Chapter 10 The Four Operations of Decimals

Exercise 1

Basics

1 (a) Estimate the sum of 8.259 and 17.78.

$8.259 + 17.78 \approx 8 + 18 =$ 26

(b) Find the sum of 8.259 and 17.78.

$$\begin{array}{r} 1\ 7.7\ 8 \\ +\quad 8.2\ 5\ 9 \\ \hline 2\ 6.0\ 3\ 9 \end{array}$$

2 (a) Estimate the sum of 0.361 and 13.7.

$0.361 + 13.7 \approx 0.4 + 14 =$ 14.4

(b) Find the sum of 0.361 and 13.7.

$$\begin{array}{r} 1\ 3.7 \\ +\quad 0.3\ 6\ 1 \\ \hline 1\ 4.0\ 6\ 1 \end{array}$$

3 (a) Estimate the sum of 0.14, 7.349, and 62.7.

$0.14 + 7.349 + 62.7 \approx 0 + 7 + 63 =$ 70

(b) Find the sum of 0.14, 7.349, and 62.7.

$$\begin{array}{r} 0.1\ 4 \\ 7.3\ 4\ 9 \\ +\ 6\ 2.7 \\ \hline 7\ 0.1\ 8\ 9 \end{array}$$

Practice

4 Write > or < in each ◯. Use estimation.

(a) $0.945 + 1.9 \ (<)\ 2.34 + 1.706$

(b) $0.062 + 0.004 \ (<)\ 0.05 + 0.29$

(c) $14.95 + 8.982 \ (>)\ 19.2 + 0.969$

5 Add.

(a) 9.356 + 5.26

$$\begin{array}{r} 9.3\ 5\ 6 \\ +\quad 5.2\ 6 \\ \hline 1\ 4.6\ 1\ 6 \end{array}$$

(b) 183.3 + 16.828

$$\begin{array}{r} 1\ 8\ 3.3\ \ \\ +\quad 1\ 6.8\ 2\ 8 \\ \hline 2\ 0\ 0.1\ 2\ 8 \end{array}$$

(c) 0.802 + 3.394

4.196

(d) 55.4 + 36.824

92.224

(e) 82 + 9.06 + 0.039

91.099

(f) 200.7 + 19.46 + 7.041

227.201

Exercise 2

Basics

1 (a) Estimate the value of 8.259 – 7.78.

$8.259 - 7.78 \approx 8.3 - 8 =$ 0.3

(b) Subtract 7.78 from 8.259.

$$\begin{array}{r} 8.259 \\ -\ 7.78 \\ \hline 0.479 \end{array}$$

2 (a) Estimate the value of 42.56 – 13.621.

$42.56 - 13.621 \approx 40 - 10 =$ 30

(b) Subtract 13.621 from 42.56.

$$\begin{array}{r} 42.560 \\ -\ 13.621 \\ \hline 28.939 \end{array}$$

3 (a) Estimate the difference between 19.459 and 142.3.

$142.3 - 19.459 \approx$ ☐

Estimates may vary.
Example: 140 – 20 = 120

(b) Find the difference between 19.459 and 142.3.

$$\begin{array}{r} 142.3 \\ -\ 19.459 \\ \hline 122.841 \end{array}$$

Practice

4 Write > or < in each ◯. Use estimation.

(a) 2.9 – 0.945 < 32 – 23.6

(b) 0.062 – 0.004 < 0.34 – 0.09

(c) 11.8 – 8.982 > 0.87 + 0.012

5 Subtract.

(a) 9.356 – 5.26

$$\begin{array}{r} 9.356 \\ -\ 5.26 \\ \hline 4.096 \end{array}$$

(b) 186.3 – 16.828

$$\begin{array}{r} 186.300 \\ -\ 16.828 \\ \hline 169.472 \end{array}$$

(c) 5.802 – 3.39
2.412

(d) 12.307 – 7.7
4.607

(e) 50 – 36.824
13.176

(f) 10.4 – 9.461
0.939

6 In a laboratory, 0.069 g of Compound A is mixed with 0.348 g of Compound B. Compound C is added to bring the total mixture to 1 g. How many grams of Compound C is added?

1 – 0.069 – 0.348 = 0.583

0.583 g

Challenge

7 Find the values. Express the answers as decimals.

(a) $6\frac{9}{40} - \frac{7}{8} + 8.23$

6.225 – 0.875 + 8.23 = 13.58

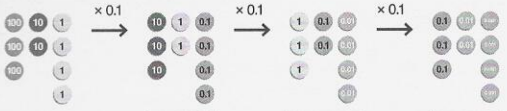
(b) $10\frac{3}{4} + 3\frac{1}{2} - (0.08 + \frac{93}{200})$

10.75 + 3.5 – (0.08 + 0.465) = 13.705

Exercise 3

Basics

1 (a)



324 | 32.4 | 3.24 | 0.324

(b) $324 \times 0.1 = 324 \times \frac{1}{10} = \frac{324}{10} =$ 32.4

(c) $32.4 \times 0.1 = \frac{324}{10} \times \frac{1}{10} = \frac{324}{100} =$ 3.24

(d) $324 \times 0.01 = 324 \times \frac{1}{100} = \frac{324}{100} =$ 3.24

(e) $32.4 \times 0.01 = \frac{324}{10} \times \frac{1}{100} = \frac{324}{1{,}000} =$ 0.324

2 Complete the charts and fill in the blanks.

(a)

	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
			8	3	2	
× 0.1				8	3	2

8 . 3 2 × 0.1 = 0.832

(b)

	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
	1	4	2	7		
× 0.01			1	4	2	7

1 4 2 . 7 × 0.01 = 1.427

Practice

3 (a) $500 \times 0.1 =$ 50 (b) $500 \times 0.01 =$ 5

(c) $50 \times 0.1 =$ 5 (d) $50 \times 0.01 =$ 0.5

(e) $5 \times 0.1 =$ 0.5 (f) $5 \times 0.01 =$ 0.05

(g) $0.5 \times 0.1 =$ 0.05 (h) $0.5 \times 0.01 =$ 0.005

4 (a) $3.2 \times 0.1 =$ 0.32 (b) $3.2 \times 0.01 =$ 0.032

(c) $45 \times 0.1 =$ 4.5 (d) $45 \times 0.01 =$ 0.45

(e) $800.8 \times 0.1 =$ 80.08 (f) $800.8 \times 0.01 =$ 8.008

5 (a) $23 \times 0.01 =$ 0.23 (b) $3.54 \times 0.1 =$ 0.354

(c) $0.07 \times 0.1 =$ 0.007 (d) $430 \times 0.01 =$ 4.3

(e) $46.02 \times 0.1 =$ 4.602 (f) $5{,}560 \times 0.01 =$ 55.6

6 (a) $3.73 \times$ 0.1 $= 0.373$ (b) $1.2 \times$ 0.01 $= 0.012$

(c) 6,500 $\times 0.01 = 65$ (d) 89.2 $\times 0.1 = 8.92$

7 4 L of sand weigh 1 kg 92 g. How many grams does 0.1 L of this sand weigh?

4 L ⟶ 1,092

1 L ⟶ 1,092 ÷ 4 = 273g

0.1 L ⟶ 273 × 0.1 = 27.3 g

27.3 g

Challenge

8 (a) $500 \times 0.001 =$ 0.5 (b) $50 \times 0.001 =$ 0.05

(c) $0.5 \times 0.001 =$ 0.0005 (d) $0.05 \times 0.01 =$ 0.0005

Exercise 4

Basics

1 (a) $45 \times 0.8 = 45 \times 8 \times 0.1 =$ [360] $\times 0.1 =$ [36]

(b) $4.5 \times 0.8 = 45 \times 8 \times 0.1 \times 0.1 =$ [3.6]

(c) $4.5 \times 0.08 = 45 \times 8 \times 0.1 \times 0.01 =$ [0.36]

(d) $0.45 \times 0.8 = 45 \times 8 \times 0.01 \times 0.1 =$ [0.36]

2 (a) Estimate the value of 503×55.

$503 \times 55 \approx 500 \times 60 =$ [30,000]

(b) Find the value of 503×55.

$503 \times 55 =$ [27,665]

```
  5 0 3
×   5 5
-------
  2 5 1 5
2 5 1 5 0
-------
2 7 6 6 5
```

(c) Estimate the value of 50.3×0.55.

$50.3 \times 0.55 \approx 50 \times 0.6 =$ [30]

(d) Find the value of 50.3×0.55.

$50.3 \times 0.55 =$ [27.665]

```
  5 0.3   ← 1 decimal place
×   0.5 5 ← 2 decimal places
---------
  2 5 1 5
2 5 1 5 0
---------
2 7.6 6 5 ← 3 decimal places
```


3 (a) Estimate the value of 42.5×0.6.

$42.5 \times 0.6 \approx 40 \times 0.6 =$ [24]

(b) Find the value of 42.5×0.6

```
  4 2.5  ← 1 decimal place
×   0.6  ← 1 decimal place
---------
  2 5 5 0 ← 2 decimal places
```

Practice

4 Estimate the values.

(a) $482 \times 7 \approx 500 \times 7 =$ [3,500]

(b) $482 \times 0.7 \approx 500 \times 0.7 =$ [350]

(c) $48.2 \times 0.7 \approx 50 \times 0.7 =$ [35]

(d) $4.82 \times 0.7 \approx 5 \times 0.7 =$ [3.5]

(e) $48.2 \times 0.07 \approx 50 \times 0.07 =$ [3.5]

5 Circle values that are less than 1. Use estimation.

[0.42 × 0.9] [3.92 × 0.4] [8.9 × 0.07] [1.8

6 Use the fact that $987 \times 78 = 76{,}986$ to find the following values.

(a) $987 \times 0.78 =$ [769.86]

(b) $98.7 \times 7.8 =$ [769.86]

(c) $9.87 \times 7.8 =$ [76.986]

(d) $98.7 \times 0.78 =$ [76.986]

7 Find the values. Remember to estimate first.

(a) 0.23×0.8
0.184

(b) 9.2×1.6
14.72

(c) 4.07×6.2
25.234

(d) 120.5×0.42
50.61

Exercise 5

Check

1. Is the sum of 0.14, 0.719, and 5.4 closer to 6 or 7? Use estimation.
   6

2. Find the values.

   (a) 6.37 + 0.268
   6.638

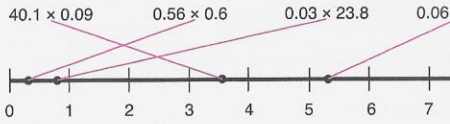
   (b) 0.802 − 0.072
   0.73

   (c) 55.55 − 0.777
   54.773

   (d) 23.4 + 9.427 + 0.8
   33.627

3. (a) 56.2 × 0.1 = 5.62
   (b) 8.9 × 0.01 = 0.089
   (c) 50.8 × 0.01 = 0.508
   (d) 189.2 × 0.1 = 18.92
   (e) 0.5 × 0.02 = 0.01
   (f) 0.07 × 0.4 = 0.028
   (g) 40.9 × 0.4 = 16.36
   (h) 2.5 × 0.08 = 0.2

4. Draw a line to connect each product with its location on the nu
   Use estimation.



5. Write > or < in each ◯.

   (a) 0.04 × 0.95 (<) 0.04

   (b) 0.2 (>) 2.91 × 0.04

   (c) 3.8 × 0.62 (<) 6.98 × 0.5

6. Find the values.

   (a) 38.24 × 0.3
   11.472

   (b) 0.04 × 62.1
   2.484

   (c) 198 × 0.15
   29.7

   (d) 6.07 × (6.27 + 0.83
   43.097

7. Janice has 3.5 kg of flour. She used 325 g of it to make cookies and 2.45 kg of it to make bread. How many kilograms of flour does she have left?
   3.5 − 0.325 − 2.45 = 0.725
   0.725 kg

8. One inch is equal to 2.54 cm. How many centimeters are in 4.5 inches?
   4.5 × 2.54 = 11.43
   11.43 cm

9. James earns $23.80 an hour at his job. He gets paid 1.5 times as much for each hour a week that he works over 40 hours. Last week he worked 47 hours. What was his pay last week?
   40 hours: 40 × $23.80 = $952
   7 hours: 7 × 1.5 × $23.80 = $249.90
   $952 + $249.90 = $1,201.90
   $1,201.90

Challenge

10. Find the values.

    (a) 0.025 × 0.04 × 2,000
    2

    (b) 200 × 0.02 × 0.002 × 2
    0.016

    (c) 0.0125 × 800 × 4,000 × 0.002
    80

11. Find the missing digits. No numbers can have trailing zeros (4.00, the 0's are called trailing zeros.)

    (a) 2 0.4 × 0.3 = 6.1 2
    Ignore the decimals and find 20_ × _ = 6_2.
    204 × 3 = 612. So 20.4 × 0.3 = 6.12.

    (b) 0.2 × 0.5 = 0.1
    Ignore the decimal. 2 × ? = 1 would need a decimal.
    Find 2 × ? = 10. ? = 5, so 0.2 × 0.5 = 0.10 = 0.1.

    (c) 0.0 4 × 0.0 5 = 0.0 0 2
    Ignore the decimals. 4 × ? = 2 would need a decimal.
    Find 4 × ? = 20. ? = 5. 0.04 × 0.05 = 0.0020 = 0.002

Exercise 6

Basics

1 (a) 4.8 ÷ 8 = 48 tenths ÷ 8 = 6 tenths = [0.6]

(b) 0.72 ÷ 9 = 72 hundredths ÷ 9 = [8] hundredths = [0.08]

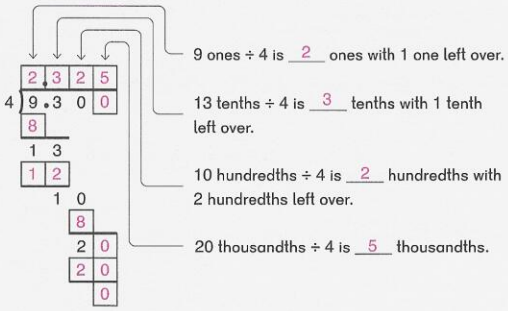
(c) 0.03 ÷ 6 = 30 thousandths ÷ 6 = [5] thousandths = [0.005]

2 (a) Complete the following estimations for 9.3 ÷ 4.

8 ÷ 4 = [2] 12 ÷ 4 = [3]

The quotient will be between 2 and 3.

(b) Divide 9.3 by 4.

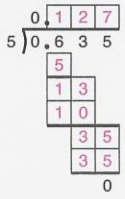


(c) Check: 2.325 × 4 = [9.3]

3 (a) Complete the following estimation for 0.635 ÷ 5.

0.60 ÷ 5 = [0.12]

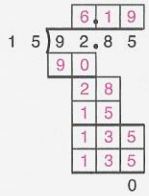
(b) Divide 0.635 by 5.



4 (a) Complete the following estimations for 92.85 ÷ 15.

100 ÷ 10 = [10] 90 ÷ 15 = [6]

(b) Divide 92.85 by 15.



Practice

5 Which of the following has a quotient between 0.1 and 1? Use estimation.

[8.35 ÷ 9] [6.72 ÷ 4] [5.81 ÷ 7] [0.62 ÷ 5]

6 Estimate the values.

(a) 1,789 ÷ 32 ≈ 1,800 ÷ 30 = [60]

(b) 178.9 ÷ 32 ≈ 180 ÷ 30 = [6]

(c) 17.89 ÷ 32 ≈ 18 ÷ 30 = [0.6]

(d) 1.789 ÷ 32 ≈ 1.8 ÷ 30 = [0.06]

7 Which of the following has a quotient between 0.1 and 1?

[135.9 ÷ 89] [6.72 ÷ 41] [16.14 ÷ 19] [0.05 ÷ 45]

8 (a) 4.2 ÷ 7 = [0.6] (b) 0.064 ÷ 8 = [0.008]

(c) 0.12 ÷ 20 = [0.006] (d) 12.012 ÷ 4 = [3.003]

(e) 0.4 ÷ 50 = [0.008] (f) 0.06 ÷ 12 = [0.005]

9 Divide.

(a) 5.238 ÷ 3
1.746

(b) 19.84 ÷ 62
0.32

(c) 37.08 ÷ 18
2.06

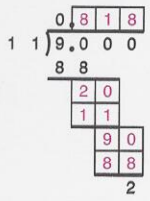
(d) 484.6 ÷ 25
19.384

10 In a laboratory, 4.56 g of residue is divided equally into 5 test tubes. How many grams of residue is in each test tube?
4.56 ÷ 5 = 0.912
0.912 g

Exercise 7

Basics

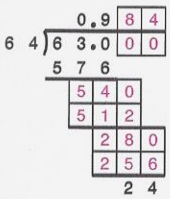
1 Express $\frac{9}{11}$ as a decimal correct to the second decimal place.



$\frac{9}{11}$ is 0.82, correct to the second decimal place.

2 Express $8\frac{63}{64}$ as a decimal correct to the second decimal place.

$8\frac{63}{64} = 8 + \frac{63}{64}$

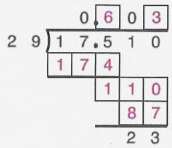


$8\frac{63}{64} \approx$ 8.98

3 (a) Complete the following estimations for 17.51 ÷ 29.

15 ÷ 30 = 0.5 18 ÷ 30 = 0.6

(b) Find the value of 17.51 ÷ 29, correct to the second decimal p



17.51 ÷ 29 is 0.60, correct to the second decimal place

Practice

4 Express each fraction or mixed number as a decimal correct to the second decimal place.

(a) $\frac{2}{3}$ 0.67

(b) $1\frac{7}{9}$ 1.78

(c) $\frac{9}{14}$ 0.64

(d) $2\frac{11}{16}$ 2.69

5 Divide. Express the quotients correct to the second decimal place.

(a) 45.2 ÷ 6
7.53

(b) 8.11 ÷ 7
1.16

(c) 35.77 ÷ 21
1.70

(d) 406.7 ÷ 13
31.28

Challenge

6 Continue to divide $\frac{9}{11}$ past the thousandths place. Which digits repeat?
$\frac{9}{11}$ = 0.81818...
81 repeats

7 Continue to divide $\frac{6}{55}$ past the thousandths place. Which digits repeat?
$\frac{6}{55}$ = 0.10909...
09 repeats

Exercise 8

Basics

1

(a) 1 mm = $\frac{1}{10}$ cm = 0.1 cm

There are 10 mm in 1 cm.

There are 10 0.1 cm in 1 cm.

$1 \div 0.1 = 1 \div \frac{1}{10} = 1 \times$ [10] = [10]

(b) $5 \div 0.1 = 5 \div \frac{1}{10} = 5 \times$ [10] = [50]

(c) $50 \div 0.1 = 50 \div \frac{1}{10} = 50 \times$ [10] = [500]

(d) $500 \div 0.1 = 500 \div \frac{1}{10} = 500 \times$ [10] = [5,000]

2

(a) $1 \div 0.01 = 1 \div \frac{1}{100} = 1 \times$ [100] = [100]

(b) $5 \div 0.01 = 5 \div \frac{1}{100} = 5 \times$ [100] = [500]

(c) $50 \div 0.01 = 50 \div \frac{1}{100} = 50 \times$ [100] = [5,000]

(d) $500 \div 0.01 = 500 \div \frac{1}{100} = 500 \times$ [100] = [50,000]

Practice

3 (a) $42 \div 0.1 =$ [420] (b) $42 \div 0.01 =$ [4,20

(c) $104 \div 0.1 =$ [1,040] (d) $104 \div 0.01 =$ [10,

(e) $9 \div 0.01 =$ [900] (f) $100 \div 0.1 =$ [1,00

(g) $72 \div 0.1 =$ [720] (h) $16 \div 0.01 =$ [1,60

(i) $3 \div 0.01 =$ [300] (j) $40 \div 0.01 =$ [4,00

(k) $400 \div 0.1 =$ [4,000] (l) $2,400 \div 0.1 =$ [24,

4 A laboratory technician has 4 g of substrate. She needs to pu
each test tube. How many test tubes does she need?

$4 \div 0.1 = 40$

40 test tubes

Challenge

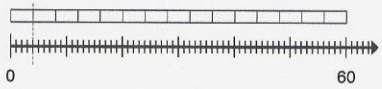
5 (a) $1 \div 0.001 =$ [1,000] (b) $5 \div 0.001 =$ [5,00

(c) $50 \div 0.001 =$ [50,000] (d) $500 \div 0.01 =$ [50,

Exercise 9

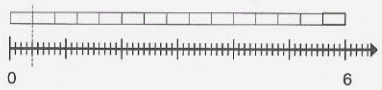
Basics

1 (a) Divide 60 by 4.



$60 \div 4 =$ 15

(b) Divide 6 by 0.4.



$6 \div 0.4 = 6 \div \frac{4}{10} = 6 \times \frac{10}{4} =$ 15

(c) $6 \div 0.4 = 60 \div 4 =$ 15

2 (a) $24 \div 1.2 = 24 \div \frac{12}{10} = 24 \times \frac{10}{12} =$ 20

(b) 2 4. ↷ ÷ 1 .2 ↷ = 240 ÷ 12 = 20

(c) $24 \div 0.12 = 24 \div \frac{12}{100} = 24 \times \frac{100}{12} =$ 200

(d) 2 4. ↷ ÷ 0 . 1 2 ↷ = 2,400 ÷ 12 = 200

3 Divide 73 by 0.4.

0.4) 7 3. ↷ ⟶

	1	8	2	5
4)	7	3	0	0
	4			
	3	3		
	3	2		
		1	0	
			8	
			2	0
			2	0
				0

$73 \div 0.4 =$ 182.5

4 Estimate the quotient of $73 \div 3.1$. Then find the quotient correct to the second decimal place.

7 3. ↷ ÷ 3 .1 ↷ $= 730 \div 31 \approx 600 \div 30 =$ 20

		2	3.	5	4	8
3 1)	7	3	0.	0	0	0
	6	2				
	1	1	0			
		9	3			
		1	7	0		
		1	5	5		
			1	5	0	
			1	2	4	
				2	6	0
				2	4	8
				1	2	

$73 \div 3.1 \approx$ 23.55

Practice

5 (a) $18 \div 0.6 =$ 30 (b) $6 \div 0.05 =$ 120

(c) $75 \div 2.5 =$ 30 (d) $44 \div 0.22 =$ 200

6 Divide. Express quotients with 3 or more decimal places correct to the second decimal place.

(a) $760 \div 0.25$
3,040

(b) $49 \div 0.08$
612.5

(c) $78 \div 0.9$
86.67

(d) $430 \div 4.5$
95.56

7 130 g of tea is put into tea bags. Each bag gets 2.5 g of tea. How many bags are needed?
$130 \div 2.5 = 52$
52 bags

Exercise 10

Check

1 (a) $6.4 \div 8 =$ 0.8 (b) $0.24 \div 4 =$ 0.06

(c) $0.3 \times 0.4 \div 6 =$ 0.02 (d) $0.48 \div 4 \times 5 =$ 0.6

(e) $89 \div 0.1 =$ 890 (f) $3 \div 0.01 =$ 300

(g) $1{,}000 \div 0.1 =$ 10,000 (h) $12 \div 0.01 =$ 1,200

(i) $9 \div 0.1 \times 0.1 =$ 9 (j) $9 \div (0.1 \times 0.1) =$ 900

(k) $4 \div 0.8 =$ 5 (l) $81 \div 0.09 =$ 900

(m) $30 \times 0.4 \div 0.02 =$ 600 (n) $30 \div 0.4 \times 0.02 =$ 1.5

2 Circle the values that are equal.

(a) **32 ÷ 0.6** **320 ÷ 0.6** **32 ÷ 60** **320 ÷ 6**

(b) **4.8 ÷ 8** **48 ÷ 0.08** **480 ÷ 8** **480 ÷ 0.8**

3 Write > or < in each ◯. Use estimation.

(a) $9.8 \div 72$ < $12.62 \div 8$

(b) $26 \div 0.08$ < $269 \div 0.39$

(c) $1{,}058 \div 9.9$ < $98 \div 0.5$

4 Find the values. Express quotients with 3 or more decir
correct to the second decimal place.

(a) $89.5 \div 6$
14.92

(b) $9 \div 0.08$
112.5

(c) $8 \div 4.5$
1.78

(d) $32 \div 0.14$
228.57

(e) $7 \div 0.05 \times 0.6$
84

(f) $4.576 \div 8.3$
4.908

5 15.8 L of a solvent is poured equally into 8 beakers. How many liters are in each beaker?
$15.8 \div 8 = 1.975$
1.975 L

6 How many 3.8 m pieces can be cut from 100 m of rope?
$100 \div 3.8 = 26.3$ (correct to the first decimal place)
26 pieces

7 Sonia bought 1.5 lb of morel mushrooms for $72. What does 1 pound of morel mushrooms cost?
$72 \div 1.5 = 48$
$48