Checkpoint 1

Problem 1-61

Operations with Signed Fractions and Decimals

Answers to problem 1-61: a: $-\frac{17}{24}$, b: 4.1, c: $1\frac{2}{5}$, d: $-1\frac{1}{3}$, e: $3\frac{7}{12}$, f: 2.24

Use the same processes with signed fractions and decimals as are done with integers (positive and negative whole numbers.)

Example 1: Compute $\frac{1}{3}+\left(-\frac{9}{20}\right)$

Solution: When adding a positive number and a negative number, subtract the values and the number further from zero determines the sign.

$\frac{1}{3}+-\frac{9}{20}=\frac{1}{3}\cdot\frac{20}{20}+-\frac{9}{20}\cdot\frac{3}{3}=\frac{20}{60}+-\frac{27}{60}=-\frac{7}{60}$

Example 2: Compute $-1.25-(-3.9)$

Solution: Change any subtraction problem to "addition of the opposite" and then follow the addition process.

$-1.25-(-3.9)\Rightarrow -1.25+3.9=-1.25+3.90=2.65$

Example 3: Compute $-1\frac{1}{4}\div 7\frac{1}{2}$

Solution: With multiplication or division, if the signs are the same, then the answer is positive. If the signs are different, then the answer is negative.

$-1\frac{1}{4}\div 7\frac{1}{2}=-\frac{5}{4}\div\frac{15}{2}=-\frac{5}{4}\cdot\frac{2}{15}=-\frac{\cancel{5}\cdot\cancel{2}}{\cancel{2}\cdot 2\cdot 3\cdot\cancel{5}}=-\frac{1}{6}$

Now we can go back and solve the original problems.

a. Both numbers are negative so add the values and the sign is negative. $-\frac{1}{3}+-\frac{3}{8}=-\frac{1}{3}\cdot\frac{8}{8}+-\frac{3}{8}\cdot\frac{3}{3}=-\frac{8}{24}+-\frac{9}{24}=-\frac{17}{24}$

b. Change the subtraction to addition of the opposite. $2.6-(-1.5)=2.6+1.5=4.1$

c. The signs are the same so the product is positive. Multiply as usual. $-4\frac{1}{5}\cdot-\frac{1}{3}=-\frac{21}{5}\cdot-\frac{1}{3}=\frac{7\cdot\cancel{3}\cdot 1}{5\cdot\cancel{3}}=\frac{7}{5}=1\frac{2}{5}$

d. The signs are different so the quotient is negative. Divide as usual. $\frac{2}{3}\div-\frac{1}{2}=\frac{2}{3}\cdot-\frac{2}{1}=-\frac{2\cdot 2}{3\cdot 1}=-\frac{4}{3}=-1\frac{1}{3}$

When adding a positive number with a negative number, subtract the values and the number further from zero determines the sign.

$$-1\tfrac{3}{4}+5\tfrac{1}{3}=-\tfrac{7}{4}+\tfrac{16}{3}=-\tfrac{7}{4}\cdot\tfrac{3}{3}+\tfrac{16}{3}\cdot\tfrac{4}{4}=-\tfrac{21}{12}+\tfrac{64}{12}=\tfrac{43}{12}=3\tfrac{7}{12}$$

The signs are the same so the quotient is positive. Divide as usual.

$$-2.8\div-1.25=1.25\overline{)2.8}=125\overline{)280}=125\overline{)280.00}\quad\begin{array}{r}2.24\\ \\ \\ \end{array}$$

Here are some more to try. Compute the value of each of the following problems with fractions and decimals.

1. $-\frac{2}{3}+\frac{1}{2}$
2. $\frac{3}{4}-\left(-\frac{5}{12}\right)$
3. $-\frac{5}{7}+\frac{2}{3}$
4. $-1\frac{6}{7}+\left(-\frac{3}{4}\right)$
5. $-1.75+3.3$
6. $(-2.5)\cdot(-3.3)$
7. $-2\frac{7}{12}\div-\frac{1}{6}$
8. $3\frac{1}{2}+\left(-4\frac{3}{8}\right)$
9. $-1\frac{1}{4}-\left(-3\frac{1}{6}\right)$
10. $\left(2\frac{5}{9}\right)\cdot\left(-\frac{3}{7}\right)$
11. $4.2\div-0.15$
12. $-32-(-4.7)$
13. $-\frac{7}{9}\cdot2\frac{3}{4}$
14. $-\frac{3}{5}\div-1\frac{1}{10}$
15. $-5\frac{1}{2}\div-\frac{3}{4}$
16. $10\frac{5}{8}+\left(-2\frac{1}{2}\right)$
17. $5\frac{1}{5}+\left(-2\frac{2}{15}\right)$
18. $12\frac{3}{4}-\left(-1\frac{5}{8}\right)$
19. $(0.3)\cdot(-0.032)$
20. $-8.4\div-2.5$
21. $5\frac{1}{12}-\left(-2\frac{6}{7}\right)$
22. $-6\frac{1}{7}\cdot-\frac{4}{5}$
23. $-2\frac{3}{8}\div3\frac{1}{4}$
24. $-4\frac{3}{10}-1\frac{1}{5}$
25. $-3.4+(-32.65)$
26. $-7.5-14.93$
27. $-2\frac{7}{9}\cdot3\frac{1}{7}$
28. $-4\frac{1}{5}\div-\frac{3}{10}$
29. $-4\frac{3}{4}-\left(-\frac{5}{7}\right)$
30. $\frac{2}{3}\div-1\frac{4}{9}$
31. $\left(3\frac{1}{3}\right)\cdot\left(-\frac{2}{5}\right)$
32. $-2\frac{1}{4}\cdot\frac{2}{3}$