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8th Grade Integers Worksheets

Questions:

- Express the following as positive or negative integers.
 - A team is awarded **5** points for a correct answer and loses **3** points for a wrong answer in a competition.
 - A submarine is **3,500** feet below sea level.
- Arrange the following integers in ascending order:
 $-29, 8, 17, -16, -9, 0, 1$
- By how much and in which direction, would there be a shift on the number line if the integer **(-6)** is added to the integer **5**?
- Give 'True' or 'False' for the following statements, along with explanations.
 - Any integer is always greater than its opposite.
 - If a negative integer is subtracted from a positive integer, then we move to the right side on the number line.
- For integers, prove that integer multiplication is associative and commutative.

- Simplify, using appropriate properties of integers:

$$\frac{11}{14} + \frac{-23}{7} + \frac{15}{14}$$

- Simplify:

$$\frac{2}{3} \times \frac{7}{8} + \frac{2}{3} \times \frac{-13}{16}$$

8. The temperature recorded in a city on Monday is 50°F . If the temperature increases by 10°F on Tuesday and falls by 11°F on Wednesday. Find the temperature recorded on Wednesday.



9. Two teams A & B participated in a competition. 2 points were awarded for every goal and 1 point is deducted as a penalty for foul. If team A did 13 goals and 5 penalties and team B scored 18 goals and 12 penalties, who won the competition and by how much?



10. An airplane ascends by **500** feet and then descends by **350** feet alternately. If the airplane was initially flying at the height of **1800** feet above sea level, find its height after **5** hours.



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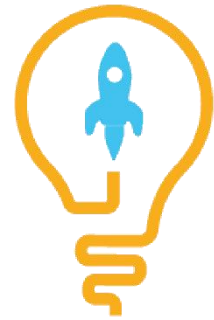
- Barbara Cabrera

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ANSWERS

1) a) $(+5), (-3)$ b) (-3500)	2) $-29, -17, -9, 0, 1, 8, 17$	3) 5 units, right
4) a) False b) True	5) Yes	6) $-10/7$
7) $1/24$	8) 49 F	9) Team B, 3 Points
10) 2600ft		



SOLUTIONS

Complete solution/explanation

Solutions

- Quantities like win points, height above sea level, etc are expressed with positive integers whereas quantities like loose points, depth below sea level, etc are expressed with negative integers.
 - 5** points for a correct answer is expressed as **+5**, **3** points for a wrong answer is expressed as **(-3)**.
 - 3,500** feet below sea level is expressed as **(-3500)**.

- Since we know that as we move to the left on the number line, the numbers decrease and as we move to the right on the number line, the number increases.

As seen on the number line, the integers are arranged in ascending order as:

-29, -17, -9, 0, 1, 8, 17

- Adding **-6** to **5** gives:

$$(-6) + 5 = (-1)$$



Therefore, there is a shift of **5** units to the right of **(-6)** to **(-1)** on the number line.

4. a. **False.**

An integer is greater or smaller than its opposite depends on the integer. For example:

For the integer **5**, its opposite is **(-5)**, which is a negative integer.

For the integer **(-9)**, its opposite is **9**, which is a positive integer.

b. **True**

Let's consider **(-1)** to be the negative number and **4** be the positive number. Subtracting **(-1)** from **4** gives:

$$4 - (-1) = 4 + 1 = 5$$

Let's consider **(-10)** to be the negative number and **14** be the positive number. Subtracting **(-10)** from **14** gives:

$$14 - (-10) = 14 + 10 = 24$$

5. Let's take examples to validate the associative and commutative properties for multiplication of any three integers **a, b**, and **c**:

$$\text{Let } a = 1, b = 2, c = (-3)$$

Now for associative property of multiplication of integers:

$$a \times (b \times c) = (a \times b) \times c$$

Substituting the values, we get:

$$\Rightarrow a \times (b \times c) = 1 \times (2 \times (-3)) = 1 \times (-6) = (-6)$$

$$\Rightarrow (a \times b) \times c = (1 \times 2) \times (-3) = 2 \times (-3) = (-6)$$

Since $a \times (b \times c) = (a \times b) \times c$, then multiplication of integers is associative.

$$\text{Let } a = (-4), b = 5$$

Now for associative property of multiplication of integers:

$$a \times b = b \times a$$

Substituting the values, we get:

$$\Rightarrow a \times b = (-4) \times 5 = (-20)$$

$$\Rightarrow b \times a = 5 \times (-4) = (-20)$$

Since $a \times b = b \times a$, then multiplication of integers is

commutative.

6. Let's simplify the given expression:

$$\begin{aligned} & \frac{11}{14} + \frac{-23}{7} + \frac{15}{14} \\ &= \frac{11}{14} + \frac{15}{14} + \frac{-23}{7} \text{ (Using the associative} \\ & \text{property)} \end{aligned}$$

$$\begin{aligned} &= \frac{11+15}{14} + \frac{-23}{7} \\ &= \frac{26}{14} + \frac{-23}{7} \\ &= \frac{13}{7} + \frac{-23}{7} \\ &= \frac{13 + (-23)}{7} \text{ (Using the associative property)} \\ &= \frac{13 - 23}{7} \\ &= \frac{-10}{7} \end{aligned}$$

7. Let's simplify the given expression:

$$\begin{aligned} & \frac{2}{3} \times \frac{7}{8} + \frac{2}{3} \times \frac{-13}{16} \\ &= \frac{2}{3} \times \left(\frac{7}{8} + \frac{-13}{16} \right) \text{ (Using the distributive} \\ & \text{property)} \end{aligned}$$

$$\begin{aligned} &= \frac{2}{3} \times \left(\frac{14}{16} + \frac{-13}{16} \right) \\ &= \frac{2}{3} \times \left(\frac{14 + (-13)}{16} \right) \\ &= \frac{2}{3} \times \left(\frac{14 - 13}{16} \right) \\ &= \frac{2}{3} \times \frac{1}{16} \\ &= \frac{2 \times 1}{3 \times 16} \\ &= \frac{2}{48} \\ &= \frac{1}{24} \end{aligned}$$

8. Temperature recorded on Monday = $50^{\circ}F$

If the temperature increases by $10^{\circ}F$ on Tuesday,
temperature on Tuesday = $50^{\circ}F + 10^{\circ}F = 60^{\circ}F$

The temperature falls by $11^{\circ}F$ on Wednesday, temperature
on Wednesday = $60^{\circ}F - 11^{\circ}F = 49^{\circ}F$

9. Since **2** points were awarded for every goal **1** point was deducted as a penalty for foul:

Points scored by Team A:

For **13** goals = $2 \times 13 = 26$ points

For 5 penalties = $(-1) \times 5 = (-5)$ points

Total points = $26 + (-5) = 26 - 5 = 21$ points

Points scored by Team B:

For **13** goals = $2 \times 18 = 36$ points

For 5 penalties = $(-1) \times 12 = (-12)$ points

Total points = $36 + (-12) = 36 - 12 = 24$ points

Clearly, Team B won the competition by **3** points

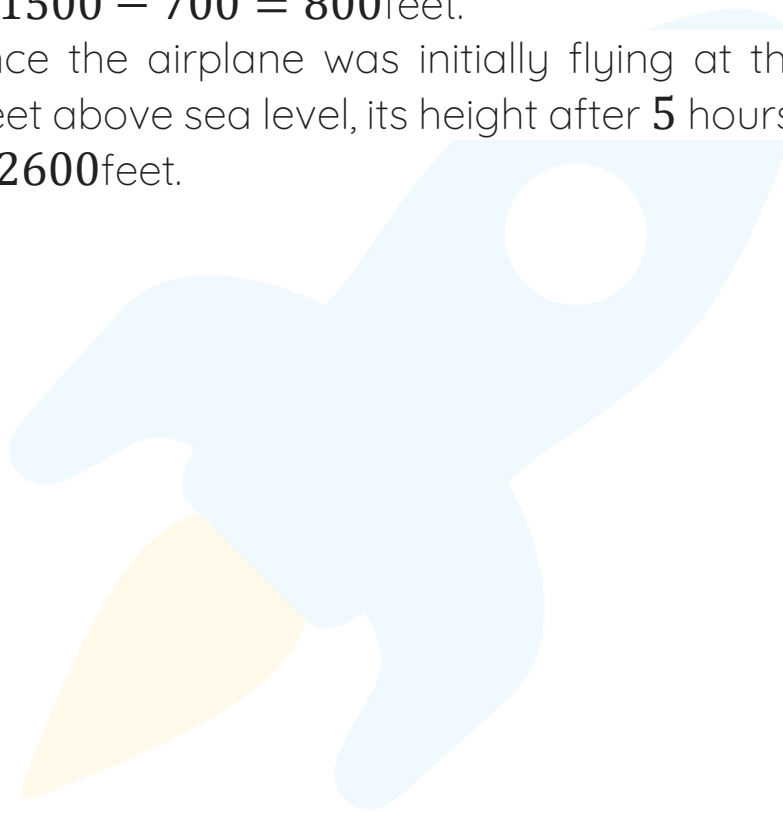
10. For **5** hours, based on the flight of the plane:

$$(+500) + (-350) + (+500) + (-350) + (+500)$$

$$= 500 - 350 + 500 - 350 + 500$$

$$= 1500 - 700 = 800 \text{ feet.}$$

Since the airplane was initially flying at the height of **1800** feet above sea level, its height after **5** hours = $1800 + 800 = 2600$ feet.



FUN FACT

- An integer can be negative, zero or positive.
- A number if expressed in a fractional form is not an integer.
- There are infinite real numbers between any two integers.
- There are zero integers between any two integers.
- We cannot determine the smallest and the largest integers.

