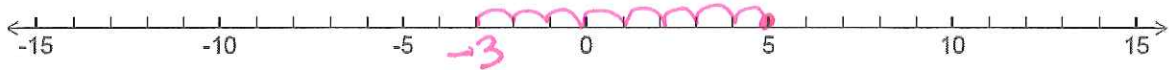Subtracting Integers with Context   Name ___Solutions___
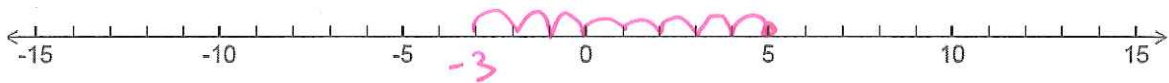
Try the number line and money contexts to subtract signed numbers and see which one you prefer.
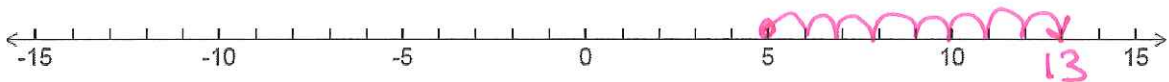
1. Find each answer using the number lines provided.

a. $5+(-8) =$ -3 (Start at five, move to the __left__ eight)

b. $5-8 =$ -3 (Start at five, move to the __left__ eight)

c. $5-(-8) =$ 13 (Start at five, move to the __right__ eight)

2. Notice that the answers to 1.a and 1.b are the same. If you prefer addition you can change all subtractions to adding the opposite of the number being subtracted, as shown in Examples A and B. In 1.c you can see that subtracting a negative number is the same as adding because you move to the right.

Example A.

$3-10 = 3+(-10)$
$\qquad = -7$

Example B.

$-6-(-10) = -6+10$
$\qquad\quad = 4$

Use the number line context to do these problems:

3. $4-5$ $= -1$
(right 4, left 5)

4. $-5-11$ $= -16$
(left 5, left 11)

5. $-4-(-3) = -4+3$ $= -1$
(left 4, right 3)

6. $10-(-4)$ $= 14$
(right 10, right 4)

7. $15-(-3)$ $= 18$

8. $-9-1$ $= -10$

9. $-5-5$ $= -10$

10. $-4-(-4)$ $= 0$

Use the money context to do these problems:

11. $3 - $8 $= -\$5$
(have 3, spend 8)

12. $-\$9 - \$6$ $= -\$15$
(spend 9, spend 6)

13. $-\$1 - (-\$4)$ $= \$3$
(spend 1, make a return of 4, removing a debt)

14. $-9 - (-8)$ $= -\$1$

15. $11 - (-9)$ $= 20$

16. $-3 - 5$ $= -8$

17. $-10 - 10$ $= -20$

18. $-6 - (-6)$ $= 0$

Use either context to do these longer problems. Show all of your steps.

19. $-5 - (-4) + 10 - 1$

$= -1 + 10 - 1$
$= 9 - 1$
$= 8$

20. $(-11 - 2) + (-12 - 1)$

$= -13 + (-13)$
$= -26$

21. $15 + (-7) + 5 - (-14)$

$= 8 + 5 + 14$
$= 13 + 14$
$= 27$

22. $4 - 5 - (-11) - (-9)$

$4 - 5 + 11 + 9$
$= -1 + 11 + 9$
$= 10 + 9 = 19$

23. The balance you owed on your last credit card statement was $201. Since then you were charged $25 in interest, made purchases of $184 and $31, returned two items for credits of $11 and $16, and made a payment of $150. What is your new balance? Show your work and answer in a complete sentence.

$-201 + (-25) - 184 - 31 + 11 + 16 + 150$
$= -226 - 184 - 31 + 11 + 16 + 150$
$= -410 - 31 + 11 + 16 + 150$
$= -441 + 11 + 16 + 150$

$\begin{array}{r} 201 \\ + 25 \\ \hline 226 \\ + 184 \\ \hline 31 \end{array}$

owe 441

$\begin{array}{r} 441 \\ - 11 \\ \hline 430 \\ - 16 \\ \hline 414 \\ - 150 \\ \hline \end{array}$

-264

24. Show how the returned items can be written as addition statements and as the subtraction of negative numbers.

$-201 + (-25) - 184 - 31 - (-11) - (-16) - (-150)$

23.
(cont')

$$= -430 + 16 + 150$$
$$= -414 + 150$$
$$= -264$$

$$\begin{array}{r} 441 \\ -11 \\ \hline 430 \end{array}$$

The new balance is $-\$264$.

or

$$\begin{array}{r} -201 \\ -25 \\ -184 \\ + -31 \\ \hline -441 \end{array}$$

$$\begin{array}{r} 11 \\ 16 \\ +150 \\ \hline 177 \end{array}$$

$$\begin{array}{r} -441 \\ +177 \\ \hline -\$264 \end{array}$$