when $x = -\frac{2}{3}$

---

3. Evaluate by following the order of operations.

a) $\frac{2}{5} \div \left(\frac{-2}{5} + \frac{1}{10} \right)$

b) $-1\frac{1}{2} - \frac{-1}{-2} - \frac{-3}{5}$

c) $\left[\frac{1}{8} + \left(\frac{-2}{3} \right) \right] \times \frac{14}{13}$

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

e) $\dfrac{-\frac{1}{3} + \left(\frac{1}{4} \right)^2}{-1\frac{1}{6}}$

f) $\frac{-1}{6} + (-0.\overline{6})(2.25) \div 3$

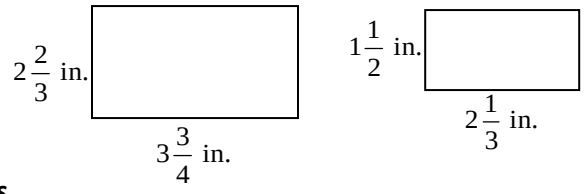
4. Choose and use the correct expression from below to determine each of the following:

a) the difference in the perimeters of the two rectangles

b) the difference in the areas of the two rectangles

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

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



Answers

1. a) 0.1 **b)** -3.90 **c)** -6.4 **d)** 10.8 **2. a)** 1.44 **b)** $\frac{5}{9}$

3. a) $-\frac{4}{3}$ *or* $-1\frac{1}{3}$ **b)** $-\frac{7}{5}$ *or* $-1\frac{2}{5}$ **c)** $-\frac{7}{12}$ **d)** $-\frac{8}{5}$ *or* $-1\frac{3}{5}$ **e)** $\frac{13}{56}$ **f)** $-\frac{2}{3}$ **4. a) ii;** $5\frac{1}{6}$ in. **b) i;** $6\frac{1}{2}$ in.^{2}

Unit 2 Review

PART A – Circle the best answer(s) for each question.

1. Which of the following is **not** a rational number?

a. $\frac{\left(\sqrt{2}\right)^2}{\left(\sqrt{5}\right)^2}$ **b.** $-0.\overline{2}$ **c.** π^2 **d.** $(3.14)^2$

2. Which of the following temperatures is the coldest?

a. $-4\frac{5}{6}^{\circ}\text{C}$ **b.** -4.8°C **c.** $4\frac{5}{6}^{\circ}\text{C}$ **d.** 4.8°C

3. Which of the following is **not** a negative rational number between -10 and -9?

a. $-\frac{29}{3}$ **b.** $-\frac{31}{3}$ **c.** -3.1^2 **d.** $-\frac{-82}{-9}$

4. The product of -0.3 and 0.06 is:

a. 0.018 **b.** -0.18 **c.** -0.018 **d.** -0.294

5. The quotient, $-\frac{0.035}{-0.7}$ is:

a. -0.005 **b.** 0.5 **c.** 0.0005 **d.** 0.05

6. The **simplified** value of $\frac{3}{5}$ decreased by $1\frac{1}{10}$ is:

a. $-\frac{1}{2}$ **b.** $1\frac{7}{10}$ **c.** $-\frac{5}{10}$ **d.** $\frac{1}{2}$

7. Which of the following expressions is **not** equivalent to $\frac{2}{3}$?

a. $\sqrt{\frac{4}{9}}$ **b.** $-0.\overline{3}-(-1)$ **c.** $-\frac{3}{4}\div\left(-1\frac{1}{8}\right)$ **d.** $\frac{3}{4}\times\frac{-8}{9}$

8. How should the expression $-\frac{12}{27}\div\frac{10}{-9}\div(-6)$ be best simplified before reducing?

a. $-\frac{12}{27}\times\frac{-9}{10}\div\left(\frac{-6}{1}\right)$ **b.** $\frac{12}{27}\times\frac{9}{10}\div\left(-\frac{6}{1}\right)$ **c.** $-\frac{12}{27}\times\frac{9}{10}\times\frac{1}{6}$ **d.** $-\frac{12}{27}\times\frac{-9}{10}\times\left(\frac{1}{-6}\right)$

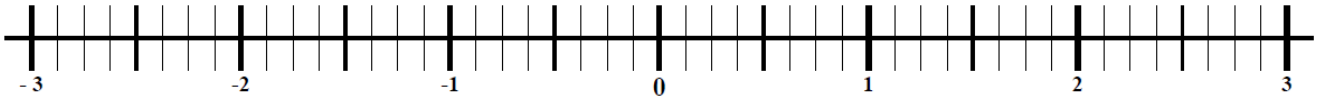
9. Which of the following expressions shows the substitution for $(x-y)^2$ when $x=-\frac{1}{2}$ and $y=-\frac{3}{4}$?

a. $-\frac{1}{2}-\left(\frac{3}{4}\right)^2$ **b.** $-\frac{1}{2}-\frac{3}{4}^2$ **c.** $\left(-\frac{1}{2}-\frac{3}{4}\right)^2$ **d.** $\left[\left(-\frac{1}{2}\right)-\left(-\frac{3}{4}\right)\right]^2$

PART B – Show all work for #3 – 6 on lined paper.

1. Plot each rational number on the number line below. Label with the corresponding letter.

A. $\frac{5}{2}$ **B.** $-\frac{-7}{8}$ **C.** $-\frac{-5}{-8}$ **D.** $\frac{-8}{-4}$ **E.** $-\frac{6}{4}$ **F.** -2.125



2. True or False? Justify your answer.

a) Every integer is also a rational number. _____

b) The denominator of a rational number can be any integer _____

c) All decimal numbers are rational numbers _____

3. Evaluate.

a) $-15.3-2.7\div(-3)$ **b)** $\frac{16-4.8\times 2.1}{8+16\div(-4)}$ **c)** $\frac{(0.8)^2-2(-1.18)}{-1-0.5}$

4. Evaluate.

a) $\frac{-3}{4}\times\frac{8}{9}$ **b)** $-\left(\frac{3}{-7}\right)+\left(-1\frac{5}{14}\right)$ **c)** $-\frac{3}{5}+\left(\frac{-7}{-10}\right)-\left(\frac{-1}{-2}\right)$

d) $\frac{7}{-8}\div(-7)$ **e)** $\frac{5}{-8}\times\frac{-4}{15}\times\frac{-18}{-14}\div\frac{-9}{21}$ **f)** $3\frac{1}{2}+\frac{8}{15}\div\frac{-4}{45}$

g) $\dfrac{\sqrt{\frac{1}{4}}-2}{\sqrt{\frac{25}{36}}-\sqrt{\frac{16}{9}}}$ **h)** $\left(\frac{2}{3}-\frac{-1}{4}\right)^2-\left(\frac{3}{-4}+\frac{2}{3}\right)^2$ **i)** $6\frac{1}{2}\times\left(-\frac{4}{5}\right)\div\left[0.\overline{6}-(-3.6)\right]$

5. Evaluate each expression for the given values.

a) $\frac{x-y}{2z}$ for $x=\frac{1}{2}$, $y=\frac{-2}{3}$, $z=\frac{-3}{4}$ **b)** $(2xy)^3$ for $x=-0.5$, $y=1.2$

6. The daily changes in selling price for a particular stock during a week were $-\$4.50$, $-\$2.94$, $\$0.28$, $-\$2.36$, and $\$3.72$. What was the average daily change in selling price for the stock during this week?

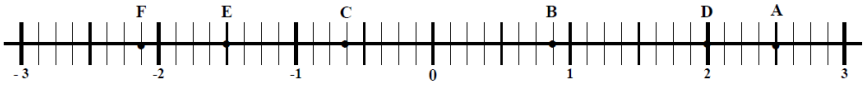
Answers

PART A

1. c 2. a 3. b 4. c 5. d 6. a 7. d 8. c 9. d

PART B

1.



2. a) True **b)** False; denominator ≠ 0. **c)** False; π, $\sqrt{15}$ are irrational numbers because they do not terminate or repeat as decimals.

3. a) -14.4 **b)** 1.48 **c)** -2 **4. a)** $-\frac{2}{3}$ **b)** $-\frac{13}{14}$ **c)** $-\frac{2}{5}$ **d)** $\frac{1}{8}$ **e)** $-\frac{1}{2}$ **f)** $-2\frac{1}{2}$ **g)** 3 **h)** $\frac{5}{6}$ **i)** $-1\frac{7}{32}$

5. a) $-\frac{7}{9}$ **b)** -1.728 **6.** $-\$1.16$