Lesson 1

Topic: Fractions and decimals

Adding decimals involving tenths

Lesson concepts

Addition and subtraction — Decimals

Lesson notes

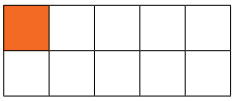
Today students will:

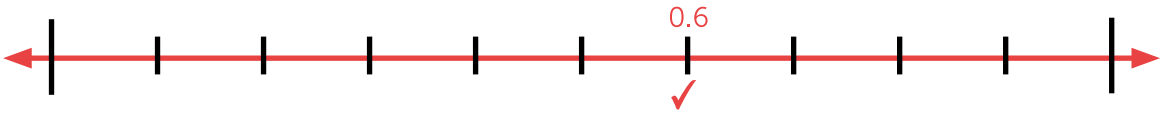
- add decimals involving tenths
- use estimation to check for reasonableness of their answer.

Lesson answers

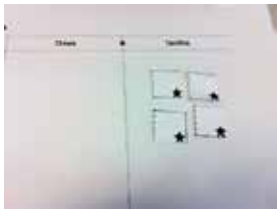
1. a. For example: A tenth is not a whole number but a decimal. A tenth is part of the place value system. A tenth is written as 0.1.

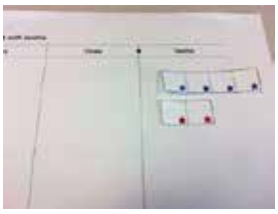
   b. For example:



2. 

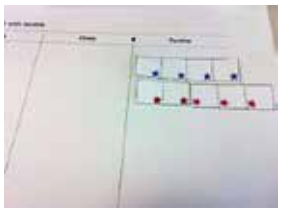
3. 100, 12, 8.5, 6, 1, 0.9, 0.3, 0.1
4. Students watch the Video — Adding tenths. They pause the video at (0:37).
5. Students locate and prepare **Sheet 1 — Place value chart**.
6. Students locate and prepare **Sheet 2 — Jigsaw tenths**.

   a. 

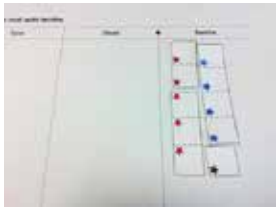
   b. 

   I now have six-tenths.

c. For example: My prediction is nine-tenths.

d. 

Yes, nine-tenths. (0.9)

e.  or 

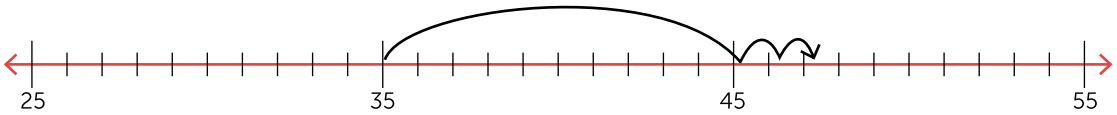
I have ten-tenths.

f. Yes, you can have ten in the tenths column but as ten-tenths equals one, it would be better to have one in the ones column than ten in the tenths column.

7. a. No answer required — students are setting up a learning object.
b. No answer required — students are setting up a learning object.
c. No answer required — students are setting up a learning object.
d. The abacus turned the ten-tenths into one ones.
e. One has been created.
f. No answer required.
g. No answer required.
h. The abacus turned the 12-tenths into one ones and two-tenths.
i. The new number is 1.2.

8. Students continue to watch the **Video — Adding tenths**. They pause at (1:55).

9. a.

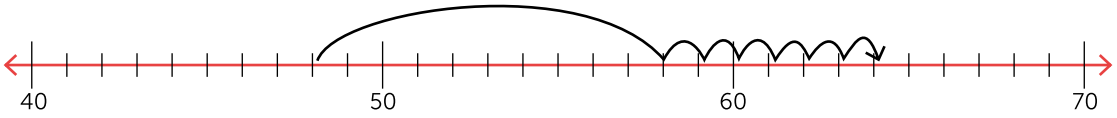


35.2 + 12
= (35.2 + 10) + 2
= 45.2 + 2
= 47.2

b.

25.5 + 13
= (25.5 + 10) + 3
= 35.5 + 3
= 38.5

c.



48.2 + 16
= (48.2 + 10) + 6
= 58.2 + 6
= 64.2

10. a. 12.8 + 24
Estimate: 13 + 24 = 37
Calculate: 12.8 + 24
= (12.8 + 20) + 4
= 32.8 + 4
= 36.8
Check: 36.8 is close to 37, so it is a reasonable answer.

b. 23.6 + 12
Estimate: 24 + 10 = 34
Calculate: 23.6 + 12
= (23.6 + 10) + 2
= 33.6 + 2
= 35.6
Check: 35.6 is close to 34, so it is a reasonable answer.

c. 78.2 + 65
Estimate: 80 + 65 = 145
Calculate: 78.2 + 65
= (78.2 + 60) + 5
= 138.2 + 5
= 143.2
Check: 143.2 is close to 145, so it is a reasonable answer.

11. a. 2.1 + 7.8
Estimate: 2 + 8 = 10
Calculate: (2.1 + 7) + 0.8
= 9.1 + 0.8
= 9.9
Check: 9.9 is close to 10, so it is a reasonable answer.

b. 12.7 + 3.1
Estimate: 13 + 3 = 16
Calculate: 12.7 + 3.1
= (12.7 + 3) + 0.1
= 15.7 + 0.1
= 15.8
Check: 15.8 is close to 16, so it is a reasonable answer.

c. 12.8 + 24
Estimate: 14 + 5 = 19
Calculate: = (14.3 + 5) + 0.1
= 19.3 + 0.1
= 19.4
Check: 19.4 is close to 19, so it is a reasonable answer.

12. Students finish watching the Video — Adding tenths.

13. Strategies will vary. Reasonableness will depend on estimation and calculations.

a. 68.4 + 5.1

Estimate: 68 + 5 = 73
Calculate: 68.4 + 5.1
= 60 + (8 + 5) + (0.4 + 0.1)
= 60 + 13 + 0.5
= 73.5
Check: 73.5 is close to 73, so it is a reasonable answer.

b. 19.7 + 8.2

Estimate: 20 + 8 = 28
Calculate: 19.7 + 8.2
= 10 + (9 + 8) + (0.7 + 0.2)
= 10 + 17 + 0.9
= 27.9
Check: 27.9 is close to 28, so it is a reasonable answer.

c. 49.7 + 6.4
Estimate: 50 + 6 = 56
Calculate: = 40 + (9 + 6) + (0.7 + 0.4)
= 40 + 15 + 1.1
= 56.1
Check: 56.1 is close to 56, so it is a reasonable answer.

d. 15.9 + 2.2
Estimate: 16 + 2 = 18
Calculate: 15.9 + 2.2
= 15.9 + 2 + 0.2
= 17.9 + 0.2
= 18.1
Check: 18.1 is close to 18, so it is a reasonable answer.

e. 19.7 + 6.2

Estimate: 20 + 6 = 26

Calculate: 19.7 + 6.2
= 19.7 + 6 + 0.2
= 25.7 + 0.2
= 25.9

Check: 25.9 is close to 26, so it is a reasonable answer.

f. 67.2 + 4.7

Estimate: 70 + 5 = 75

Calculate: 67.2 + 4.7
= 67.2 + 4 + 0.7
= 71.2 + 0.7
= 71.9

Check: 71.9 is close to 75, so it is a reasonable answer.

Lesson 2

Topic: Fractions and decimals

Subtracting decimals involving tenths

Lesson concepts

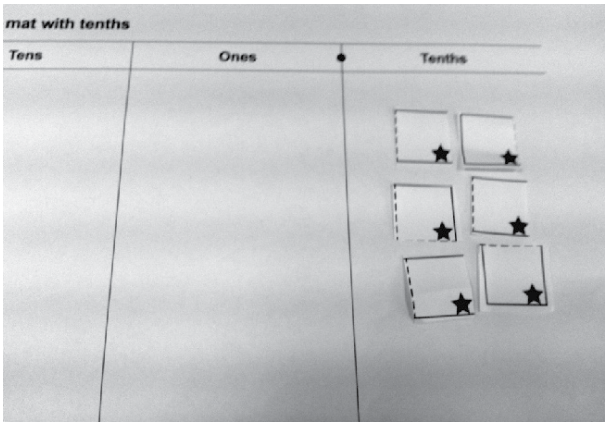
Addition and subtraction — Decimals

Lesson notes

Today students will:

- subtract decimals involving tenths
- use estimation to check for reasonableness of answers.

Lesson answers

1. Students retrieve Sheet 1 — Place value chart.
2. a. 

   b. There are four-tenths now.

   c. One-tenth

   d. For example: If I subtracted another tenth from the tenths column there would be no tenths left and the new number would be zero.

3. a. 1.5 – 0.3 = 1.2

   b. 1.4 – 0.3 = 1.1

   c. 1.9 – 0.8 = 1.1

   d. 1.8 – 0.6 = 1.2

4. Students watch the **Video — Subtracting tenths** and pause at (1:13).

5. a. 35.2 – 12

   Estimate: 35 – 10 = 25
   Calculate: 35.2 – 12
   = (35.2 – 10) – 2
   = 25.2 – 2
   = 23.2
   Check: 23.5 is close to 25, so it is a reasonable answer.

   b. 25.5 – 13

   Estimate: 26 – 13 = 13
   Calculate: 25.5 – 13
   = (25.5 – 10) – 3
   = 15.5 – 3
   = 12.5
   Check: 12.5 is close to 13, so it is a reasonable answer.

   c. 48.2 – 16

   Estimate: 48 – 16 = 32
   Calculate: 48.2 – 16
   = (48.2 – 10) – 6
   = 38.2 – 6
   = 32.2
   Check: 32.2 is close to 32, so it is a reasonable answer.

6. a. 15.9 + 2.2

   Estimate: 13 – 4 = 9
   Calculate: 12.8 – 4
   = 12.8 – 4
   = 8.8
   Check: 8.8 is close to 9, so it is a reasonable answer.

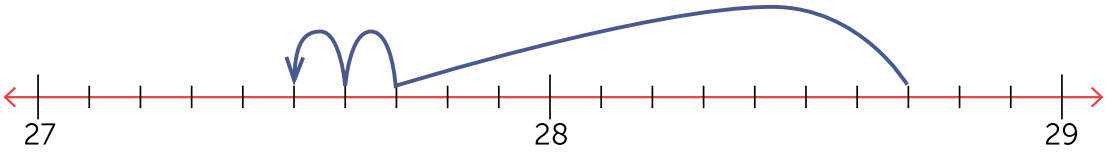
   b. 23.6 – 19

   Estimate: 24 – 19 = 5
   Calculate: 23.6 – 19
   = (23.6 – 10) – 9
   = 13.6 – 9
   = 4.6
   Check: 4.6 is close to 5, so it is a reasonable answer.

c. 78.2 – 16
Estimate: 80 – 16 = 64
Calculate: 78.2 – 16
= (78.2 – 10) – 6
= 68.2 – 6
= 62.2
Check: 62.2 is close to 64, so it is a reasonable answer.

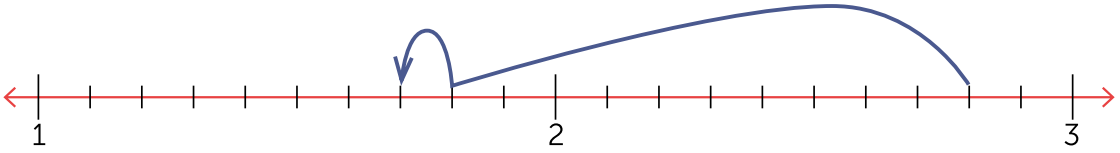
7. Answers to **Sheet 5 — Subtracting using number lines.**

a. 28.7 – 1.2
Estimate: 29 – 1 = 28
Calculate: using the jump strategy on a number line



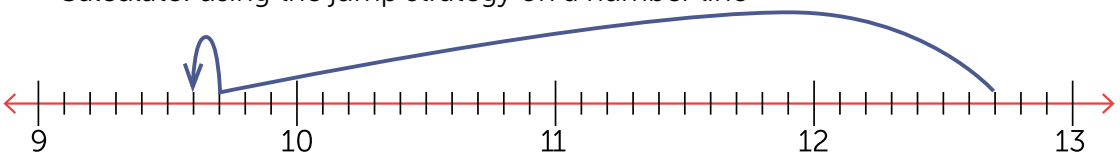
28.7 – 1.2
= (28.7 – 1) – 0.2
= 27.7 – 0.2
= 27.5
Check: 27.5 is close to 28, so it is a reasonable answer.

b. 78.2 – 16
Estimate: 3 – 1 = 2
Calculate: using the jump strategy on a number line



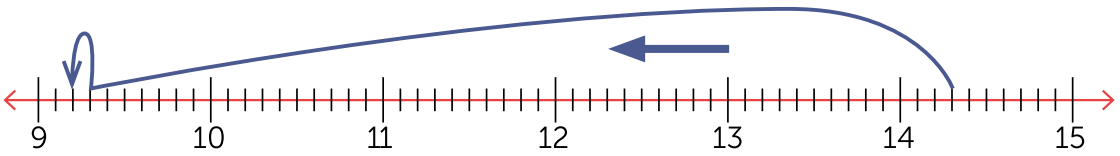
2.8 – 1.1
= (2.8 – 1) – 0.1 = 1.8 – 0.1
= 1.7
Check: 1.7 is close to 2, so it is a reasonable answer.

c. 12.7 – 3.1
Estimate: 13 – 3 = 10
Calculate: using the jump strategy on a number line



12.7 – 3.1
= (12.7 – 3) – 0.1
= 9.7 – 0.1
= 9.6
Check: 9.6 is close to 10, so it is a reasonable answer.

d. 14.3 – 5.1
Estimate: 14 – 5 = 9
Calculate: using the jump strategy on a number line



14.3 – 5.1
= (14.3 – 5) – 0.1
= 9.3 – 0.1
= 9.2
Check: 9.2 is close to 9, so it is a reasonable answer.

8. Students finish watching the **Video — Subtracting tenths**.

9. a. 78.9 – 1.4

Estimate: 79 – 1 = 78
Calculate: 78.2 – 1.4
= 70 + (8 – 1) + (0.9 – 0.4)
= 77 + 0.5
= 77.5
Check: 77.5 is close to 78, so it is a reasonable answer.

b. 68.5 – 5.4

Estimate: 70 – 5 = 65
Calculate: 68.5 – 5.4
= 60 + (8 – 5) + (0.5 – 0.4)
= 60 + 3 + 0.1
= 63.1
Check: 63.1 is close to 65, so it is a reasonable answer.

c. 19.7 – 8.2
Estimate: 20 – 8 = 12
Calculate: 19.7 – 8.2
= 10 + (9 – 8) + (0.7 – 0.2)
= 10 + 1 + 0.5
= 11.5
Check: 11.5 is close to 12, so it is a reasonable answer.

d. 49.7 – 6.6
Estimate: 50 – 7 = 43
Calculate: 49.7 – 6.6
= 40 + (9 – 6) + (0.7 – 0.6)
= 40 + 3 + 0.1
= 43.1
Check: 43.1 is close to 43, so it is a reasonable answer.

10. Reasonableness will depend on estimation

a. 15.9 – 2.2
Estimate: 16 – 2 = 14
Calculate: 15.9 – 2.2
= (15.9 – 2) – 0.2
= 13.9 – 0.2
= 13.7
Check: 13.7 is close to 14, so it is a reasonable answer.

b. 19.9 – 6.8
Estimate: 20 – 7 = 13
Calculate: 19.9 – 6.8
= (19.9 – 6) – 0.8
= 13.9 – 0.8
= 13.1
Check: 13.1 is close to 13, so it is a reasonable answer.

c. 67.8 – 4.7
Estimate: 68 – 5 = 63
Calculate: 67.8 – 4.7
= (67.8 – 4) – 0.7
= 63.8 – 0.7
= 63.1
Check: 63.1 is close to 63, so it is a reasonable answer.

Lesson 3

Topic: Fractions and decimals

Solving problems involving decimals

Lesson concepts

Addition and subtraction — Decimals

Lesson notes

Today students will:

- apply addition and subtraction strategies to solve problems
- check for reasonableness of answers.

Lesson answers

1. a. 36.2 + 54.3
   Estimate: 40 + 50 = 90
   Calculate: 36.2 + 54.3
   = (36.2 + 54) + 0.3
   = 90.2 + 0.3
   = 90.5
   Check: 90.5 is close to 90, so it is a reasonable answer.

   b. 17.9 – 16.5
   Estimate: 18 – 16 = 2
   Calculate: 17.9 – 16.5
   = 17.9 – 16
   = 1.9 – 0.5
   = 1.4
   Check: 1.4 is close to 2, so it is a reasonable answer.

   c. 564.1 + 29.7
   Estimate: 564 + 30 = 594
   Calculate: 564.1 + 29.7
   = (560 + 20) + (4 + 9) + (0.1 + 0.7)
   = (580 + 13) + 0.8
   = 593 + 0.8
   = 593.8
   Check: 593.8 is close to 594, so it is a reasonable answer.

d. 38.2 + 27.3
Estimate: 38 + 30 = 68
Calculate: 38.2 + 27.3
= (30 + 20) + (8 + 7) + (0.2 + 0.3)
= (50 + 15) + 0.5
= 65 + 0.5
= 65.5
Check: 65.5 is close to 68, so it is a reasonable answer.

e. 28.9 – 16.5
Estimate: 30 – 15 = 15
Calculate: 28.9 – 16.5
= (20 – 10) + (8 – 6) + (0.9 – 0.5)
= (10 + 2) + 0.4
= 12 + 0.4
= 12.4
Check: 12.4 is close to 15, so it is a reasonable answer.

f. 67.8 + 89.1
Estimate: 70 + 90 = 160
Calculate: 67.8 + 89.1
= (60 + 80) + (7 + 9) + (0.8 + 0.1)
= 140 + 16 + 0.9
= 156.9
Check: 156.9 is close to 160, so it is a reasonable answer.

g. 43.2 + 69.6
Estimate: 40 + 70 = 110
Calculate: 43.2 + 69.6
= (40 + 60) + (3 + 9) + (0.2 + 0.6)
= (100 + 12) + 0.8
= 112 + 0.8
= 112.8
Check: 112.8 is close to 110, so it is a reasonable answer.

h. 31.9 – 28.3
Estimate: 32 – 28 = 4
Calculate: 31.9 – 28.3
= (31 – 28) + (0.9 – 0.3)
= 3 + 0.6
= 3.6
Check: 3.6 is close to 4, so it is a reasonable answer.

i. 123.5 + 87.4
Estimate: 120 + 90 = 210
Calculate: 123.5 + 87.4
= (120 + 80) + (3 + 7) + (0.5 + 0.4)
= (200 + 10) + 0.9
= 210.9
Check: 210.9 is close to 210, so it is a reasonable answer.

j. 753.5 – 85.2
Estimate: 750 – 90 = 660
Calculate: 753.5 – 85.2
= (750 – 80) + (3 – 5) + (0.5 – 0.2)
= 670 – 2 + 0.3
= 668 + 0.3
= 668.3
Check: 668.3 is close to 660, so it is a reasonable answer.

2. a 0.7 + 0.5 = 1.2
b. 0.6 + 0.8 = 1.4
c. 1.1 – 0.8 = 0.3
d. 1.3 – 0.4 = 0.9
e. For example: 0.6 + 0.5 = 1.1

3.

Question	Working out	Answer
a. What is the difference between the two amounts of water? 	1.5 – 1.2 = 0.3	0.3 L
b. What is the total of the two numbers? 	23.3 + 35.4 = (23 + 35) + (0.3 + 0.4) = 58 + 0.7	58.7
c. Bob has two bottles of water. One bottle has 15.2 L. The second bottle has 8.7 L. How much water does Bob have altogether? 	15.2 + 8.7 = (15 + 8) + (0.2 + 0.7) = 23 + 0.9 = 23.9	23.9 L
d. Yussef ran 100 m in 15.8 seconds. Rahni ran the same distance in 13.2 seconds. How much faster was Rahni? 	15.8 – 13.2 = (15 – 13) + (0.8 – 0.2) = 2 + 0.6 = 2.6	2.6 secs
e. Kym has a 2.5 kg bag of apples. She ate 1.2 kg. How many kilograms of apples are left? 	2.5 – 1.2 = (2 – 1) + (0.5 – 0.2) = 1 + 0.3 = 1.3	

4. **Sheet 6 — Addition and subtraction of decimals** (see page 25).

Lesson 4

Topic: Fractions and decimals

Multiplying whole numbers by powers of 10

Lesson concepts

Multiplication and division — Mental computation

Lesson notes

Today students will:

- multiply whole numbers by powers of 10.

Lesson answers

1. For example:
   a. 42
   b. 18
   c. 12
   d. 49
   e. 72

2.

Thousands			Ones			
H	T	O	H	T	O	
					6	
				6	0	x 10
			6	0	0	x 100
		6	0	0	0	x 1000

For example:

a. 6 is written in the ones place and 60 is written in the tens and ones places.
b. Ten times larger
c. 600
d. 100 times larger
e. 6 000

3. For example: Each time a number is multiplied by ten the number moves one place to the left and another zero is added.

4.

Number	42	378	8 740
× 10	420	3 780	87 400
× 100	4 200	37 800	874 000
× 1 000	42 000	378 000	8 740 000

5. a. 5 600
   b. 608 000
   c. 380
   d. 21 000

6. a. $7 \times 800 = 7 \times 8 \times 100$
   $= (7 \times 8) \times 100$
   $= 56 \times 100$
   $= 5\,600$

   b. $3\,000 \times 5 = 3 \times 1\,000 \times 5$
   $= (3 \times 5) \times 1\,000$
   $= 15 \times 1\,000$
   $= 15\,000$

   c. $50 \times 6 = 5 \times 10 \times 6$
   $= (5 \times 6) \times 10$
   $= 30 \times 10$
   $= 300$

   d. $9 \times 300 = 9 \times 3 \times 100$
   $= (9 \times 3) \times 100$
   $= 27 \times 100$
   $= 2\,700$

7. a. $40 \times 70 = (4 \times 10) \times (7 \times 10)$
$= (4 \times 7) \times (10 \times 10)$
$= 28 \times 100$
$= 2\,800$

b. $600 \times 40 = (6 \times 100) \times (4 \times 10)$
$= (6 \times 4) \times (100 \times 10)$
$= 24 \times 1\,000$
$= 24\,000$

c. $500 \times 600 = (5 \times 100) \times (6 \times 100)$
$= (5 \times 6) \times (100 \times 100)$
$= 30 \times 10\,000$
$= 300\,000$

d. $20 \times 9\,000 = (2 \times 10) \times (9 \times 1\,000)$
$= (2 \times 9) \times (10 \times 1\,000)$
$= 18 \times 10\,000$
$= 180\,000$

8. For example:

a. ... one place to the left.
b. ... two places to the left.
c. ... three places to the left.

9. Answers may vary but could include:

a. $135 \times 20 = 135 \times 2 \times 10$
$= (135 \times 2) \times 10$
$= 270 \times 10$
$= 2\,700$

b. $300 \times 78 = 3 \times 100 \times 78$
$= (3 \times 78) \times 100$
$= (3 \times 70 + 3 \times 8) \times 100$
$= (210 + 24) \times 100$
$= 234 \times 100$
$= 23\,400$

Lesson 5

Topic: Fractions and decimals

Multiplying decimals by powers of 10

Lesson concepts

Multiplication and division — Decimals

Lesson notes

Today students will:

- multiply decimals by powers of 10.

Lesson answers

1. a. × 10 = 5 820 or × 100 = 58 200 or × 1 000 = 582 000
   b. × 10 = 160 or × 100 = 1 600 or × 1 000 = 16 000
   c. × 10 = 80 or × 100 = 800 or × 1 000 = 8 000
   d. × 10 = 3 200 or × 100 = 32 000 or × 1 000 = 320 000
   e. × 10 = 2 080 or × 100 = 20 800 or × 1 000 = 208 000
2. Students locate the **Number slider**.
3. For example:
   a. The value of the number increases ten times.
   b. The place value changes. For example, tenths are renamed ones when multiplied by ten.
   c. 6 280
   d. When multiplying whole numbers and decimals by powers of ten, the process is the same, the digits move one place value to the left when you multiply by 10, two places when you multiply by 100 and so on.
   e. 62 800

4. When a decimal is multiplied by a power of 10, the digits move places to the left.
   - when multiplied by 10, the digits move one place to the left
     428.7 × 10 = 4 287
   - when multiplied by 100, the digits move two places to the left
     428.7 × 100 = 42 870
   - when multiplied by 1 000, the digits move three places to the left
     428.7 × 1 000 = 428 700

   The number of places that the decimal point moves equals the number of zeros in the power of 10.

5.

Number	36.9	61.24	9.403
× 10	369	612.4	94.03
× 100	3 690	6 124	940.3
× 1 000	36 900	61 240	9 403

6. a. 1 245
   b. 8 034
   c. 62.8
   d. 974.1

7. a. 1 000
   b. 100
   c. 100
   d. 10

8. a. 1 020, 10 200
   b. 6.7, 67
   c. 680, 6 800
   d. Multiplying by 10

9. For example:
   a. ... one place to the left
   b. ... two places to the left.
   c. ... three places to the left.

10. Answers may vary but could include:
    a. No answer required.
    b. 100 people each paid $56.04 to hire a DJ for a party. How much did the DJ get paid?
    c. A shop owner ordered 1 000 stamps at $0.58 each. How much did the owner pay for all the stamps?

Lesson 6

Topic: Fractions and decimals

Multiplying tenths by one-digit whole numbers

Lesson concepts

Multiplication and division — Decimals

Lesson notes

Today students will:

- multiply decimals by one-digit whole numbers.

Lesson answers

1. a. For example:

Compensate

994 × 3

Build up 1 000 × 3

= 3 000

Compensate 3 000 – 6 × 3

= 3 000 – 18

= 2 982

or: Split

994 × 3

= (900 × 3) + (90 × 3) + (4 × 3)

= 2 700 + 270 + 12

= 2 982

or: Use repeated addition

994 × 3

= 994 + 994 + 994

= 2 982

2. a. Ten-tenths
   b. One whole
   c. 35-tenths
   d. Three-ones and five-tenths or 3.5
   e. 45-tenths or four-ones and five-tenths or 4.5
   f. The tenths place remains the same.

3. a. 4.2
   b. 2.7
   c. 3.2
   d. 1.4

4. a. Estimate: 27×3 is rounded to $30 \times 3 = 90$
   Calculate: $27 \times 3 = (20 \times 3) + (7 \times 3)$
   $= 60 + 21$
   $= 81$
   b. For example:
   Estimate: 2.7×3 is rounded to $3 \times 3 = 9$
   Calculate: The answer will be 8.1 not 81. As 27 is divided by 10 to get 2.7, the answer 81 is divided by 10 to give 8.1.

5. a. For example:
   Estimate: 6.8×5 is rounded to $7 \times 5 = 35$

	ones	tenths
×	6	8
5	30	40

   Calculate: 6.8×5
   = 30-ones + 40-tenths
   = 30-ones + 4-ones and 0-tenths
   = 34
   Check: 34 is close to 35, so my answer is reasonable.
   b. Estimate: 208.3×6 is rounded to $200 \times 6 = 1\,200$

	hundreds	tens	ones	tenths
×	2	0	8	3
6	12	0	48	18

   Calculate: 208.3×6
   = 12-hundreds + 0-tens + 48-ones + 18-tenths
   = 12-hundreds + 0-tens + 4-tens + 8-ones + 1-ones + 8-tenths
   = 12-hundreds + 0-tens + 4-tens + 9-ones + 8-tenths
   = 1 200 + 0 + 40 + 9 + 0.8
   = 1 249.8
   Check: 1 249.8 is close to 1 200, so my answer is reasonable.

6. a. When multiplying ones by ones, the answer will always be:

tens ☐ ones ☑ tenths ☐

b. When multiplying tenths by ones, the answer will be:

tens ☐ ones ☐ tenths ☑

7. a. Answers may vary but could include:

Estimate: 1.4 × 8 is rounded to 1 × 8 = 8

	ones	tenths
×	1	4
8	8	32

Calculate: 1.4 × 8 = 8-ones + 32-tenths
= 8-ones + 3-ones + 2-tenths
= 11-ones + 2-tenths
= 1-ten + 1-one + 2-tenths
= 11.2
The dressmaker requires 11.2 m

Check: 11.2 is close to 8, so my answer is reasonable.

b. Estimate: 0.3 × 25 is rounded to 0.5 × 25 = 12.5

Calculate:

	tenths
×	3
20	60
5	15

= 60-tenths + 15-tenths
= 6-ones + 1-one + 5-tenths
= 7.5
7.5 L of juice is needed

Check: 7.5 is close to 12.5, so my answer is reasonable.

c. Estimate: 6.7 × 8 is rounded to 7 × 8 = 56

Calculate:

	ones	tenths
×	6	7
8	48	56

= 48-ones + 56-tenths
= 48-ones + 5-ones + 6-tenths
= 53.6
The length of string would be 53.6 m

Check: 53.6 is close to 56, so my answer is reasonable.

Lesson 7

Topic: Fractions and decimals

Multiplying decimals by multiples of 10

Lesson concepts

Multiplication and division — Decimals

Lesson notes

Today students will:

- multiply decimals by multiples of 10.

Lesson answers

1. a. 12-hundredths
   b. One-tenth and two-hundredths or 0.12
   c. 24-hundredths
   d. Two-tenths and four-hundredths or 0.24
   e. 48-hundredths or 0.48
   f. The hundredths place remains the same.
2. a. 0.18
   b. 0.24
   c. 0.45
   d. 0.18
3. a Estimate: $0.35 × 8 is rounded to 50 cents × 8 = 400 cents or 4 dollars or $4.00

   Calculate:

	ones	hundredths
×	3	5
8	24	40

   = 24-tenths + 40-hundredths

   = 2-ones + 4-tenths + 4-tenths + 0-hundredths

   = $2.80

b. Estimate: $2.83 × 9 is rounded to $3 × 9 = $27
Calculate: $2.83 × 9 = (2-ones and 83-hundredths) × 9
= 2-ones × 9 + 83-hundredths × 9
= 18-ones + 747-hundredths
= 18-ones + 7-ones + 47-hundredths
= 25-ones + 47-hundredths
= $25.47

c. Estimate: $24.08 × 3 is rounded to $25 × 3 = $75
Calculate: $24.08 × 3 = (24-ones and 8-hundredths) × 3
= 24-ones × 3 + 8-hundredths × 3
= 72-ones + 24-hundredths
= $72.24

4. a. Answers may vary but could include:
Estimate: $90
Thinking: $4.62 × 20 is rounded to $5.00 × 20
$5.00 × 20
= $5 × 2 × 10
= $100
so $90 is the closest answer

b. Estimate: 400 m
Thinking: 0.54 m × 800 is rounded to 0.50 × 800
0.50 × 800
= 0.50 × 8 × 100
= 4 × 100
so 400 m is the closest answer

c. Estimate: 9 000 L
Thinking: 3.21 L × 3 000 is rounded to 3 × 3 000
3 × 3 000
= 3 × 3 × 1 000
= 9 × 1 000
= 9 000
so 9 000 L is the closest answer

5. **Sheet 10 — Multiplication training** (see page 28).

Addition and subtraction of decimals

Complete the following questions.

- Show your working.
- Check the reasonableness of your answer.

1. Complete the following questions

a. 12.6 + 13

Estimate $12.6 + 13 = 13 + 13$
$= 26$

Calculate using partitioning $12.6 + 13 = 12 + 0.6 + 13$
$= (12 + 13) + 0.6$
$= 25 + 0.6$
$= 25.6$

Check The answer 25.6 is close to 26, so it is a reasonable answer.

b. 27.8 – 18

Estimate $27.8 - 18 \approx 30 - 20$
≈ 10

Calculate using the jump method $27.8 - 18 = 27.8 - (10 + 8)$
$= (27.8 - 10) - 8$
$= 17.8 - 8$
$= 9.8$

Check The answer 9.8 is close to 10, so it is a reasonable answer.

c. 33.4 – 24.3

Estimate $33.4 - 24.3 \approx 35 - 25$
≈ 10

Calculate using the split method $33.4 - 24.3 = (33 + 0.4) - (24 + 0.3)$
$= (33 - 24) + (0.4 - 0.3)$
$= 9 + 0.1$
$= 9.1$

Check The answer 9.1 is close to 10, so it is a reasonable answer.

2. Complete the following word problems

a. A baby elephant was weighed when he arrived at the zoo and then weighed again after nine months.

Month	Weight
Start	55.0 kg
Nine	66.2 kg

How much weight did the elephant gain? Show your working.

Weight gain = 9th month weight – start weight
= 66.2 – 55.0
= 11.2

Weight gain is 11.2 kg

b. The normal body temperature is considered to be 37.0 degrees Celsius. How many degrees above or below normal are the following temperatures?

i. 37.9 °C? 37.9 °C is greater than 37.0 °C
Degrees above = 37.9 – 37.0
= 0.9 °C above

ii. 38.2 °C? 38.2 °C is greater than 37.0 °C
Degrees above = 38.2 – 37.0
= 1.2 °C above

The following puzzle is completed by placing numbers in each of the four corners.

The numbers are determined by using the totals that have been provided.

- Start by partitioning the 3.5 into two numbers such as 2.1 and 1.4.
- 2.1 has been written in the box in the lower left-hand corner.
- 1.4 has been written in the box in the lower right-hand corner.
- Next you will need to solve the problem: 9.6 = 1.4 + ☐
- Write the solution in the box on the top right-hand corner.
- Continue until all the boxes in the square have been filled in.

3. Find the solution for this puzzle.
   For example:

9	+	6.5	= 15.5
		+	
0.4	+	3.1	= 3.5
= 9.4		= 9.6	

4. Write different solutions to the following squares.
   Other solutions:

- 1.5/2 & 7.9/7.6
- 2/1.5 & 7.4/8.1
- 1.9/1.6 & 7.5/8
- 1.8/1.7 & 7.6/7.9
- 1.6/1.9 & 7.8/7.7
- 1.4/2.1 & 8/7.5
- 1.3/2.2 & 8.1/7.4
- 1.2/2.3 & 8.2/7.3

7.9	+	7.6
+		+
1.5	+	2

Multiplication training

1. a. The animals listed in the table below can jump many times their own length.
Work out how far each one can jump.

Animal	Length of animal	How many times its own length the animal can jump	How far can the animal jump?
Jumping spider	16 mm	100	1 600 mm
Klipspringer	1.5 m	10	15 m
Bullfrog	12 cm	10	120 cm
Froghopper	0.006 m	100	0.6 m
Grasshopper	5 cm	30	150 cm
Flea	1 mm	200	200 mm
Kangaroo rat	0.011 m	50	0.55 m

b. The animals in the table below can lift many times their own weight.
Work out how much weight each one can lift.

Animal	Weight of animal	How many times its own length the animal can lift	What weight can the animal lift?
Gorilla	170 kg	10	1 700 kg
Leafcutter ant	0.5 g	50	25 g
Rhinoceros beetle	20 g	1 000	20 000 g
Ant	0.003 g	100	0.3 g

2. Help each competitor with their training by solving the following expressions.
Hint: Use your knowledge of basic facts and powers of numbers.

0.4x7	0.4x70	0.4x700
2.8	28	280

2.8x6	2.8x60	2.8x600
16.8	168	1 680

12.3x4	12.3x40	12.3x400
49.2	492	4920

8.26x9	8.26x90	8.26x900
74.34	743.4	7 434