Math 9 Chapter 3 – Rational Numbers Review Name: key

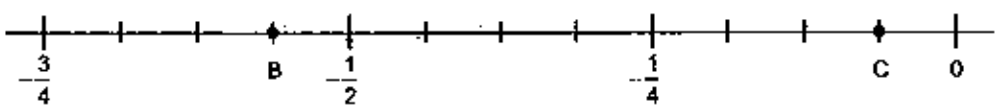
Answer all questions in the space provided. Show your work wherever possible.

LEARNING OUTCOME: 3A: I can compare and order rational numbers.

1. Circle all of the rational numbers in the list $\frac{2}{11}, 3.6, 0.8\overline{3}, \frac{11}{2}$

2. Identify the number that is NOT equal to the other three numbers. $\frac{-5}{8}, \frac{5}{-8}, \frac{-5}{-8}, -\frac{5}{8}$

3. Write the rational number represented by each letter on the number line, as a fraction.



$B = \frac{-9}{16}$ $C = \frac{-1}{16}$

4. Order these numbers from least to greatest by: $-\frac{3}{4}, -\frac{7}{9}, -\frac{5}{6}, -\frac{2}{3}$ $\frac{-5}{6} < \frac{-7}{9} < \frac{-3}{4} < \frac{-2}{3}$

5. Circle all of the numbers in the list that are between $\frac{4}{6}$ and $\frac{7}{5}$? $\frac{5}{6}, \frac{1}{5}, \frac{7}{8}, \frac{4}{5}$

6. Which rational number is greater? Explain how you know: $3.3, 3.\overline{3}$

$3.\overline{3} = 3.333\ldots$ ∴ bigger than 3.3

LEARNING OUTCOME: 3B: I can add rational numbers.

7. Add.

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

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

b) $\left(-\frac{1}{3}\right) + \left(-\frac{5}{8}\right)$

$= \frac{-8}{24} + \left(-\frac{15}{24}\right)$

$= \frac{-8-15}{24} = \frac{-23}{24}$

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

$= \frac{5}{3} - \frac{9}{4}$

$= \frac{20}{12} - \frac{27}{12}$

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

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

$= -\frac{19}{4} - \frac{8}{5}$

$= -\frac{95}{20} - \frac{32}{20}$

$= -\frac{127}{20}$

8. Determine this sum. $(-2.5) + (-6.1)$

$= -8.6$

9. A student first borrowed \$40.25, then borrowed another \$15.75 from his father. He then paid back \$20.75. How much does he still owe his father?

$-40.25 - 15.75 + 20.75 = -35.25$

\$ He still owe \$35.25

LEARNING OUTCOME: 3C: I can subtract rational numbers.

10. Subtract.

a) $\left(-\frac{5}{12}\right) - \frac{1}{12}$

$= \frac{-6}{12} = \frac{-1}{2}$

b) $\frac{11}{12} - \left(-\frac{3}{8}\right)$

$= \frac{22}{24} + \frac{9}{24} = \frac{31}{24}$

c) $6\frac{1}{2} - \left(-5\frac{1}{3}\right)$

$= 6\frac{3}{6} + 5\frac{2}{6}$

$= 11\frac{5}{6}$

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

$= -7\frac{3}{6} - 1\frac{4}{6}$

$= -8\frac{7}{6} = -9\frac{1}{6}$

11. Determine this difference. $3.7 - (-5.9)$

$= 3.7 + 5.9 = 9.6$

LEARNING OUTCOME: 3D: I can multiply rational numbers.

12. Multiply.

a) $\left(-\frac{2}{5}\right)\times\left(\frac{3}{7}\right)$

$= \frac{-6}{35}$

b) $\frac{4}{9} \times (-6)$

$= \frac{4\times(-6)^{\div 3}}{9_{\div 3}}$

$= \frac{4\times(-2)}{3} = \boxed{\frac{-8}{3}}$

c) $\frac{4}{7}\times\left(-\frac{21}{32}\right)$

$= \frac{\cancel{4}^{1}}{\cancel{7}_{1}} \times \frac{-\cancel{21}^{-3}}{\cancel{32}_{8}}$

$= \frac{1\times(-3)}{1\times 8} = \frac{-3}{8}$

d) $\left(2\frac{5}{8}\right)\times\left(-1\frac{1}{3}\right)$

$= \frac{\cancel{21}^{7}}{\cancel{8}_{2}} \times \frac{-\cancel{4}^{-1}}{\cancel{3}_{1}}$

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

e) $(-0.2)\times(-5.4)$

$= 1.08$

$$\begin{array}{r} 5.4 \\ \times 0.2 \\ \hline 1.08 \end{array}$$

13. Mrs. Lee's has \$35 in her wallet. She decides to buy 3 new pyjama outfits for her daughter at a cost of \$14 each.

a. Write a multiplication statement with rational numbers to determine the COST of buying the calculators.

$14\times 3 = 42.$

b. How much does Mrs. Lee's have left in her wallet after paying for the pyjamas.

She doesn't have enough to buy 3 pajamas! She can only buy 2, She would have $35-(14\times 2)=7$ \$7 left on her wallet.

LEARNING OUTCOME: 3E: I can divide rational numbers.

14. Divide.

a) $\left(-\frac{7}{11}\right)\div\left(-\frac{2}{3}\right)$

$= \frac{-7}{11} \times \frac{-3}{2}$

$= \frac{21}{22}$

b) $-\frac{25}{36}\div\left(-\frac{5}{9}\right)$

$= \frac{\overset{-5}{\cancel{-25}}}{\cancel{36}_{4}} \times \frac{-\cancel{9}^{-1}}{\cancel{8}_{1}}$

$= \frac{(-5)\times(-1)}{4\times 1}$

$= \frac{5}{4}$

c) $1\frac{1}{2} \div \left(-2\frac{3}{5}\right)$

$= \frac{3}{2} \div \frac{-13}{5}$

$= \frac{3}{2} \times \frac{5}{-13}$

$= \boxed{\frac{-15}{26}}$

LEARNING OUTCOME: 3F: I can use order of operations (BEDMAS) with rational numbers.

15. Simplify. Show all your steps.

a) $\left(-\frac{1}{8}\right)+\left(-\frac{2}{5}\right)\times\left(\frac{15}{16}\right)$

$= -\frac{1}{8} + \left(\frac{-2}{5} \times \frac{15^{3}}{16_{8}}\right)$

$= \frac{-1}{8} + \left(\frac{-3}{8}\right)$

$= \frac{-4}{8} = \frac{-1}{2}$

b) $\left[\frac{1}{3}+\frac{3}{5}\right]\div\left[\left(-\frac{5}{9}\right)\times\frac{12}{25}\right]$

$= \left(\frac{5}{15}+\frac{9}{15}\right) \div \left(\frac{-5}{9} \times \frac{12^{4}}{25}\right)$

$= \frac{14}{15} \div \left(\frac{-4}{15}\right)$

$= \frac{14}{15} \times \frac{-15}{4_{2}} = \boxed{\frac{-7}{2}}$

c) $-\frac{1}{16}+\left(-\frac{1}{4}+\frac{3}{4}\right)^{2}+\frac{5}{8}$

$= \frac{-1}{16} + \left(\frac{2}{4}\right)^{2} + \frac{5}{8}$

$= \frac{-1}{16} + \frac{4}{16} + \frac{10}{16}$

$= \frac{13}{16}$

d) $(-12.2)\times(-6.1)-[9.3-(-6.9)]$

$= 74.42 - (9.3+6.9)$

$= 74.42 - 16.2$

$= 58.22$

12.2
×6.1
122
732
74.42

9.3
+6.9
16.2

74.42
−16.2
58.22

LEARNING OUTCOME: CURRICULAR COMPENTENCIES

16. Which temperature is warmer, $\frac{-1}{4}$ °C or -0.3°C? Explain.

$\frac{-1}{4}°C = -0.25°C > -0.3°C \therefore \boxed{-0.25°C}$

17. The table includes the melting points and the boiling points of six elements known as the noble gases.

Noble Gas	Melting Point (°C)	Boiling Point (°C)
Argon	−189.2	−185.7
Helium	−272.2	−268.6
Neon	−248.67	−245.92
Krypton	−156.6	−152.3
Radon	−71.0	−61.8
Xenon	−111.9	−107.1

a) Which noble gases have a melting point that is less than the melting point of argon?

Helium, Neon

b) Which noble gases have a boiling point that is greater than the boiling point of krypton?

Radon, Xenon

c) Arrange the boiling points in descending order.

$-61.8 > -107.1 > -152.3 > -185.7 > -245.92 > -268.6$

18. The table uses positive numbers to show how many hours the time in a location is ahead of the time in London, England. Negative numbers show how many hours the time is behind the time in London.

Location	Time Zone
Alice Springs, Australia	$+9\frac{1}{2}$
Brandon, Manitoba	-6
Chatham Islands, New Zealand	$+12\frac{3}{4}$
Istanbul, Turkey	$+2$
Kathmandu, Nepal	$+5\frac{3}{4}$
London, England	0
Mumbai, India	$+5\frac{1}{2}$
St. John's, Newfoundland and Labrador	$-3\frac{1}{2}$
Tokyo, Japan	$+9$
Victoria, British Columbia	-8

a) How many hours is the time in St. John's ahead of the time in Brandon?

$-3\frac{1}{2}-(-6)=-3\frac{1}{2}+6=2\frac{1}{2}$ hours.

b) How many hours is the time in Victoria behind the time in Mumbai?

$-8-(5\frac{1}{2})=-13\frac{1}{2}$ hours

c) Determine and interpret the time difference between Tokyo and Kathmandu.

$9-5\frac{3}{4}=3\frac{1}{4}$ Tokyo is $3\frac{1}{4}$ hours ahead of Kathmandu.

d) Determine and interpret the time difference between Chatham Islands and St. John's.

$12\frac{3}{4}-(-3\frac{1}{2})=12\frac{3}{4}+3\frac{2}{4}=15\frac{5}{4}=16\frac{1}{4}$, Chatham Islands is $16\frac{1}{4}$ hours ahead of St. John's

e) In which location is the time exactly halfway between the times in Istanbul and Alice Springs?

$2+9\frac{1}{2}=11\frac{1}{2}$

$11\frac{1}{2}\div 2=\frac{23}{2}\times\frac{1}{2}=\frac{23}{4}=5\frac{3}{4}$.

Kathmandu

19. Can the difference of two rational numbers be more than both of the rational numbers? Explain using examples in fraction form.

Yes, $\frac{1}{2}-(\frac{-1}{2})=\frac{1}{2}+\frac{1}{2}=1$

$1>\frac{1}{2}$ & $1>\frac{-1}{2}$

20. Taj has three scoops for measuring flour. The largest scoop holds $2\frac{1}{2}$ times as much as the smallest one. The middle scoop holds $1\frac{3}{4}$ times as much as the smallest one. Describe a way in which Taj could measure each of the following quantities if he can only use full scoops.

a) $4\frac{1}{4}$ times as much as the smallest scoop holds

$2\frac{1}{2}+1\frac{3}{4}=2\frac{2}{4}+1\frac{3}{4}=3\frac{5}{4}=4\frac{1}{4}$

one large scoop & one middle scoop.

b) $\frac{1}{2}$ as much as the smallest scoop holds

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

use one large scoop, then use smallest scoop twice to take out two smallest scoop. Then you're left with 1/2.

21. Kwasi said that he ignored the fractions when he decided that $-2\frac{1}{5}$ is smaller than $-1\frac{9}{10}$. Is he correct? Explain his thinking.

Yes because both $\frac{1}{5}$ & $\frac{9}{10}$ are proper fractions so they won't affect the integers (-2 & -1 respectively).

22. Add one pair of brackets to the left side of each equation to make it a true statement.

a) $3.5 \times (4.1 - 3.5) - 2.8 = -0.7$

b) $(2.5 + (-4.1) + (-2.3)) \times (-1.1) = 4.29$

c) $-5.5 - (-6.5) \div (2.4 + (-1.1)) = -0.5$