28.1 Integer Chips - Worksheet 1

1 Calculate $3 + 4$ using an integer chip diagram and a number line diagram.

2 Calculate $-2 + (-5)$ using an integer chip diagram and a number line diagram.

3 Calculate $-2 + 6$ using an integer chip diagram and a number line diagram.

4 Calculate $3 + (-5)$ using an integer chip diagram and a number line diagram.

28.2 Integer Chips - Worksheet 2

1 Calculate $2 - (-5)$ using an integer chip diagram and a number line diagram.

2 Calculate $-4 - (-1)$ using an integer chip diagram and a number line diagram.

3 Calculate $-2 - 4$ using an integer chip diagram and a number line diagram.

4 Calculate $5 - 3$ using an integer chip diagram and a number line diagram.

28.3 Integer Chips - Worksheet 3

1 Perform the following calculations using a mental framework of integer chips.

$3+4=$ $\quad -2+8=$ $\quad -5+1=$

$2+(-5)=$ $\quad 8+(-4)=$ $\quad -3+(-5)=$

$-4+6=$ $\quad -7+7=$ $\quad 6+(-4)=$

This just means to think about the integer chip diagrams without actually drawing them.

2 Perform the following calculations by rewriting them as addition calculations that can be done with integer chips and then performing the calculation.

$8-4=$ $\quad 3-7=$ $\quad -2-4=$

$4-9=$ $\quad -3-3=$ $\quad 7-3=$

$-5-3=$ $\quad 5-7=$ $\quad 5-2=$

Visualize or verbalize the process as you go through it, but you do not need to write words or draw pictures. Focus on which chips you start with, the chips you have after you've flipped some of them, and the cancellation of zero pairs.

3 Practice your mental arithmetic by performing the following calculations.

$21-48=$ $\quad 33+(-15)=$ $\quad -27+59=$

$-32+15=$ $\quad 29-(-55)=$ $\quad -18+(-25)=$

$11+(-36)=$ $\quad -42-(-26)=$ $\quad -42+37=$

4 Practice your mental arithmetic by performing the following calculations.

$218-134=$ $\quad -143+237=$ $\quad -115+(-283)=$

$142-280=$ $\quad -248-(-333)=$ $\quad 272+(-358)=$

28.4 Integer Chips - Worksheet 4

1 There is a common phrase that is associated with subtraction: "Subtraction is addition of the opposite." Integer chips and the number line can help to illuminate this concept. Consider the following diagram:

$1 \quad + \quad (-1) \quad = \quad 0$

How would you describe the idea that 1 and -1 are "opposite" numbers? How well does this idea extend to other numbers?

What does it mean for one thing to be the "opposite" of another thing?

2 Describe how integer chips can be used to demonstrate the idea that "subtraction is addition of the opposite." (Hint: You may want to think about the physical manipulation of the chips when doing subtraction, and the relationship between a number and its opposite.)

3 The more technical term of the "opposite" of a number is the "additive inverse" of a number. The additive inverse of a number a is the number b that has the property that $a + b = 0$. Using this definition, we can see that -1 is the opposite of 1 since $1 + (-1) = 0$. Use this definition to argue that the additive inverse of the additive inverse of a number is itself.

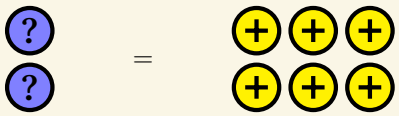
This is another tricky problem. Focus on the defining property of the additive inverse of a number.

28.5 Integer Chips - Worksheet 5

1 Integer chips can be combined with a variable chip to represent simple algebraic equations. Here is a representation of the equation $x + 2 = 6$:

The equation can be "solved" by adding the same type and number of chips to both sides of the equation until the unknown chip has been isolated. Describe the step required to isolate the unknown and determine its value.

2 The concept of division is making even groupings of things. The following is a visual demonstration of the fact that $2x = 6$ means that $x = 3$:



Draw a series of integer chip diagrams that demonstrate solving the equation $2x + 4 = -8$.

3 This type of visual representation of solving equations can be very helpful for introducing young children to algebraic reasoning. However, the practical use of this turns out to be very limited. Why do you think that is?