MAT033 Pre-Algebra Worksheet 1. Integers & Factors

Part a: Integers

1 Solve:

Find the opposite:

-5

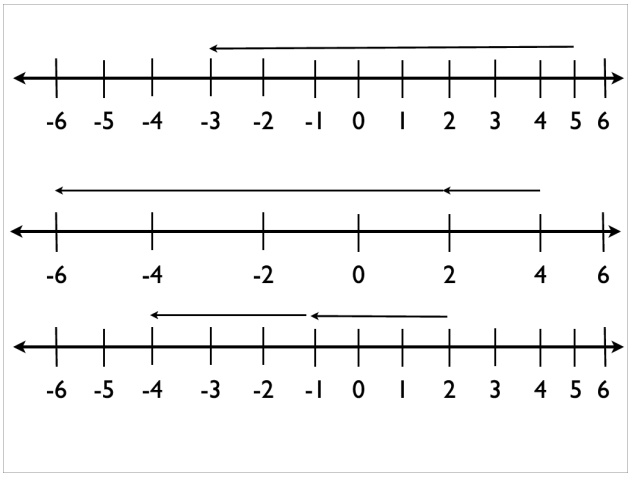
10

Order from smallest to largest:

$-21, -20, 0$

$-5, -3, 1, 2$

Convert the following number lines into sums:



Solve:

$n = -5 + 3$

$x = 10 + -4$

$n = 5 \times -2$

$y = 3 \times 0$

$q = -5 \times -3 \times 1$

$x = 37 \times -25 \times 0$

$x = -5 + -7$

$n + 2 = -5$

2 Word Problems

1. Christine has 20 dollars in the bank. She puts in (deposits) 10 dollars, withdraws 25 dollars, and then withdraws five dollars two more times.

   - Write an expression for the amount of money she has in the bank after all of these transactions.
   - How much money does she need to deposit or withdraw in order to have exactly zero dollars in the bank?

2. A man is searching for buried treasure. Every year he digs 10 meters further down.

   - After five years, how many meters down has the man dug?
   - How about after twenty years?
   - Every years the wind refills the hole the man is digging. It fills in two meters every year. After five years, how many meters has the wind filled in?
   - After five years, what is the net depth of the hole?

3. An apple tree grows upwards at a rate of five meters per year.

   - How tall is the tree after five years?
   - After ten years, the tree starts to make apples. If an apple falls from one half of the tree's height, how far does it fall?
   - While the tree is growing up, the roots are growing downward. The roots grow two meters per year. After ten years, how long is the tree from the top to the bottom?

4. Thomas earns $2,000 per month after tax. His rent is $500 per month, his car payment is $100 per month, he puts $100 per month into long-term savings, and his telephone and utility bills are each $100 per month. Thomas wants to save up for a vacation that will cost $2400. Work out a budget for him, i.e. how much he can spend per month on food, clothes and entertainment that will let him take the vacation after one year.

Part b: Factors

1. Which of the following statements are true?
   (a) 3 is a factor of 18. (b) 3 is a multiple of 18. (c) 18 is a multiple of 3. (d) 27 has 7 as a factor. (e) 35 has 5 as a factor. (f) 12 has -3 and -2 as factors.

2. A *perfect number* is equal to the sum of all of its positive factors other than itself (all factors, not just prime factors). For example, 6 is perfect because its positive factors are $1, 2, 3, 6$, and $1 + 2 + 3 = 6$. The next perfect number after 6 is between 20 and 30. What is it?

3. Find the prime factorizations of the following numbers:
   (a) 24 (b) 64 (c) 29

4. Find all of the primes between 1 and 30.

5. Find the Greatest Common Factors of the following pairs of numbers, first using Method #1 (from page 5 of the notes for class 2), and then using the Euclidean Algorithm: (a) (10,15) (b) (21,49)

6. Find the Least Common Multiple of the number pairs in the previous problem

7. 48 boxes are to be stacked in a rectangular array a boxes wide, b boxes deep, and c boxes high. Find integers a, b, c that are as nearly equal to one another as possible. This will make a compact array.