**Pre-Algebra**

**Essential Question: How do we subtract rational numbers?**

**Do Now:**

Use "***mental math***" to simplify the following numerical expressions.

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

$\frac{1}{2}$

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

$-\frac{1}{4}$

C. $-0.75+3$

2.25

Perform the indicated operation.

D. -9 – 4

$-9+(-4)$

$-13$

E. 11 – (-5)

$11+5$

16

F. -20 – (-40)

$-20+40$

20

## Subtracting Rational Numbers

1) **Add the opposite (*keep, change, opposite*).**
2) **Follow rules for adding integers, fractions and decimals.**
3) **Final answers in fraction form must be simplified completely.**

1) -0.2 – 1.35

$-0.2+(-1.35)$

$0.20$
$+1.35$
$1.55$

$-1.55$

2) $-\frac{3}{10}-\left(-\frac{9}{10}\right)$

$-\frac{3}{10}+\frac{9}{10}$

$\frac{6}{10}\xrightarrow{\div 2}\frac{3}{5}$

3) $-\frac{7}{8}-\frac{1}{4}$

$-\frac{7}{8}+\left(-\frac{1}{4}\right)\cdot\frac{2}{2}$

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

$-\frac{9}{8}$ or $-1\frac{1}{8}$

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

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

$3\cdot -\frac{14}{5}+\frac{10}{3}\cdot\frac{5}{5}$

$-\frac{42}{15}+\frac{50}{15}$

$\frac{8}{15}$

5) $\frac{1}{2}-7\frac{4}{6}$

$\frac{1}{2}+\left(-7\frac{4}{6}\right)$

$3\cdot\frac{1}{2}+\left(-\frac{46}{6}\right)$

$\frac{3}{6}+\left(-\frac{46}{6}\right)$

$-\frac{43}{6}$ or $-7\frac{1}{6}$

6) 19 – (-0.06)

$19+0.06$

19.06

**IT'S YOUR TURN NOW**

7) $4\frac{1}{3}-\left(-5\frac{1}{3}\right)$

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

$9\frac{2}{3}$

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

$-3\frac{1}{2}+1\frac{3}{8}$

$4\cdot -\frac{7}{2}+\frac{11}{8}$

$-\frac{28}{8}+\frac{11}{8}$

$-\frac{17}{8}$ or $-2\frac{1}{8}$

9) 1.7 – 6.75

$1.7+(-6.75)$

$6.75$
$-1.70$
$5.05$

$-5.05$

**For each situation below, write a numerical expression to represent the situation. Evaluate your expression and answer the question.**

10) At the beginning of a laboratory experiment, the temperature of a substance is -12.6°C. During the experiment, the temperature of the substance decreases 7.5°C. What is the final temperature of the substance?

$-12.6 - 7.5$

$-12.6 + (-7.5)$

$\boxed{-20.1°C}$

$12.6 + 7.5 = 20.1$

11) A diver descended 25.65 feet below the surface of the ocean. He then went 16.5 feet further down and then climbed 12.45 feet. What is the new elevation of the diver?

$-25.65 - 16.5 + 12.45$

$-25.65 + (-16.5) + 12.45$

$-42.15 + 12.45$

$-29.7$

$25.65 + 16.50 = 42.15$ $\quad 42.15 - 12.45 = 29.70$

29.7 feet below the surface

12) Analyze the numerical expression below. Can you simplify it "quickly"? Explain how.

$-15.2 + 17.89 - 8.4 + 15.2 + 9 - 17.89 + 8.4$

9

Look for opposites which equal zero.

***Today's Take Away***

**The rules for subtracting rational numbers are the same as the rules for subtracting integers.**

Keep Change Opposite


Scientists determined that Antarctica's average winter temperature was -34.44°C. The difference between Antarctica's highest recorded temperature and this temperature was 49.44 degrees. What was Antarctica's highest recorded temperature?

$-34.44 + 49.44$

A. -83.88°C B. -15°C C. 15°C D. 83.88°C

$49.44 - 34.44 = 15.00$