

Adding and Subtracting Whole Numbers

Goal Use mental math strategies to calculate sums and differences.

1. Use mental math to calculate each sum.
Describe your strategy.

a) $680 + 210 = \underline{890}$

Regroup $600 + 200 + (80 + 10) = 600 + 200 + 90$, or 890.

b) $763 + 847 + 289 = \underline{1899}$

Round 289 to nearest hundred, then regroup to get
 $750 + (847 + 3) + (300 + 10) = 750 + 850 + 310$, or 1910.
289 is 11 less than 300. So subtract 11 from 1910.

2. Use mental math to calculate each sum.

a) $545 + 655 = \underline{1200}$ d) $715 + 903 + 422 = \underline{2040}$

b) $874 + 926 = \underline{1800}$ e) $1822 + 428 + 650 = \underline{2900}$

c) $766 + 704 = \underline{1470}$ f) $2016 + 624 + 910 = \underline{3550}$

3. Use mental math to calculate each difference.
Describe your strategy.

a) $680 - 490 = \underline{190}$

If the question was $690 - 490$, the answer would be 200. 680 is 10 less than 690. So subtract 10 from 200.

b) $1650 - 95 = \underline{1555}$

Round 95 to nearest hundred to get $1650 - 100 = 1550$. 95 is 5 less than 100.
So add 5 to 1550.

4. Use mental math to calculate each difference.

a) $820 - 450 = \underline{370}$

c) $903 - 237 = \underline{520}$

e) $3005 - 755 = \underline{2250}$

b) $625 - 175 = \underline{450}$

d) $1020 - 500 = \underline{666}$

f) $2103 - 487 = \underline{1616}$

At-Home Help

Rounding is a mental math strategy for adding and subtracting numbers. When you round, you will need to adjust your answer to get the exact answer.

For example:

$23 + 58$ can be rounded to $20 + 60 = 80$. 23 is 3 more than 20 and 58 is 2 less than 60. So adjust your answer by adding 1.

The answer is 81.

$76 - 40$ can be rounded to $80 - 40 = 40$. 76 is 4 less than 80.

So adjust your answer by subtracting 4. The answer is 36.

Regrouping is another mental math strategy for adding and subtracting numbers. Regroup numbers into 5s or 10s to make calculations easier.

For example:

$43 + 92$ can be regrouped as $(43 + 2) + 90$.

The answer is $45 + 90 = 135$.

$80 - 19$ can be regrouped as $(80 - 10) - 9$.

The answer is $70 - 9 = 61$.

Estimating Sums and Differences

Goal Estimate sums and differences to solve problems.

- Which sums are greater than 2200?
 - $840 + 622 + 713$ less than 2200
 - $372 + 923 + 987$ greater than 2200
 - $565 + 834 + 879$ greater than 2200
 - $703 + 543 + 824$ less than 2200
- Which differences are less than 540?
 - $1280 - 640$ greater than 540
 - $6080 - 5590$ less than 540
 - $4608 - 3024$ greater than 540
 - $8146 - 7870$ less than 540
- A mountain-climbing contest had teams climb two different mountains. One team climbed Mount Everest. It has a height of 8848 m. Another team climbed Mount Logan in the Yukon Territory. It has a height of 5959 m. About how much higher did the Mount Everest team climb? Describe your strategy.
 About 2800 m. Round 8848 and 5959 to nearest hundred to get $8800 - 6000 = 2800$.
- Sam recorded the forms of transportation used by neighbourhood students to get to school. The neighbourhood will win an award if more than 5000 students use a physically active form of transportation to get to school.

Form of transportation	Number of students
walk	3162
bicycle	1072
bus	2154
car	936
other (skateboard, inline skates, etc.)	636

Will Sam's neighbourhood win the award? Describe your strategy.

No. Round numbers to nearest thousand or hundred to get $3000 + 1000 + 600 = 4600$.

About 4600 students use a physically active form of transportation.

At-Home Help

To solve problems, use estimation if the problem does not ask for an exact answer.

Round to the place value that gives you numbers that are easy to add or subtract. You might adjust your rounding up or down, depending on the numbers.

Sometimes you may want to use more than one strategy to solve the problem.

Always check if your answer is reasonable.

Remember to show all your work.

Adding Whole Numbers

Goal Solve problems by adding four 3-digit whole numbers.

1. Calculate.

$$\begin{array}{r}
 \text{a) } \begin{array}{r} \overset{1}{2} \overset{2}{0} 6 \\ 349 \\ 127 \\ + 467 \\ \hline 1149 \end{array}
 \end{array}$$

$$\begin{array}{r}
 \text{b) } \begin{array}{r} 329 \\ 462 \\ 503 \\ + 368 \\ \hline 1500 \\ 140 \\ \hline 22 \\ \hline 1662 \end{array}
 \end{array}$$

$$\begin{array}{r}
 \text{c) } \begin{array}{r} \overset{1}{4} \overset{1}{2} 1 \\ 230 \\ 329 \\ + 547 \\ \hline 1527 \end{array}
 \end{array}$$

2. During summer camp, Cecilia's group planted trees on five days. The group planted 154 trees on the first day, 183 trees on the second day, 189 trees on the third day, and 196 trees on the fifth day. The group planted a total of 934 trees.

a) How many trees were planted on the fourth day? Show your work.

$$\begin{array}{r}
 212 \text{ trees} \quad \begin{array}{r} 32 \\ 154 \\ 183 \\ 189 \\ + 196 \\ \hline 722 \end{array}
 \end{array}$$

$$\begin{array}{r}
 934 \\
 - 722 \\
 \hline
 212
 \end{array}$$

b) Use estimation to check if your answer is reasonable.

Round 154 down and the other numbers up.

$$100 + 200 + 200 + 200 = 700 \quad 900 - 700 = 200$$

My estimate of 200 is close to 212. So my answer is reasonable.

3. Balvinder sells chocolate bars to raise money for his school. From Monday to Friday, Balvinder sold \$676 worth of chocolate bars. On Monday he sold \$117, on Tuesday he sold \$130, on Wednesday he sold \$143, and on Friday he sold \$156. Calculate how much he sold on Thursday. Show your work.

$$\begin{array}{r}
 \$130 \quad \begin{array}{r} \$117 \\ \$130 \\ \$143 \\ + \$156 \\ \hline 400 \\ 130 \\ \hline 16 \\ \hline \$546 \end{array}
 \end{array}$$

$$\begin{array}{r}
 \$676 \\
 - \$546 \\
 \hline
 \$130
 \end{array}$$

At-Home Help

To add numbers, add digits with the same place value.

Check your answer using estimation.

For example:

$$\begin{array}{r}
 \begin{array}{r} \overset{1}{2} \overset{1}{1} 3 \\ 327 \\ 163 \\ + 204 \\ \hline 907 \end{array}
 \end{array}$$

$$\begin{array}{r}
 \text{or } \begin{array}{r} 213 \\ 327 \\ 163 \\ + 204 \\ \hline 800 \\ 90 \\ \hline 17 \\ \hline 907 \end{array}
 \end{array}$$

Estimate:

$$200 + 300 + 200 + 200 = 900$$

Subtracting Whole Numbers

Goal Subtract whole numbers to solve problems.

1. Estimate and then subtract. Show your work.

a) $8702 - 6914$

Estimate: more or
less than 2000?

$$\begin{array}{r} \text{less} \\ \hline 8702 \\ - 6914 \\ \hline 1788 \end{array}$$

c) $64902 - 5964$

Estimate: more or
less than 60 000?

$$\begin{array}{r} \text{less} \\ \hline 64902 \\ - 5964 \\ \hline 58938 \end{array}$$

b) $10550 - 9845$

Estimate: more or
less than 1000?

$$\begin{array}{r} \text{less} \\ \hline 10550 + 155 = 10705 \\ 9845 + 155 = 10000 \\ \hline 10705 \\ - 10000 \\ \hline 705 \end{array}$$

d) $56003 - 7894$

Estimate: more or
less than 46 000?

$$\begin{array}{r} \text{more} \\ \hline 56003 \\ - 7894 \\ \hline 48109 \end{array}$$

2. Rico's home town had a population of 75 692 people in 1990. In 2000, the population was 83 020 people. By how much did the population increase? Determine if your answer is reasonable using estimation. Show your work.

7328 people

Add 8 to both numbers. $83\ 020 + 8 = 83\ 028$

$75\ 692 + 8 = 75\ 700$

$$\begin{array}{r} 83028 \\ - 75700 \\ \hline 7328 \end{array}$$

Estimate: $85\ 000 - 75\ 000 = 10\ 000$

My estimate of 10 000 is close to 7328. So my answer is reasonable.

At-Home Help

To subtract numbers, start subtracting from the smallest place value. Regroup if you need to.

For example:

$$\begin{array}{r} 10 \\ 7\ 0\ 12 \\ 5\ 8\ 12 \\ - 2\ 6\ 4\ 9 \\ \hline 3\ 1\ 6\ 3 \end{array}$$

You can also add a number to both numbers to get numbers that are easier to subtract.

For example, add 51 to both numbers. $5812 + 51 = 5863$
 $2649 + 51 = 2700$

$$\begin{array}{r} 5863 \\ - 2700 \\ \hline 3163 \end{array}$$

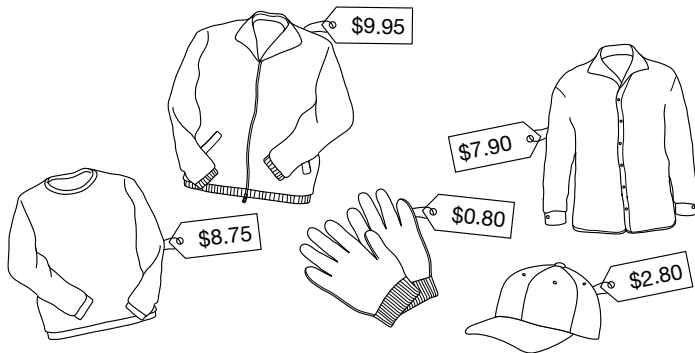
Check your answer using estimation or addition.

Estimate: $5800 - 2600 = 3200$

Adding and Subtracting Decimal Numbers

Goal Use mental math strategies to calculate sums and differences.

Samantha, Matthew, and Akira went to buy some clothes from a charity fundraiser.



1. a) Samantha has \$22.00. Choose three items she can buy.

Suggested answer: 1 jacket, 1 hat, and 1 sweater

- b) Use mental math to calculate the total cost. What bills and coins can she use to pay for the items?

(using answer above) \$21.50 one \$20 bill, one loonie, and two quarters

- c) Use mental math to calculate Samantha's change.

\$0.50

2. Akira has \$18.75 and Matthew has \$24.50. How much more money does Matthew have than Akira? Use mental math to calculate your answer.

\$5.75

3. a) Choose three items that Akira can buy. Use mental math to calculate the total cost.

Suggested answer: 1 pair of gloves, 1 sweater, and 1 shirt (total cost) \$17.45

- b) Use mental math to calculate Akira's change.

\$1.30

At-Home Help

To add or subtract money amounts mentally, regroup the numbers to make the calculations easier.

Remember to check if your answers are reasonable.

For example, to add $\$6.95 + \$3.25 + \$7.75$, regroup.

$$\begin{aligned} 7.00 - 0.05 + 3.00 + 0.25 + 7.00 \\ + 0.75 &= 7.00 + 3.00 + 7.00 - 0.05 \\ &\quad + 0.25 + 0.75 \\ &= 17.00 - 0.05 + 1.00 \\ &= 18.00 - 0.05 \\ &= \$17.95 \end{aligned}$$

Adding Decimals

Goal

Add decimals using base ten blocks and pencil and paper.

1. Estimate and then add. Show your work.

a) $0.56 + 0.98$

Estimate: $0.5 + 1 = 1.5$

$$\begin{array}{r} 1 \\ 0.56 \\ +0.98 \\ \hline 1.40 \\ 0.14 \\ \hline 1.54 \end{array}$$

b) $2.804 + 0.426$

Estimate: $3 + 0.5 = 3.5$

$$\begin{array}{r} 1 \quad 1 \\ 2.804 \\ +0.426 \\ \hline 3.230 \end{array}$$

c) $0.897 + 5.824$

Estimate: $1 + 6 = 7$

$$\begin{array}{r} 0.897 \\ +5.824 \\ \hline 5.000 \\ 1.600 \\ 0.110 \\ 0.011 \\ \hline 6.721 \end{array}$$

d) $3.498 + 2.635 + 0.384$

Estimate: $3 + 3 + 0.3 = 6.3$

$$\begin{array}{r} 1 \quad 2 \quad 1 \\ 3.498 \\ 2.635 \\ +0.384 \\ \hline 6.517 \end{array}$$

e) $4.675 + 3.899 + 0.269$

Estimate: $5 + 4 = 9$

$$\begin{array}{r} 4.675 \\ 3.899 \\ +0.269 \\ \hline 7.000 \\ 1.600 \\ 0.220 \\ 0.023 \\ \hline 8.843 \end{array}$$

f) $4.8 + 3.152 + 0.59$

Estimate: $5 + 3 + 1 = 9$

$$\begin{array}{r} 1 \quad 1 \\ 4.800 \\ 3.152 \\ +0.590 \\ \hline 8.542 \end{array}$$

At-Home Help

Decimal tenths, hundredths, and thousandths are added using the same rules as whole numbers.

- It is easier to add vertically if the decimal points are aligned.
- Add place values that are the same.
- If the sum of a place value is 10 or more, regroup using the next greater place value.
- Check your answer using estimation.

For example:

$$\begin{array}{r} 2 \quad 1 \quad 1 \\ 0.762 \\ 0.45 \\ 0.803 \\ +0.107 \\ \hline 2.122 \end{array} \quad \begin{array}{r} 0.762 \\ 0.45 \\ 0.803 \\ +0.107 \\ \hline 2.000 \\ 0.110 \\ 0.012 \\ \hline 2.122 \end{array}$$

Estimate:

$$0.8 + 0.4 + 0.8 + 0.1 = 2.1$$

To add a decimal number that has only tenth and hundredth place values and a decimal number that has a thousandth place value, add a zero for the thousandth place value.

For example, calculating

$$1.34 + 0.379 \text{ is the same as}$$

$$1.340 + 0.379. \text{ Answer is } 1.719.$$

Subtracting Decimals

Goal Subtract decimals using base ten blocks and pencil and paper.

1. Estimate and then subtract. Show your work.

a) $5.0 - 2.3$

Estimate: $5 - 2 = 3$

$$\begin{array}{r} 4 \ 10 \\ 5 \ .0 \\ - 2 \ .3 \\ \hline 2 \ .7 \end{array}$$

b) $8.21 - 3.63$

Estimate: $8 - 3 = 5$

Add 0.37 to both numbers.

$8.21 + 0.37 = 8.58$

$3.63 + 0.37 = 4.00$

$$\begin{array}{r} 8 \ .5 \ 8 \\ - 4 \ .0 \ 0 \\ \hline 4 \ .5 \ 8 \end{array}$$

c) $4.020 - 1.989$

Estimate: $4 - 2 = 2$

$$\begin{array}{r} 9 \ 11 \\ 3 \ \cancel{10} \ \cancel{10} \\ \cancel{4} \ .\cancel{0} \ \cancel{2} \ \cancel{0} \\ - 1 \ .9 \ 8 \ 9 \\ \hline 2 \ .0 \ 3 \ 1 \end{array}$$

d) $6.411 - 2.58$

Estimate: $6.5 - 2.5 = 4$

Add 0.42 to both numbers.

$6.411 + 0.42 = 6.831$

$2.58 + 0.42 = 3.00$

$$\begin{array}{r} 6 \ .8 \ 3 \ 1 \\ - 3 \ .0 \ 0 \ 0 \\ \hline 3 \ .8 \ 3 \ 1 \end{array}$$

e) $9.05 - 6.208$

Estimate: $9 - 6 = 3$

$$\begin{array}{r} 8 \ 10 \ 4 \ 10 \\ \cancel{9} \ .\cancel{0} \ \cancel{5} \ \cancel{0} \\ - 6 \ .2 \ 0 \ 8 \\ \hline 2 \ .8 \ 4 \ 2 \end{array}$$

f) $3.8 - 0.058$

Estimate: $4 - 0 = 4$

Add 0.942 to both numbers.

$3.8 + 0.942 = 4.742$

$0.058 + 0.942 = 1.000$

$$\begin{array}{r} 4 \ .7 \ 4 \ 2 \\ - 1 \ .0 \ 0 \ 0 \\ \hline 3 \ .7 \ 4 \ 2 \end{array}$$

At-Home Help

Decimal tenths, hundredths, and thousandths are subtracted using the same rules as whole numbers.

- It is easier to subtract vertically if the decimal points are aligned.
- Subtract place values that are the same, starting from the smallest place value.
- If you can't find the difference for a particular place value, regroup using the next greater place value.
- Check your answer using estimation or addition.

For example:

$$\begin{array}{r} 9 \ 9 \\ 2 \ \cancel{10} \ \cancel{10} \\ \cancel{8} \ .\cancel{0} \ \cancel{0} \ \cancel{0} \\ - 0 \ .7 \ 5 \ 7 \\ \hline 2 \ .2 \ 4 \ 3 \end{array}$$

You can also add a number to both numbers to get numbers that are easier to subtract.

For example, add 0.243 to both numbers.

$3.000 + 0.243 = 3.243$

$0.757 + 0.243 = 1.000$

$$\begin{array}{r} 3 \ .2 \ 4 \ 3 \\ - 1 \ .0 \ 0 \ 0 \\ \hline 2 \ .2 \ 4 \ 3 \end{array}$$

To subtract a decimal number that has only tenth and hundredth place values from a decimal number that has a thousandth place value, add a zero for the thousandth place value. For example, calculating $3.25 - 1.722$ is the same as $3.250 - 1.722$.

Communicate About Solving a Multi-Step Problem

Goal Explain a solution to a problem.

Twyla wants to add 1 kg of compost to two vegetable gardens. One garden measures 6.00 m by 3.60 m. The other garden measures 7.60 m by 5.30 m. One kilogram of compost is needed for 43 m². Does Twyla have enough compost for both gardens? Write a solution. Determine if your answer is reasonable. Use the Communication Checklist.

Suggested answer:

Understand the Problem

I need to determine if Twyla has enough compost for both gardens. *Make a Plan:* This problem will take more than one step and more than one operation to solve. First I need to multiply to find the area of each garden. Then I need to add to find the total area. I can compare the total area with the area that 1 kg will cover, or 43 m².

Carry Out the Plan:

$$\begin{array}{r} \text{Area of one garden: } 6.00 \text{ m} \times 3.60 \text{ m} = 21.60 \text{ m}^2 \\ \text{Area of other garden: } 7.60 \text{ m} \times 5.30 \text{ m} = 40.28 \text{ m}^2 \\ \text{Total area: } 61.88 \text{ m}^2 > 43 \text{ m}^2 \end{array} \quad \begin{array}{r} 21.60 \text{ m}^2 \\ + 40.28 \text{ m}^2 \\ \hline 61.88 \text{ m}^2 \end{array}$$

So Twyla does not have enough compost for both gardens.

Look Back: Check whether calculations are reasonable.

Round all numbers in the problem to the nearest whole number.

$$\text{Area of one garden: } 6 \text{ m} \times 4 \text{ m} = 24 \text{ m}^2$$

$$\text{Area of other garden: } 8 \text{ m} \times 5 \text{ m} = 40 \text{ m}^2$$

$$\text{Total estimated area: } 64 \text{ m}^2 > 43 \text{ m}^2$$

My estimated answer for the problem shows that Twyla does not have enough compost for both gardens. So my calculated answer is reasonable.

At-Home Help

To solve problems, follow these steps.

Understand the Problem

- What are you asked to find out?
- What information is given?
- What information is necessary to solve the problem?

Make a Plan

- Is there more than one step needed to solve the problem?
- What calculations can be used?

Carry Out the Plan

- Show all your work.

Look Back

- Check whether your answer is reasonable.

Use the Communication Checklist.

Communication Checklist

- Did you explain your thinking?
- Did you show how you calculated each step?
- Did you explain how you checked each answer?
- Did you show the right amount of detail?

Test Yourself Page 1

Circle the correct answer.

1. Using estimation, which question has an answer greater than 1600?

A. $569 + 872 + 236$

C. $379 + 406 + 765$

B. $264 + 504 + 429$

D. $596 + 604 + 366$

Use the survey results to answer Questions 2 and 3.

Favourite food	Number of students
chili	214
pizza	307
curried chicken	234
sushi	209

2. About how many students were surveyed?

A. about 850

B. about 980

C. about 800

D. about 950

3. How many more students chose pizza than sushi?

A. 86 students

B. 89 students

C. 98 students

D. 96 students

4. Which calculation is *not* reasonable?

A. $604 + 392 + 850 + 723 = 2569$

C. $356 + 147 + 520 + 801 = 1824$

B. $824 - 368 = 456$

D. $18\,011 - 9234 = 7777$

5. What are the missing numbers from top to bottom?

$$\begin{array}{r} 6\ 2\ 5\ 2\ \square \\ - \square\ 7\ \square\ 3 \\ \hline \square\ 3\ \square\ 2\ 8 \end{array}$$

A. 1, 8, 9, 5, 6

B. 1, 8, 9, 5, 7

C. 1, 8, 0, 5, 8

D. 1, 9, 9, 5, 7

Use the chart to answer Questions 6 and 7.

6. What is the total volume of juice?

A. 10.300 L

C. 10.090 L

B. 10.200 L

D. 9.090 L

Juice	Volume (L)
orange	2.615
apple	2.365
cranberry	2.130
mango	3.090

7. How much more mango juice is there than orange juice?

A. 1.475 L

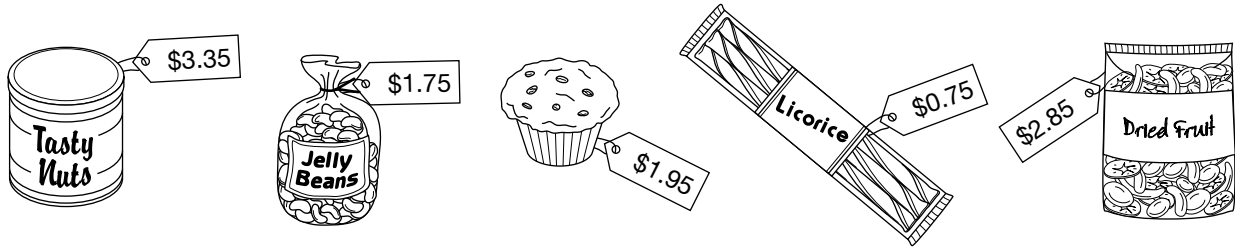
C. 0.685 L

B. 1.685 L

D. 0.475 L

Test Yourself Page 2

Use the picture below to answer Questions 8 and 9.



8. What is the total cost of the items shown?

A. \$10.65

B. \$7.45

C. \$10.50

D. \$11.05

9. Kittie bought a can of nuts, a package of dried fruit, and a muffin with a \$10 bill. How much change should she receive?

A. \$1.75

B. \$0.85

C. \$1.85

D. \$0.75

10. Jasmine is making a fruit cake. The recipe has a combination of fruits and nuts. What is the total mass of fruit and nuts in the fruit cake?

Ingredient	Mass (kg)
currants	0.450
raisins	0.525
almonds	0.175
candied peel	0.175

A. 1.200 kg

B. 1.325 kg

C. 1.550 kg

D. 1.860 kg

11. Asgar hiked on two different trails during summer camp. One trail measures 2.863 km. Asgar hiked a total of 5.501 km. How long is the other trail?

A. 3.738 km

B. 3.648 km

C. 2.748 km

D. 2.638 km