1.7 Subtraction of Real Numbers

1 Subtract Numbers

Any subtraction problem can be rewritten as an addition problem using the additive inverse.

To Subtract Real Numbers

In general, if \( a \) and \( b \) represent any two real numbers, then

\[
a - b = a + (-b)
\]

This rule says that to subtract \( b \) from \( a \), add the opposite or additive inverse of \( b \) to \( a \).

\[
\begin{align*}
4 + (-7) &= 4 + (-7) = -3 \\
-4 + 7 &= -4 + 7 = 3 \\
4 + (-7) &= 4 + (-7) = 11 \\
-4 + 7 &= -4 + 7 = 3 \\
11 + (-6) &= 11 + (-6) = 5 \\
11 + (-6) &= 11 + (-6) = 17 \\
-11 + 6 &= -11 + 6 = -17 \\
-11 + 6 &= -11 + 6 = -5
\end{align*}
\]
\[13 - 7 = 13 + (-7) = 6\]
\[13 - (-7) = 13 + (7) = 20\]
\[-13 - 7 = -13 + (-7) = -20\]
\[-13 - (-7) = -13 + (7) = -6\]
\[7 - 11 = 7 + (-11) = -4\]
\[-7 - 11 = -7 + (-11) = -18\]
\[7 - (-11) = 7 + (11) = 18\]
\[-7 - (-11) = -7 + (11) = 4\]

\[9 - 5 = 9 + (-5) = 4\]
\[9 - (-5) = 9 + (5) = 14\]
\[-9 - 5 = -9 + (-5) = -14\]
Rewriting Expressions

In general, for any real numbers $a$ and $b$,

\[ a + (-b) = a - b, \]  
\[ a - (-b) = a + b \]

\text{Ex} \quad 4 + 3 - 7 - (-4) - 2 + 3

\text{Ex} \quad -8 - (-3) - 4 + 2 + (-2) - (-5)
16. $9 - 4$
20. $17 - (-5)$
24. $9 - (-9)$
28. $-5.7 - (-3.1)$
32. $6 - 10$
36. $-6.3 - 4.7$
40. $9 - 9$
44. $-25 - 16$

72. $\frac{5}{12} - \frac{7}{8}$
76. $\frac{5}{4} - \frac{7}{11}$
80. $\frac{17}{18} - \frac{13}{20}$
84. $\frac{5}{12} - \left( -\frac{3}{8} \right)$

88. Subtract $-\frac{5}{16}$ from $-\frac{9}{10}$. 
134. **Death Valley** A medical supply package is dropped into Death Valley, California, from a helicopter 1605.7 feet above sea level. The package lands at a location in Death Valley 267.4 feet below sea level. What vertical distance did the package travel?