Math 7 Unit 1 test: Adding and subtracting integers

Name _____ Date _____ Period _____

12 questions, 37 points

1. Find the integer n for which $-19 + n + 38 + (-12) = -24$. (2 points)

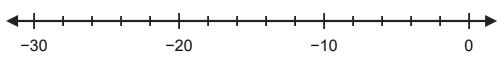
2. Find $-(-13) + (-|-18|) + |10 + (-22)|$. (3 points)

3. Ava says that $(-a) - (-b) = b - a$ for all integers a and b. (3 points)

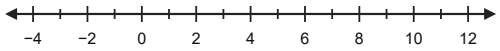
(a) Test her statement with $a = 7$ and $b = -3$.

(b) Show that she is right for all integers, giving a reason for each step.

4. A token starts at point A, at -14 on a number line. It moves 9 units right to point B, then 23 units left to point C. Find the coordinates of B and C, and find the distance AC. (3 points)



5. Point M lies between -2 and 10 on a number line, and M is twice as far from 10 as it is from -2. Find the coordinate of M, and check both distances. (3 points)



6. Three record-breaking days in United States weather history: (3 points)

(a) On January 15, 1972, the temperature in Loma, Montana, went from $-54°$F to $49°$F in one day. Find the change.

(b) On January 22, 1943, in Spearfish, South Dakota, it went from $-4°$F to $45°$F in two minutes. How many degrees larger was the Loma rise than the Spearfish rise?

(c) On January 23, 1916, in Browning, Montana, the temperature fell 100 degrees in one day from $44°$F. What was the temperature at the end of that fall?

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7. At 6 a.m. the temperature was −9°C. At 3 p.m. it was the opposite of the 6 a.m. temperature. (3 points)

(a) Find the change from 6 a.m. to 3 p.m.

(b) Liam says: "Whenever a temperature below zero rises to its opposite, the rise is twice the absolute value of the starting temperature." Explain why he is right.

8. Let $a = -4$ and $b = 7$. (4 points)

(a) Evaluate $a - b$ and $b - a$.

(b) Find the distance between the point at $a - b$ and the point at $b - a$.

(c) Explain why, for any two different numbers a and b, the points at $a - b$ and $b - a$ are on opposite sides of 0, at the same distance from it.

9. A school library counts books returned to its shelves as positive and books checked out as negative. One day, before lunch, 38 books were returned and 76 were checked out. After lunch, 24 were returned and 36 were checked out, and in the last hour 13 more were checked out. (3 points)

(a) Write the day's changes as a sum of integers, and find the net change in the number of books on the shelves.

(b) The shelves held 2214 books when the library opened. How many did they hold when it closed?

10. Heights are measured from sea level, and a height below sea level is negative. The highest point in Europe, at 5,642 meters, is Mount Elbrus; the lowest, at −28 meters, is the shore of the Caspian Sea. The highest point in Africa, at 5,895 meters, is Mount Kilimanjaro; the lowest, at −155 meters, is Lake Assal. (Heights are rounded to the nearest meter.) (3 points)

(a) For each continent, find the difference in height between its highest and lowest points.

(b) On which of the two continents is that difference greater, and by how many meters?

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11. At noon one day, the thermometer at a research base in Greenland read −18°C and the one at a base in Antarctica read −43°C. (3 points)

(a) Which base was colder at noon, and how many degrees apart were the two readings?

(b) By evening the two thermometers showed the same reading. The Greenland temperature had fallen 7 degrees since noon. Find the evening reading, and the change in temperature at the Antarctic base from noon to evening.

12. A school store records its profit each month. A loss is written as a negative profit. (4 points)

Month	September	October	November	December
Profit (dollars)	−25	35	−40	60

(a) Find the change in profit from each month to the next: September to October, October to November, and November to December.

(b) Between which two months did the profit rise the most?

(c) Find the change in profit from September to December, and show that it equals the sum of the three changes in (a).

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