# Math 7 Unit 1 worksheet: Adding integers (answer key)

**ANSWERS AT A GLANCE**

1. (a) 5 (b) −8 (c) −14 (d) 26 (e) −21 (f) −23 (g) −37 (h) −106 (i) 25 (j) 175
2. (a) 1 (b) −2
3. (a) 5 + (−3) + 6 + (−4) = 4 yards (b) 6 yards
4. Jin added the absolute values as if the signs were the same; Sofia subtracted correctly but gave the sum the sign of the wrong number. The sum is −11.
5. (a) 10 shaded and 6 white counters. (b) Every white counter is in a zero pair, and 4 shaded counters are left over, so the number of counters is an even number plus 4, which is even; 15 is odd.
6. 7 and −13
7.

| | | |
|---|---|---|
| 0 | −7 | −2 |
| −5 | −3 | −1 |
| −4 | 1 | −6 |

Every row, column and diagonal adds to −9.

**WORKED SOLUTIONS**

**1.** Find each sum.

(a) $-9 + 14$ (b) $12 + (-20)$ (c) $-31 + 17$ (d) $45 + (-19)$ (e) $-8 + (-13)$

(f) $0 + (-23)$ (g) $73 + (-110)$ (h) $-204 + 98$ (i) $-15 + 40$ (j) $-125 + 300$

**ANSWER**

(a) 5 (b) −8 (c) −14 (d) 26 (e) −21 (f) −23 (g) −37 (h) −106 (i) 25 (j) 175

**SOLUTION**

(a) Different signs: 14 − 9 = 5, and 14 is farther from zero, so the sum is 5.

(b) 20 − 12 = 8, and −20 is farther from zero, so the sum is −8.

(c) 31 − 17 = 14, and −31 is farther from zero, so the sum is −14.

(d) 45 − 19 = 26, and 45 is farther from zero, so the sum is 26.

(e) Both negative: 8 + 13 = 21, so the sum is −21.

(f) Adding −23 to 0 is the move 23 to the left from 0, so the sum is −23.

(g) 110 − 73 = 37, and −110 is farther from zero, so the sum is −37.

(h) 204 − 98 = 106, and −204 is farther from zero, so the sum is −106.

(i) 40 − 15 = 25, and 40 is farther from zero, so the sum is 25.

(j) 300 − 125 = 175, and 300 is farther from zero, so the sum is 175.

**2.** In a soccer league, a team's goal difference for one game is the number of goals it scored minus the number scored against it: −1 means it lost by one goal, 2 means it won by two goals, and 0 means a draw. Priya's team had these goal differences in six games: −2, 2, −1, −1, 2, 1.

(a) What is the team's goal difference for the six games together?

(b) Before these six games, the team's goal difference for the season was −3. What is it after them?

**ANSWER**

(a) 1 (b) −2

**SOLUTION**

(a) Add the six goal differences with a running total: −2 + 2 = 0, then 0 + (−1) = −1, then −1 + (−1) = −2, then −2 + 2 = 0, then 0 + 1 = 1.

The goal difference for the six games is 1.


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(b) Add the six games to the season so far: $-3 + 1 = -2$.

**3.** In football, a gain of yards counts as a positive number and a loss of yards as a negative number. On four plays in a row, a team gains 5 yards, loses 3 yards, gains 6 yards and then loses 4 yards.

(a) Write the four plays as a sum of integers and find the team's net gain in yards.

(b) The team needs a net gain of 10 yards, counted from where the four plays started, for a first down. How many more yards must it gain?

**ANSWER**

(a) $5 + (-3) + 6 + (-4) = 4$ yards (b) 6 yards

**SOLUTION**

(a) A gain is positive and a loss is negative:

$$5 + (-3) + 6 + (-4)$$

Collect the gains and the losses: $5 + 6 = 11$ and $-3 + (-4) = -7$. Then $11 + (-7) = 4$, so the net gain is 4 yards.

(b) The team must move from 4 to 10 on the number line. The move that does this is 6 yards forward, since $4 + 6 = 10$. It must gain 6 more yards.

**4.** Jin and Sofia each worked out $-18 + 7$. Jin wrote $-25$ and Sofia wrote 11. Explain the mistake each one made, and find the correct sum.

**ANSWER**

Jin added the absolute values as if the signs were the same; Sofia subtracted correctly but gave the sum the sign of the wrong number. The sum is $-11$.

**SOLUTION**

The two numbers have different signs, so part of one cancels the other.

Jin added the absolute values, $18 + 7 = 25$, and kept the negative sign. That is the rule for two numbers with the same sign. With counters, 7 white counters make 7 zero pairs with 7 of the 18 shaded ones, so the counters cannot all add up.

Sofia found the right size, $18 - 7 = 11$, but made the sum positive. The sum takes the sign of the number farther from zero, which is $-18$.

Correct: $18 - 7 = 11$, and $-18$ is farther from zero, so $-18 + 7 = -11$. On the number line, start at $-18$ and move 7 to the right: that lands on $-11$, still left of zero.

**5.** A white counter stands for 1 and a shaded counter for $-1$.

(a) A pile of 16 counters is worth $-4$. How many shaded counters and how many white counters are in it?

(b) Explain why no pile of 15 counters can be worth $-4$.

**ANSWER**

(a) 10 shaded and 6 white counters. (b) Every white counter is in a zero pair, and 4 shaded counters are left over, so the number of counters is an even number plus 4, which is even; 15 is odd.

**SOLUTION**

(a) The pile is worth $-4$, so after the zero pairs are ringed, 4 shaded counters are left over. The other $16 - 4 = 12$ counters are all in zero pairs, which is 6 zero pairs: 6 white and 6 shaded counters. So the


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pile has 6 + 4 = 10 shaded counters and 6 white ones. Check: −10 + 6 = −4, and 10 + 6 = 16.

(b) In any pile worth −4, each white counter pairs with a shaded one, and exactly 4 shaded counters are left over. The counters in zero pairs come two at a time, so their number is even, and adding the 4 left over keeps it even. A pile worth −4 always has an even number of counters, and 15 is odd.

**6.** Two integers have different signs. Their sum is −6, and the sum of their absolute values is 20. Find the two integers.

**ANSWER**

7 and −13

**SOLUTION**

The sum is negative, so the negative integer is the one farther from zero. With different signs, the size of the sum is the larger absolute value minus the smaller, so the absolute values differ by 6. They also add to 20.

Two numbers that add to 20 and differ by 6: the larger is (20 + 6) ÷ 2 = 13 and the smaller is 20 − 13 = 7.

The negative integer has absolute value 13, so the integers are −13 and 7. Check: 7 + (−13) = −6 and 7 + 13 = 20.

**7.** In a magic square, the three numbers in every row, in every column and in both diagonals have the same sum. Fill in the four empty squares of this magic square.

| | | |
|---|---|---|
| 0 | −7 | |
| | −3 | |
| | 1 | −6 |

**ANSWER**

| | | |
|---|---|---|
| 0 | −7 | −2 |
| −5 | −3 | −1 |
| −4 | 1 | −6 |

Every row, column and diagonal adds to −9.

**SOLUTION**

The diagonal from the top left is full: 0 + (−3) + (−6) = −9. So every line must add to −9.

Top row: 0 + (−7) = −7, and the move from −7 to −9 is −2. The top right number is −2.

Other diagonal: −2 + (−3) = −5, and the move from −5 to −9 is −4. The bottom left number is −4.

Left column: 0 + (−4) = −4, and the move from −4 to −9 is −5. The middle left number is −5.

Right column: −2 + (−6) = −8, and the move from −8 to −9 is −1. The middle right number is −1.

Check the lines not used yet: middle row −5 + (−3) + (−1) = −9, bottom row −4 + 1 + (−6) = −9, middle column −7 + (−3) + 1 = −9.


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