CHAPTER

12

Operations with Decimals

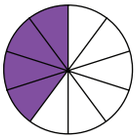
Chapter Outcomes:

- Develop and apply procedures to solve problems involving the addition and subtraction of decimals.
- Develop estimation skills.
- Develop and apply the procedures to multiply decimals by whole numbers and decimals (limited to tenths by tenths) and to divide a decimal by a whole number (up to hundredths) to solve problems.

Performing operations with decimals is essential, especially in measurement and money. Imagine you are shopping for a bicycle with your birthday money. You know the cost of the bicycle but without doing some operations with decimals, there is no way to know if you have enough money. In addition, those calculations can also help you to find out the amount of change you will get back, if you purchase the bicycle.

Getting Ready for Chapter 12

1. Write the decimal fraction of the shaded part.



2. What is the value of 8 in the number 4.08?

Compare. Write >, < or =.

3. 1.14 ◯ 1.41	4. 0.91 ◯ 0.19

5. Order the numbers below from least to greatest.

   2.41, 4.12, 1.24, 4.21

6. Round 15.6 to the nearest whole number.

7. Write 230.09 is expanded notation form.

Estimate Decimal Sums and Differences

Teaching Point 1:

How do you estimate when you add and subtract decimals?

Mark wants to buy a pants that cost $45.65 and a shirt that costs $25.15 at D Barn Men's Store. Estimate the cost of both items.

Use rounding to estimate.

Round each decimal to the nearest whole number. Then add.

$45.65 ⟶ **$ 46**

+$24.15 ⟶ +**$ 24**

$ 70

The cost of both items is about $70.

The same pants cost $62.38 at the Match Men's Store. About how much more does the pants cost at this store than at D Barn Men's Store?

Round each decimal to nearest whole number. Then subtract.

$62.38 ⟶ **$ 62**

−$45.65 ⟶ −**$ 46**

$ 16

The pants cost about $16 more at Match Men's Store.

Activity 1:

Round each to the nearest whole number to estimate each sum or difference.

1. 0.56 + 3.29 =	2. 17.45 − 6.85 =
3. $23.56 + $3.29 =	4. 3.4 + 5.1 + 1.8 =
5. 97.12 − 54.72 =	6. $12.38 − $9.19 =
7. 9.3 + 6.9 + 2.2 =	8. 3.2 + 2.93 + 4.5 =
9. $26.55 − $6.85 =	10. 401.4 − 90.8 =

11. 21.05 + 7.82 _____	**12.** 18.26 −14.09 _____
13. 136.21 − 68.71 _____	**14.** 89.39 +2 781.50 _____
15. 149.02 7 368.16 + 25.73 _____	**16.** 9.72 68.16 +53.90 _____
17. 207.08 −183.57 _____	**18.** 38.84 −27.64 _____
19. 401.23 − 99.89 _____	**20.** 66.44 + 5.76 _____

21. Meena uses 3.43 metres of blue ribbon, 0.94 metres of red ribbon and 4.16 metres of white ribbon to decorate the room. Estimate the total length of ribbon she uses for the decorations.

22. Sanjo has $25.00 to spend at the Bazaar. He wants to buy an ice-cream for $5.50, a hot dog for $6.25 and a drink for $3.95. Estimate the amount of money he would have left after he buys these things.

Use the table and estimation to answer questions 23-24.

Grams of Protein per Serving	
Food	Grams of Protein
1 boiled egg	6.29
A glass of milk	8.22
A bowl of oatmeal	11.45
2 slices of whole wheat bread	8.53

23. Gina had a boiled egg, 2 slices of bread and a glass of milk for breakfast. About how many grams of protein did Gina have at breakfast?

24. Vinod had a bowl of oatmeal, a glass of milk, and one other item for breakfast. He had about 25 grams of protein. What was the third item Vinod had for breakfast?

25. Neesha downloads a song that is 4.32 minutes long and one that is 8.28 minutes long. About how many minutes will it take all of her songs to play if she already has 13.8 minutes of songs?

26. Mickey spends $45.40 on a present for his mom and a $60.95 on a present for his dad. If Mickey started with $120, about how much money does he have left?

Add and Subtract Decimals through Hundredths

Teaching Point 1:

How can you add decimals through hundredths?

Mia has 0.4m of red fabric and 0.5m of blue fabric. How much fabric does Mia have in all?

Model 0.4m + 0.5m.

0.4 + 0.5 + 0.9

Ones		Tenths
	•	
	•	
0	•	9

	Ones		Tenths
0.4		•	
+0.5		•	
0.9	0	•	9

Mia cut 0.9 metres of fabric in total.

Find 19.6 + 4.71.

1. Line up the decimal points. Add a 0 so that both numbers end in the same value.

19.60 +
+ 4.71

T	O		Tths	Hths
1	1 9	•	6	0
	4	•	7	1
2	4	•	3	1

1

1
19.60
+ 4.71
.31

11
19.60
+ 4.71
4.31

11
19.60
+ 4.71
24.31

2. Add the digits in each place value. Regroup if necessary.

3. Bring down the decimal point.

Estimate for reasonableness:
20 + 5 = 25.
The sum 24.31 is close to 25.
So, the answer is reasonable.

So, 19.6 + 4.71 = 24.31

Teaching Point 2:

How can you subtract decimals through hundredths?

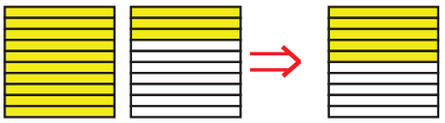
Subtract 0.8 from 1.3.

Model 1.3 – 0.8

3 tenths is less than 8 tenths.

Regroup 1 ones and 3 tenths.

1 one 3 tenths = 13 tenths



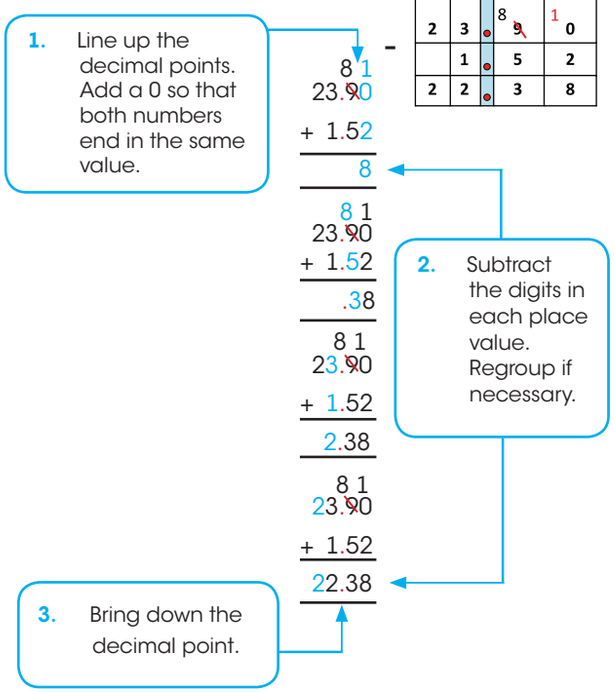
13 tenths – 8 tenths = 5 tenths

Ones	Tenths
0	5

	Ones	Tenths
0 1		
1.3		
−0.8		
0.5	0	5

So, 1.3 – 0.8 = 0.5

Find 23.9 – 1.52.



Estimate for reasonableness:
24 – 2 = 22.

The sum 22.38 is close to 22.

So, the answer is reasonable.

So, 23.9 – 1.52 = 22.38.

Activity 1:

Copy and complete the following.

1. 0.6 + 0.9 =	**2.** 0.7 + 0.8 =
3. 0.6 + 0.4 + 0.9 =	**4.** 0.2 + 0.6 + 0.7 =
5. 0.4 + 0.57 =	**6.** 0.93 + 0.6 =
7. 0.87 + 0.29 =	**8.** 0.15 + 0.78 =

9. 2.5 + 13.38 =	**10.** 16.8 + 7.76 =
11. 2.5 + 6 + 7.59 =	**12.** 8.1 + 11.45 + 9.6 =
13. 5.5 + 0.82	**14.** 0.17 + 0.94
15. 1.05 + 7.82	**16.** 2.41 + 0.58
17. $21.05 +$47.69	**18.** $129.05 +$ 62.79

Solve the problems below. Check for reasonableness of answer.

19. Jamie is jogging from the park to the school. He has jogged 1.62km so far. He has 0.38km left to jog. How far is the park located away from the school?

20. Abby practiced the piano for 3.5 hours on Sunday and 1.8 hours on Monday. How long did she practice over the two days?

21. Three of the decimals shown below have a sum equal to 14.04. Which number below does not belong with the other three?
1.15 2.57 5.03 6.44

Use the bill below to answer questions 21 – 23.

Family Lunch	
Rice	– $22.55
Curry Chicken	– $85.95
Dahl	– $26.10
Fresh Salad	– $15.69

22. What is the total cost of the family lunch?

23. What would be the total cost of the Rice, Curry Chicken and Fresh Salad?

24. If one family member bought one roti-skin that costs $6, what will be the total cost of the lunch now?

25. A litre of milk costs $8.32 and a litre of orange juice costs $5.95. Mother buys two litres of milk and two litres of orange juice. How much does mother spend?

26. For a party Mrs. Smith buys 2.75 litres of orange juice and 4.26 litres of apple juice. How much juice does Mrs. Smith buy in total?

Activity 2:

Copy and complete the following.

1. 0.8 – 0.6 =	**2.** 0.7 – 0.2 =
3. 1.4 – 0.2 =	**4.** 2.8 – 0.5 =
5. 5.2 – 1.4 =	**6.** 14.6 – 9.7 =
7. 12.09 – 4.8 =	**8.** 36.6 – 15.07 =
9. 23.7 – 18.29 =	**10.** 158.01 – 18.96 =
11. 0.45 +0.22 _____	**12.** 6.01 –0.45 _____
13. 7.6 –2.75 _____	**14.** 39.57 –18.98 _____
15. $23.50 +$17.59 _____	**16.** $450.00 +$ 76.99 _____

Solve the problems below. Check for reasonableness of answer.

17. Mark finished the road race in 21.39 minutes. Alex took 19.59 minutes to finish. How much longer did Mark take to finish the race than Alex?

18. The sum of two numbers is 4.04. One number has a 4 in the tenths place and a 1 in the hundredths place. What are the two numbers?

19. Maya uses ribbons to decorate packages. She has a total of 3.75m of ribbon. If she uses 0.48m of ribbon to wrap one package, how much ribbon does Maya have left?

Activity 3:

Solve the real-world problems below.

1. Dana spends $13.02 on snacks, $9.85 on a drink, and $15.20 on a sandwich. How much change does she receive from $50?
2. Alysha adds 3.24, 4.29, and 2.07. How much more than 5.31 is the sum?
3. Varun and Vinod want to buy a pack of pencils. The pack of pencils costs $10.68. They each have $5.25 to spend. How much more money do they need to buy the pencils?
4. Sandra has $75 in her bank account. On Monday, she deposits $19.75 in the account. If Sandra buys a meal for $40.35, about how much money does Sandra have left in her account?
5. The mass of a watermelon is 5.6kg. A pumpkin has a mass that is 0.34 less than the watermelon. What is the total mass of the watermelon and the pumpkin?
6. A piece of fabric 6m long is cut into two pieces. The first piece is 2.74m long. How much longer is the second piece?
7. A jug contains 1.75 litres of water. A bucket contains 15.2 litres more water than the jug. How much water does the bucket contain?
8. Peter is 0.08m taller than Ali. Jamiah is 0.16m shorter than Peter. If Jamiah is 1.65m tall, what is Ali's height?

Multiply Decimals and Whole Numbers

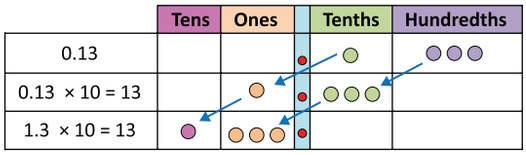
Teaching Point 1:

How can patterns help you place the decimal point in a product?

Multiply by	*Move the decimal point to the right*
1	0 places
10	1 place
100	2 places

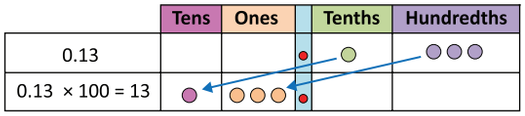
Multiply 0.13 by 10.

$0.13 \times 10 = 0.13 = 1.3$ ← 1 decimal place to the right.



Multiply 0.13 by 100

$0.13 \times 100 = 0.13 = 13$ ← 2 decimal places to the right.



When you need to move the decimal point beyond the number of digits in the number you are multiplying, place 1 or more zeros.

Moving the decimal point to the **right** increases the number's value.

Activity 1:

Move the decimal point to find each product.

1. 0.4 × 10 =	**2.** 0.3 × 10 =
3. 0.17 × 10 =	**4.** 0.01 × 10 =
5. 5.4 × 10 =	**6.** 10.5 × 10 =
7. 6.81 × 10 =	**8.** 8.03 × 10 =
9. 60.7 × 10 =	**10.** 40.09 × 10 =
11. 0.15 × 100 =	**12.** 0.06 × 100 =
13. 18.16 × 100 =	**14.** 28.33 × 100 =
15. 0.8 × 100 =	**16.** 0.2 × 100 =
17. 3.8 × 100 =	**18.** 30.1 × 100 =
19. 51.01 × 100 =	**20.** 25.6 × 100 =

Use the table below to answer questions **21** and **22**.

Coins In Arianne's Piggy Bank

Type of Coin	Number of Coins
	10
	100
	10
	100

21. Write in dollar notation the total value of each type of coin that is in the piggy bank.

22. What is the total value of coins in Arianne's piggy bank?

23. Sally wants to buy 100 plums. She can buy plums at $0.45 each or 10 plums for $3.55.

(a) How much money would she spend if she buys the plums at $0.45 each.

(b) How much money would she spend if she buys the plums at 10 plums for $3.55

Teaching Point 2:

How can you multiply decimals by multiples of 10?

Multiply 0.3 by 20.

Break apart whole numbers to multiply.

$3 \times 20 = (3 \times 2) \times 10$

$= 6 \times 10$

$= 60$

Use the same rule for multiplying 3 by 20.

$0.3 \times 20 = (0.3 \times 2) \times 10$

$= 0.6 \times 10$

$= 6.0$ or 6

Activity 2:

Find each product.

1. $0.5 \times 20 =$	**2.** $0.8 \times 80 =$
3. $0.25 \times 30 =$	**4.** $0.06 \times 70 =$
5. $1.6 \times 40 =$	**6.** $20.4 \times 50 =$
7. $2.4 \times 90 =$	**8.** $8.07 \times 20 =$
9. $30.1 \times 60 =$	**10.** $50.03 \times 80 =$
11. $41.32 \times 40 =$	**12.** $25.05 \times 70 =$

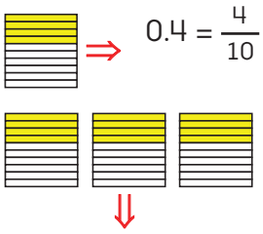
13. Which is greater: 20.46 x 200 or 24.06 x 20?

Teaching Point 3:

How do you multiply whole numbers and decimals?

Multiply 0.4 by 3.

Use a Model

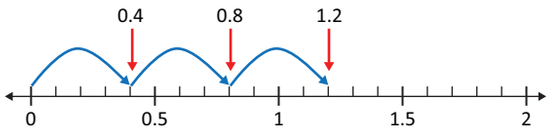


$0.4 = \frac{4}{10}$

$0.4 \times 3 = \frac{4}{10} \times \frac{3}{1}$ ← Multiply the fractions.

$= \frac{12}{10}$ ← Change to a mixed number.

$= 1\frac{2}{10}$ ***or*** 1.2 ← Change to a decimal.



$0.4 + 0.4 + 0.4 = 0.4 \times 3$

4 tenths x 3 = 12 tenths

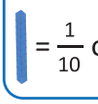
Regroup the tenths

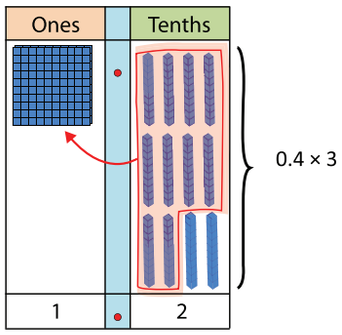
12 tenths = 1 one and 2 tenths or 1.2

Use a Place Value Chart

Use base ten blocks

 = 1 one

 = $\frac{1}{10}$ of 1 one



So, 0.4 × 3 = 1.2

$$\begin{array}{r} {\scriptstyle 1}\\ 0.4\\ \times\ 3\\ \hline 1.2 \end{array}$$

1. Multiply the tenths by 3.
4 tenths × 3 = 12 tenths
Regroup the tenths.
12 tenths = 1 one 2 tenths

2. Line up the decimal point.

Activity 3:

Find the product. Use a model.

1. 0.3 × 2 =	2. 0.8 × 1 =
3. 0.4 × 3 =	4. 0.6 × 7 =
5. 0.8 × 4 =	6. 0.7 × 5 =
7. $\begin{array}{r} 1.6\\ \times\ 5\\ \hline \end{array}$	8. $\begin{array}{r} 5.4\\ \times\ 9\\ \hline \end{array}$
9. $\begin{array}{r} 8.5\\ \times\ 3\\ \hline \end{array}$	10. $\begin{array}{r} 2.8\\ \times\ 4\\ \hline \end{array}$

11. $\begin{array}{r} 15.9\\ \times\ 8\\ \hline \end{array}$	12. $\begin{array}{r} 13.2\\ \times\ 7\\ \hline \end{array}$
13. $\begin{array}{r} 34.2\\ \times\ 15\\ \hline \end{array}$	14. $\begin{array}{r} 20.1\\ \times\ 12\\ \hline \end{array}$
15. $\begin{array}{r} 53.7\\ \times\ 11\\ \hline \end{array}$	16. $\begin{array}{r} 61.8\\ \times\ 13\\ \hline \end{array}$

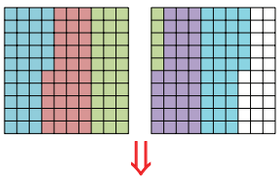
Teaching Point 4:

How do you multiply whole numbers and decimals?

Maya bought 5 dinner mints at $0.35 each. How much did she pay in all?

$0.35 × 5 = ?

Use a Model



0.35 × 5 = 0.35 + 0.35 + 0.35 + 0.35 + 0.35

= 1.75

Maya paid $1.75 for the dinner mints.

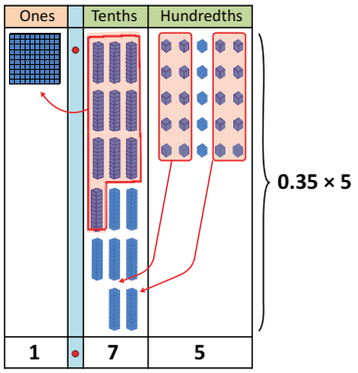
Use a Place Value Chart

Use base ten blocks

= 1 one

= $\frac{1}{10}$ of 1 one

= $\frac{1}{100}$ of 1 one



1 2
0.35
× 5
1.75

1. **Multiply** the hundredths by 5.
   5 hundredths × 5 = 25 hundredths
   Regroup the hundredths.
   25 hundredths = 2 tens 5 hundredths

2. **Multiply** the tenths by 5.
   3 tenths × 5 = 15 tenths
   Add the tenths.
   15 tenths + 2 tenths = 17 tenths
   Regroup the tenths.
   17 tenths = 1 one 7 tenths.

So, 0.35 x 5 = 1.75.

Activity 4:

Multiply.

1. 0.36 × 2 =	2. 0.48 × 3 =
3. 0.74 × 5 =	4. 0.06 × 7 =
5. 0.18 × 4 =	6. 0.97 × 8 =
7. 1.36 × 5 =	8. 4.08 × 6 =
9. 10.19 × 4 =	10. 26.91 × 9 =
11. $5.02 × 7 =	12. $27.18 × 3 =
13. $150.95 × 6 =	14. $404.05 × 8 =
15. 22.34 × 11 =	16. 41.87 × 13 =

Activity 5:

Solve the problems below.

1. A piece of wood is 6.5 m long. What is the total length of 7 pieces of wood of similar lengths?
2. Kiara measures the length of her desk with 12 handspans. If her handspan is 6.7 cm long, what is the length of her desk?
3. Samantha works at a restaurant for 15 hours a week. At this rate, how many hours will she work after 7.5 weeks?

4. Jared had a puppy that weighed 1.45 kg. Melissa had a dog that weighed 4 times as much as Jared's puppy. How much did Melissa's dog weigh?

5. Issa walks his dog 4 times farther than Maya walks her dog. Maya walks her dog 0.23 km. How far does Issa walk his dog?

6. Mark has 9 twenty-five cent coins. How much money does he have?

7. Joy drinks 4 bottles of water each day. If each bottle contains 0.56 litres of water, how much water does she drink daily?

8. Shania bought 6 copy books for $1.45 each. How much do they cost altogether?

9. A glass is filled with 0.25 litres of water. Liann fills a jug with 7 times as much water. How much water is in Liann's jug?

10. What is the weight of 5 bags of cement if each bag weighs 55.95 kg?

11. Kavita measures her notebook by using paper clips that are each 1.6 cm long. Kavita's notebook is 16 paper clips long. What is the length of Kavita's notebook?

12. Mrs. Brown buys 7 bottles of liquid soap. The cost of each bottle is $14.65. She gives the cashier $110. How much change does she get?

Use the table below to answer questions 13 and 14.

Sporting Item	Cost
Ball	$25.95
Hoop	$15.68
Cricket Bat	$115.65

13. How much money is needed to buy 5 balls and 10 hoops?

14. A teacher has $200 and wants to buy a cricket bat and 4 balls. How much more money does she need?

15. Javan has a card with the product of 4 × 0.06 written on it. Hayley has a card with a number that is 0.04 less than the product of Javan's number. What is Hayley's number?

16. Carrie has 0.73 litres of juice in a jug. Sara's jug has 2 times as much juice as Carrie's jug. Lee's jug has 4 times as much juice as Sara's jug. Sara and Lee pour all their juice into a large bowl. How much juice is in the bowl?

17. Vanna bought 3 pens and a package of paper from the stationery store. Each pen costs $5.85 and the paper costs $35.80. How much did she spend?

18. Hannah saved $12.15. Jayley saved 3 times as much as Hannah. Sarah saved $24.50 more than Jayley. How much money did Sarah save?

Multiply Decimals by Decimals

Teaching Point 1:

How do you multiply decimals?

Multiply 0.6 by 0.4.

Use Fractions

$0.6 \times 0.4 = \frac{6}{10} \times \frac{4}{10} \Rightarrow$ Express decimals as fractions

$= \frac{24}{100} \Rightarrow$ Multiply

$= 0.24 \Rightarrow$ Express as a decimal.

Activity 1:

Use fractions to find each product.

1. $0.3 \times 0.2 =$	**2.** $0.6 \times 0.4 =$
3. $0.9 \times 0.1 =$	**4.** $0.7 \times 0.7 =$
5. $0.8 \times 0.5 =$	**6.** $0.6 \times 0.5 =$
7. $0.2 \times 0.9 =$	**8.** $0.4 \times 0.7 =$
9. $1.2 \times 0.4 =$	**10.** $2.5 \times 0.9 =$

11. Carla lives a 0.8 km distance from the school. She gets a ride with her uncle part of the way and walks 7 tenths of the distance. How far does Carla walk to school?

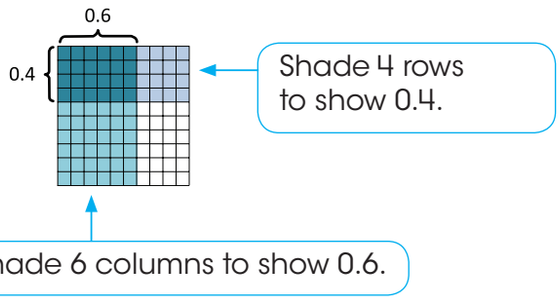
12. A jug contains 0.8 litres of juice. A glass has 0.5 times the juice as the jug. How much more juice does the jug contain than the glass?

Teaching Point 2:

How do you multiply decimals?

Multiply 0.6 by 0.4.

Use a Model

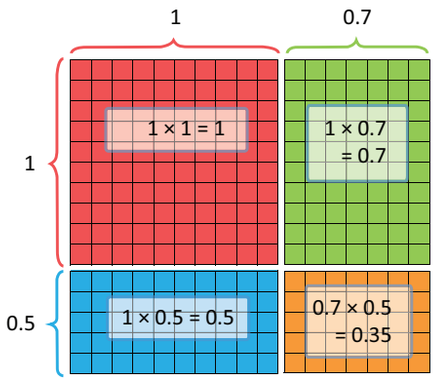


The shadings overlap 24 squares.
This represents 24 hundredths, or 0.24.
$0.6 \times 0.4 = 0.24$

One pack of split peas weighs 1.7 kg. How many kilograms would 1.5 packs weigh?

Find 1.7×1.5.

Use a Model



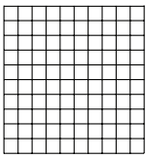
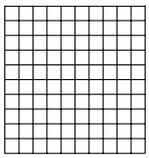
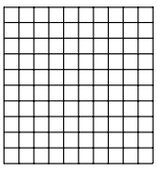
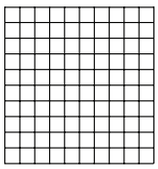
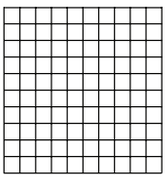
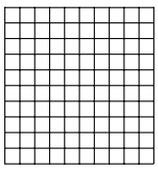
The **model** represents: 1 whole + 7 tenths + 5 tenths + 35 hundredths

1 + 0.7 + 0.5 + 0.35 = 2.55

So, the weight of 1.5 packs is 2.55 kg.

Activity 2:

Use each grid below to find each product.

1. 0.4 × 0.2 = 	**2.** 0.7 × 0.6 = 
3. 0.8 × 0.3 = 	**4.** 0.6 × 0.6 = 
5. 0.4 × 0.7 = 	**6.** 0.8 × 0.9 = 

Draw models to find each product.

7. 1.4 × 0.2 =	**8.** 2.3 × 0.4 =
9. 1.6 × 1.9 =	**10.** 1.5 × 1.3 =
11. 2.1 × 1.5 =	**12.** 2.6 × 1.7 =

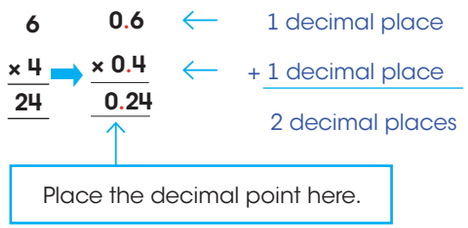
13. Ayesha's baby brother weighs 4.6 kg. Ayesha weight is 5.4 times more than her baby brother. How much does Ayesha weigh?

14. My bedroom window is 1.3 metres wide. The living room window is 1.5 times as wide as the bedroom window. What is the width of the living room window?

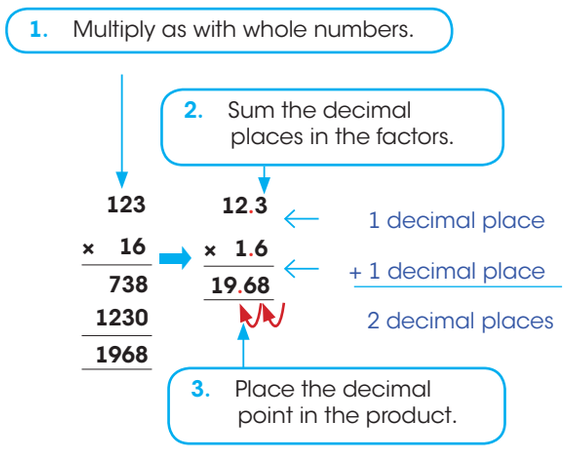
Teaching Point 3:

How can you place a decimal point in a product when multiplying decimals?

Multiply 0.6 by 0.4.



Multiply 12.3 by 1.6



12.3 x 1.6 = 19.68

Estimate to place the decimal point in the product.

12.3 × 1.6 =

↓ ↓

12 × 2 = 24

Since 24 is close to 19.68, the decimal point is in the correct place.

Activity 3:

Estimate first. Then find each product.

1. 9.3 × 4.1 =	**2.** 0.7 × 1.8 =
3. 16.6 × 0.5 =	**4.** 137.3 × 0.9 =
5. 4.6 × 3.5 =	**6.** 2.3 × 2.4 =
7. 12.6 × 0.2 =	**8.** 8.3 × 10.6 =
9. 19.1 × 8.5 =	**10.** 0.4 × 15.1 =
11. 9.1 × 11.6 =	**12.** 0.06 × 15 =
13. 18.1 × 3.7 =	**14.** 28.3 × 6.4 =
15. 6.8 × 7.2 =	**16.** 0.21 × 29 =
17. 123.8 × 1.3 =	**18.** 106.1 × 4.7 =
19. 250.2 × 5.8 =	**20.** 25.6 × 7.9 =

Solve.

21. Javan rode his bike 7 times around the savannah. The perimeter of the savannah is 0.6 km. How many kilometres did he ride?

22. Emily drank 2.5 bottles of water during the day. If each bottle contains 1.3 litres of water, how much water did Emily drink?

23. The width of a window is 9.2 metres. The length is 3.4 times the width. What is the length of the window?

24. On Monday Mr. Khan measured a pumpkin vine in his garden and it was 3.6 m long. When it was measured on Friday, it was 2.1 times as long. How long was the vine on Friday?

Divide Decimals by Whole Numbers

Teaching Point 1:

How can patterns help you place the decimal point in a quotient?

Divide 13 by 100.

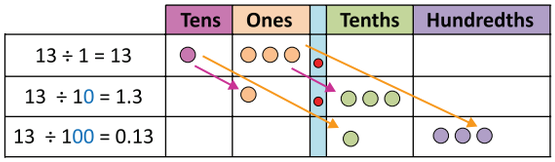
Look for a pattern in these quotients.

13 ÷ 1 = 13

13 ÷ 10 = 1.3 ← 1 decimal place to the left.

13 ÷ 100 = 0.13 ← 2 decimal places to the left.

So, 13 ÷ 100 = 0.13.



Divide by	Move the decimal point to the left
1	0 places
10	1 place
100	2 places

Moving the decimal point to the **left** decreases the number's value.

Activity 1:

Find each quotient.

1. 4.4 ÷ 10 =	**2.** 12 ÷ 10 =
3. 24.6 ÷ 10 =	**4.** 10.9 ÷ 10 =
5. 0.6 ÷ 10 =	**6.** 0.1 ÷ 10 =
7. 18.3 ÷ 10 =	**8.** 109.1 ÷ 10 =
9. 49 ÷ 100 =	**10.** 127 ÷ 100 =
11. 6 549 ÷ 100 =	**12.** 210 ÷ 100 =
13. 1 ÷ 100 =	**14.** 9 ÷ 100 =

15. Vanessa has a bottle full of ten cent coins. The total amount of money in the bottle is $25.00. How many ten cent coins does she have?

16. Isaiah is saving to buy a video game. The video game costs $135.00. He has 10 weeks to save for it. How much money should he save each week?

17. How is dividing 420 by 10 the same as dividing 4 200 by 100. Explain.

18. Daddy drives 24.5 km to his mother's house. He drives one-tenth as many kilometres to his brother's house. How many kilometres does daddy drive to his brother's house?

19. Elena shared a total of 25.8 kilograms of sugar into 10 bags. If each bag had equal amounts of sugar, how much sugar was in each bag?


20. Lia used 15 kg of white flour to make bread. She used one-tenth as many kilograms of whole wheat flour as kilograms of white flour. She used one-hundredth as many kilograms of margarine as kilograms of white flour.

(a) How much whole wheat flour did Lia use?

(b) How much margarine did Lia use?

(c) What was the total weight of all three ingredients?

21. Elena sews beads on a costume for a play. She sews 100 beads end-to-end along the width of the skirt.
The skirt is 250 centimetres wide. What is the length of one bead?

Teaching Point 2:

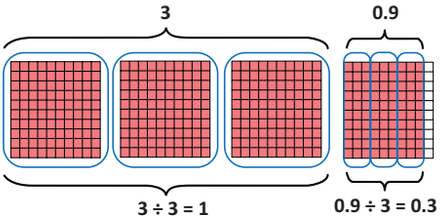
How do you divide a decimal by a whole number?

Three friends share 6.9 sandwiches equally. How many sandwiches did each friend get?

Find, 3.9 ÷ 3 = ?

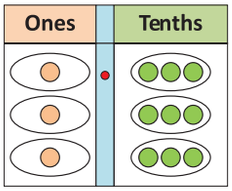
Use a Model

Shade the grids to show 3.9. Separate the grids into 3 equal groups.



So, each friend got 1.3 sandwiches.

Use a Place Value Chart



1. Write the decimal point in the quotient directly above the decimal point in the dividend.
2. **Divide** the ones by **3**. 3 ones ÷ 3 = 1 ones
3. **Divide** the tenths by 3. 9 tenths ÷ 3 = 3 tenths

$$\begin{array}{r} 1.3 \\ 3\overline{)\,3.9} \\ -3 \\ \hline 09 \\ -\ 9 \\ \hline 0 \end{array}$$

So, 3.9 ÷ 3 = 1.3

Activity 2:

Find each quotient.

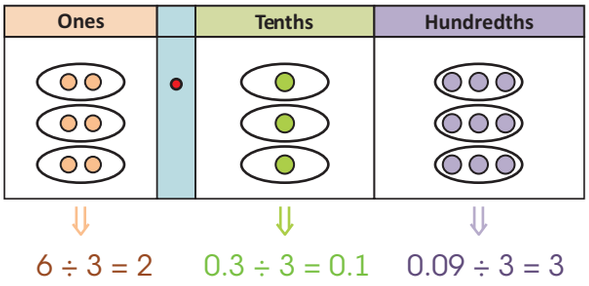
1. 0.4 ÷ 2 =	**2.** 12.63 ÷ 3 =
3. 24.6 ÷ 6 =	**4.** 50.5 ÷ 5 =
5. 45.9 ÷ 9 =	**6.** 308.7 ÷ 7 =
7. 96.8 ÷ 8 =	**8.** 344.8 ÷ 4 =
9. 99.9 cm ÷ 9 =	**10.** 224.4 cm ÷ 4 =
11. 824.8 ÷ 8 =	**12.** 1 265.5 ÷ 5 =
13. 528.9 ÷ 3 =	**14.** 714.7 ÷ 7 =

Teaching Point 2:

How do you divide a decimal by a whole number?

Divide 6.39 by 3

Model on a Place Value Chart



So, 6.39 ÷ 3 = 2.13

Follow a rule.

Step 1	Step 2	Step 3
Divide the ones by 3	**Divide the tenths by 3**	**Divide the hundredths by 3**
2 3 ⟌ 6.39 **–6** 6 ones ÷ 3 = 2 ones	**2.1** 3 ⟌ 6.39 –6 3 **–3** 3 tenths ÷ 3 = 1 tenth	**2.13** 3 ⟌ 6.39 –6 3 –3 9 **–9** 9 hundredths ÷ 3 = 3 hundredths

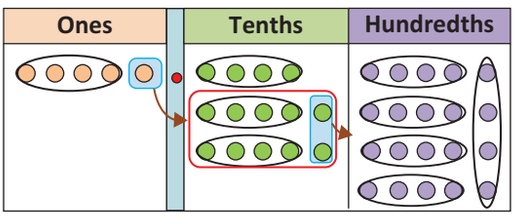
So, 6.39 ÷ 3 = 2.13

Teaching Point 3:

How do you divide a decimal by a whole number?

Divide 5.4 by 4

Model on a Place Value Chart



Follow a rule.

Step 1

Divide the ones by 4.

5 ones ÷ 4 = 1 one **R 1 one**

1
4 ⟌ 5.4
–4
1

Step 2

Regroup the remainder 1 one
1 one = 10 tenths
Add the tenths: 10 tenths + 4 tenths = 14 tenths
Divide the tenths by 4.
14 tenths ÷ 4 = 3 tenths **R 2 tenths**

1.3
4 ⟌ 5.4
–4
1 4
–1 2
2

Step 3

Regroup the remainder 2 tenths
2 tenths = 20 hundredths
Divide the hundredths by 4
20 hundredths ÷ 4 = 5 hundredths

1.35
4 ⟌ 5.4**0**
–4
14
–12
20
–20

You can add a zero at the end of 5.4 to continue dividing.

So, 5.4 ÷ 4 = 1.35

Activity 3:

Find each quotient.

1. 0.28 ÷ 2 =	**2.** 0.84 ÷ 4 =
3. 24.66 ÷ 3 =	**4.** 50.55 ÷ 5 =
5. 824.08 ÷ 8 =	**6.** 48.04 ÷ 4 =
7. 36.93 ÷ 3 =	**8.** 900.09 ÷ 9 =
9. 0.7 ÷ 5 =	**10.** 0.5 ÷ 2 =
11. 0.6 ÷ 4 =	**12.** 0.2 ÷ 4 =
13. 4.5 ÷ 3 =	**14.** 3.2 ÷ 8 =
15. 71.4 ÷ 7 =	**16.** 68.8 ÷ 8 =
17. $4.35 ÷ 5 =	**18.** $207.12 ÷ 6 =
19. $60.52 ÷ 2 =	**20.** $272.68 ÷ 4 =

Activity 4:

Solve the problems below.

1. Mother bought 15 apples at the market for $101.25. If each apple costs the same amount of money, what was the price of one apple?

2. Five friends went for lunch and shared the bill, which was $78.45, equally. What was each friend's share?

3. If one dozen of the avocados, each of the same mass, weigh 7.2 kg. What does 1 avocado weigh?

4. Marlon earned a total of $128.60 for walking the neighbour's dog in five days. How much did he earn each day, if he earned the same amount each day?

5. A 3 kilogram package of meat costs $38.67. How much does 1 kilogram of meat costs?

6. Miss Peters used 6.25 litres of juice to serve 25 children. If each child received the same amount of juice, how much juice was in each serving?

7. A 360 m fence has a flag on each post. There are posts at each end and at equal distances along the fence. If there are 16 flags along the fence, what is the distance between two posts?

8. Mother made an overseas phone call for 31 minutes which cost $57.35. How much did the call cost per minute?

9. A mini box of cereal has a mass of 23 grams and costs $5.98. A small box of the same cereal has a mass of 300 grams and costs $24.00. Which has a greater cost per gram?

10. Cupcakes cost $35.40 for a dozen or $18.78 for a half dozen. Which is the better buy? Explain.

11. Ayesha worked 20 hours last week and earned $145.80. Aleena worked 15 hours last week and earned $112.50. How much more does Aleena earn per hour?

Decimal Patterns

Teaching Point 1:

Write the missing elements in the number pattern.

×2 ×2 ×2 ×2 ×2

3.1, 6.2, 12.4, 24.8, ☐, 99.2

The **rule** is ***multiply by 2***.

Therefore, the missing number is **49.6**.

Activity 1:

Complete the patterns. Find the pattern rule.

1. 14.5, 12.5, 10.5, ☐, 6.5, 4.5
2. 5.95, ☐, 5.75, 5.65, 5.55, 5.45
3. 1, 1.3, 1.6, ☐, ☐, 2.5
4. 100, 99.95, ☐, 99.85, ☐, 99.75
5. 0.02, 0.04, 0.06, ☐, ☐, ☐
6. 1.01, 3.03, 9.09, ☐, ☐
7. 49.6, 24.8, ☐, ☐, 3.1
8. 0.89, ☐, 0.83, 0.80, ☐, 0.74
9. 125 300, 12 530, 1 253, ☐, 12.53
10. 0.01, 0.1, ☐, 10, 100, ☐

Chapter Review

Solve the problems below.

1. 4.35 + 12 + 1.4 =
2. 15.2 – 9.68 =
3. 12.3 × 15 =
4. 0.5 × 0.9 =
5. 23.15 ÷ 5 =
6. Write the missing numbers in the sequence below.

1.1	1.1	2.2	3.3	5.5		

What will be the 10th term in the pattern?

7. Express as a single decimal fraction $\frac{7}{10} \times 12$.
8. What is the decimal that is exactly in the middle of 2 and 2.5?
9. Mother has 6.55 metres of ribbon. She wants to cut it into 2 metre pieces. How many pieces of ribbon can she get?
10. Two containers are shown below. How much more does the water container hold than the orange juice container?

11. A piece of rope 6.54 metres long is cut into two pieces. One piece is twice as long as the other. What is the length of the longest piece?

12. A box containing 24 cricket balls has a mass of 7.45 kg. The box, when empty, has a mass of 0.25 kg. find the mass of each ball.

13. The sum of two numbers is 80.6. One of the numbers is 9 times the other. What are the two numbers?

14. Mother wants to buy 3 watches at a cost of $55.75 each. Estimate the least number of $10 bills she needs to buy the watches.

15. Jehue ran the following distances over a 2-week period while training for the World Games.

Week	Distance Ran
1	4.5 km
2	3.25 km

What is the TOTAL distance covered by Jehue over the two weeks?

16. Jane bought the 3 items shown below at the book store.

$8.25 $15.09 $9.99

(a) What is the total cost of the 3 items?

(b) Calculate Jane's exact change if she paid for the items with a $50.00 bill?

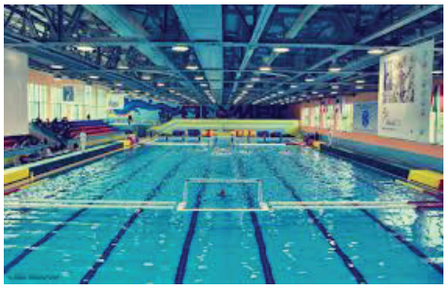
17. At the meat shop, Jason bought 3 kg of ground beef for $9.60 per kilogram. He bought 4 kg of ground chicken for $4.60 per kilogram. How much more did Jason spend on beef than on chicken?

18. Mother used 7.2 kilograms of gauvas to make guava jam. She used one-tenth as many kilograms of sugar as kilograms of guavas. How many kilograms of sugar did Mother use?

19. A 6-pack of socks costs $48.78. This is $3.96 less than the cost of buying 6 individual pairs of socks. If each pair of socks costs the same amount, how much does each pair of socks cost when purchased individually?

20. Ann bought 3 kg of bananas that cost $4.50 per kg at the grocery. Amy went to the market and purchased 3.5 kg of bananas at $4 per kg. How much money did they spend in total?

21. Javan drank a total of 5.6 litres of water on Monday and Tuesday. If he drank 0.74 litres more water on Tuesday than Monday, how much water did he drink on Monday?



22. The width of 8 lanes in swimming pools used for competitions is 21.92 metres. The width of 9 lanes is 21.96 metres. How much wider is each lane when there are 8 lanes than when there are 9 lanes?

23. Kristian buys 6 tickets to go to the movies. He pays $8.50 for a bag of popcorn. His total cost is $103.60. What is the cost of each ticket?

24. A box of 8 packs of chocolate bars costs $76.48. A single bar of chocolate costs $11.75. What is the savings on each chocolate bar if you buy a box of 8 chocolate bars?

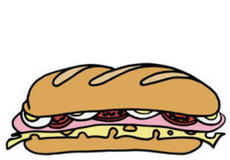
25. Mr. Lee grows tomatoes and cucumbers. He harvests 49.92 kilograms of tomatoes and 65.28 kilograms of cucumbers. He distributes the tomatoes and cucumbers into 32 packages.

(a) How many kilograms of cucumbers are there in one package?

(b) If Mr. Lee sells one kilogram of tomatoes for $8 and one kilogram of cucumbers for $6, from the sale of which vegetable would he earn more money?

26. Avinash spent $15.00 on an equal number of mangoes and oranges. Each mango costs $2 and each orange $1. How many fruits did he buy altogether?

27. The diagrams below show the cost of a sandwich, a cup cake and a drink at a food shop.



$15.95 $5.55 $3.50

(a) James has 1 sandwich, two cupcakes and 1 drink. Calculate the cost of his meal.

(b) David got exactly $50.00 change from a $100.00 note after purchasing items from the food shop. What possible combination of the THREE items did he buy?

_____ sandwich(es) $ _____
_____ cupcake(s) $ _____
_____ drink(s) $ _____
Total $ _____