



The National
Orthodox School
Shmaisani

Mathematics

Unit 9: Decimals and percentages

The student's book

Chapter 9

Check in

- 1 a 4370
b 56300
c i 7.3 ii 3.4 iii 5.7 iv 5.0
- 2 a $\frac{3}{5}$ b $\frac{2}{3}$ c $1\frac{1}{2}$ d $\frac{3}{4}$
e $\frac{1}{3}$ f $\frac{2}{3}$

Exercise 9A

- 1 a 45000
b 0.000037
c 4300
d 0.508
e 4.7
f 0.0000264
g 9200
h 0.00045613
i 760 000 000
j 0.24
- 2 a 5
b 4
c 9
d 5
e 2
f 3
- 3 a 42000000
b 4
c 0.0031
d 49
- 4 54.1
- 5 He has just put 4 zeros on the end of the number instead of moving the digits.
- 6 a > b =

Investigation page 132

If the decimal is $0.abc$

If $a = c$ then $b + c \leq 9$

If $a + 1 = c$ then $b + c > 9$

$a + b + c \leq 18$

3-digit starting number	Palindromic result
0.010	11.11
0.020	22.22
0.030	33.33
0.040	44.44
0.050	55.55
0.060	66.66
0.070	77.77
0.080	88.88
0.090	99.99
0.091	101.101
0.101	112.211
0.111	123.321
0.121	134.431
0.131	145.541
0.141	156.651
0.151	167.761

Answers

0.161	178.871
0.171	189.981
0.182	202.202
0.192	213.312
0.202	224.422
0.212	235.532
0.222	246.642
0.232	257.752
0.242	268.862
0.252	279.972
0.273	303.303
0.283	314.413
0.293	325.523
0.303	336.633
0.313	347.743
0.323	358.853
0.333	369.963
0.364	404.404
0.374	415.514
0.384	426.624
0.394	437.734
0.404	448.844
0.414	459.954
0.455	505.505
0.465	516.615
0.475	527.725
0.485	538.835
0.495	549.945
0.546	606.606
0.556	617.716
0.566	628.826
0.576	639.936
0.637	707.707
0.647	718.817
0.657	729.927
0.728	808.808
0.738	819.918
0.819	909.909

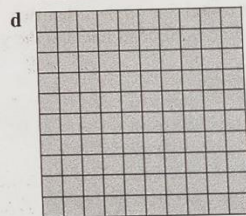
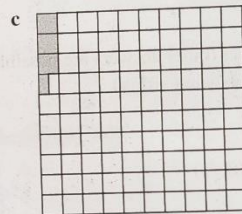
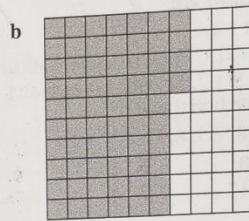
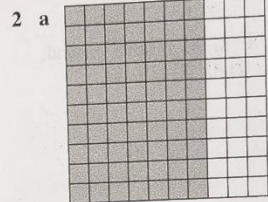
Exercise 9B

- 1 a 6.1 b 6.3 c 6.7 d 6.4 e 6.9
 f 7.0 g 6.4 h 6.8 i 6.1
- 2 a 3.2 b 4.4 c 0.8 d 0.8 e 0.7
 f 5.0 g 6.0 h 7.1 i 1.2
- 3 a 6.23 b 0.78 c 0.97 d 4.03 e 4.20
 f 6.11 g 4.00 h 0.03 i 0.21
- 4 a i 6.418 ii 6.42 iii 6.4
 b i 0.706 ii 0.71 iii 0.7
 c i 0.022 ii 0.02 iii 0.0
 d i 9.601 ii 9.60 iii 9.6
 e i 7.181 ii 7.18 iii 7.2
 f i 0.314 ii 0.31 iii 0.3
 g i 6.300 ii 6.30 iii 6.3
 h i 4.082 ii 4.08 iii 4.1

- 5 a \$26.14
 b $\$26.14 \times 7 = \182.98 , they need to round up what they pay to at least \$26.15
- 6 a 0.7459 b 0.74594
 7 a 0.17 b 0.27 c 0.38 d 6.86
- 8 $7.3 + 2.4$ $24.5 + 8.19$
- 9 a i 21.78 cm ii 21.8 cm
 b i 29.19 cm² ii 29.2 cm²
- 10 a There will be 4 people without seats who have tickets.
 b Anything between 15.75 tonnes and 16 tonnes will think it is safe to cross the bridge when it isn't.
- 11 a 7.4 b 0.40 c 0.00
 12 a 85.0 b 61.000 c 7.90 d 7.99 e 0.0
 13 3.4499 cm, 33.81 mm, 3.35 cm

Exercise 9C

- 1 a 40% b 36%
 c 2.5% d 149%



- 3 a 5% is the same as $\frac{5}{100}$ b 39% is the same as $\frac{39}{100}$
 c 81% is the same as $\frac{81}{100}$ d $\frac{128}{100}$ e $\frac{249}{100}$
- 4 a $\frac{34}{100}$ b $\frac{11}{100}$ c $\frac{9}{100}$
 d $\frac{0.7}{100}$ or $\frac{7}{1000}$ e $\frac{356}{100}$
- 5 a 15% b 25% c 17%
 d 189% e 0.3%

Exercise 9D

- 1 a 25 b 50 c 75
 d 70 e 35
 f $\frac{225}{100}$ and 225% g $\frac{155}{100}$ and 155%
 h $3\frac{35}{100} = 335\%$
- 2 a 60% b 80% c 55% d 60%
 e 6% f 220% g 282% h 220%
- 3 a 40% b 20% c 70% d 80%
 e 40% f 120% g 300% h 0.9%
 i 245%

- 4 a $\frac{6}{10}$ b 60%
 5 a $\frac{13}{20}$ b 65%
 6 a 70%
 b She scored the same percentage in both.
 7 a 60% b 74% c 82% d 65.5%
 8 15%
 9 Earl and Eric
 10 a 52% b 70% c 48%
 d 30% e 60%
 11 50%, 75%, 58%, 55%, 62.5%; year 8
 12 a 60% b 25% c 15%
 13 a i $\frac{7}{20}$ ii 35% b i $\frac{3}{5}$ ii 60%
 c i $\frac{3}{10}$ ii 30% d i $\frac{4}{8} = \frac{1}{2}$ ii 50%
 14 a 52% b 48% c 20% d 70%
 e 20%

Exercise 9E

- 1 90/100, 90%; 75/100, 75%; 25/100, 25%; 3/100, 3%;
 $5.8/100 = 58/1000, 5.8\%$; $140/100 = 2/1000, 140\%$
 2 multiply by 100%
 3 a 80% b 41% c 97%
 d 6% e 1%
 4 a 10% b 13.4% c 2.5% d 79.6%
 e 2.34% f 81.75% g 3.5% h 143%
 i 700%
 5 0.12; 8/100, 0.08; 10/100, 0.1; 16/100, 0.16; 39/100, 0.39;
 $64/100, 0.64$; $230/100, 2.3$; $0.2/100 = 2/1000, 0.002$
 6 b two places to the left
 7

Fraction	Decimal	%
$\frac{2}{5}$	0.4	40%
$\frac{4}{5}$	0.8	80%
$\frac{7}{10}$	0.7	70%
$\frac{3}{4}$	0.75	75%
$\frac{13}{20}$	0.65	65%
$\frac{17}{20}$	0.85	85%
$\frac{6}{25}$	0.24	24%
$\frac{3}{50}$	0.06	6%
$\frac{1}{25}$	0.04	4%

- 8 a 0.19 b 0.29 c 0.66 d 0.03
 e 6.21 f 0.007 g 10 h 4.3
 i 0.015
 9 b 90%, 85%, $\frac{36}{40}$
 10 a 26% b 62% c $\frac{9}{20}$
 d 63% e $\frac{17}{16}$
 11 a $\frac{300}{500}$ b 0.04 c 15%
 12 a and b

13

Fraction	Decimal	Percentage
$\frac{1}{3}$	0.333	33.3
$\frac{3}{8}$	0.375	37.5
$\frac{5}{8}$	0.625	62.5
$\frac{3}{16}$	0.1875	18.75
$\frac{7}{16}$	0.4375	43.75
$\frac{2}{3}$	0.6666...	66.67
$\frac{3}{7}$	0.4285...	42.86
$\frac{716}{18}$	7.2	720
$50\frac{1}{2}$	50.5	5050

- 0.333..., 33.3...%; $\frac{3}{8}, 37.5\%$; $\frac{5}{8}, 62.5\%$; 0.1875, 18.75%; $\frac{7}{16}, 43.75\%$; 0.666...; 66.6...%; 0.4285..., 42.85...%; 7.2, 720%;
 $50\frac{1}{2}, 50.5\%$
 14 42%, $\frac{43}{100}, \frac{11}{25}, \frac{9}{20}, 0.46$
 15 Jane should buy the 600g cheese as it has a lower percentage of fat (34% rather than 36% for the 400g), she is doing the wrong thing.
 16 No, she is wrong $\frac{1}{2}$ is 50% not 0.5%
 17 82.5%, 62.5% and 102.5%

Exercise 9F

- 1 Joshua has made the mistake as \$6.3 is the same as \$6.30, crossing off the 0's is not how to divide by 10.
 2 a \$5 b 12km c 5l d \$60
 e \$74 f \$1.50 g 24g h 9 children
 i \$30 j \$1
 3 This is closest to method 3, divide by 100 then multiply.
 4 a $\frac{17}{10}$ b 0.02 c 63% d 0.3 e $\frac{2}{3}$
 5 a \$0.93 b \$1.14 c \$1.30 d \$1.02
 e \$3.75 f \$9.66 g \$0.60 h \$0.525
 i \$6.65 j \$0.30
 6 No, he has found half. 0.5% is half of 1% so should be 1.2
 7 Anya
 8 a \$54.96 b 5.6kg c 43.2l d 80.5km
 e 2m f 9.6g
 9
 10 No, because 200% is the same as multiplying by 2, it should be \$100, she has found 20%
 11 a 350g cheese b 500g cheese c no
 12 a 20% of 1250 b 15% of 220
 c 0.25×90
 13 326.4 km
 14 a 108 b 1620 c 21600
 15 a 8% b 8%; 396; 234; 198; 72
 16 3.15 tonnes

Answers

17 a 0.2×15 b 5% of 36 c 0.02×10

18 \$141.36, \$230.64

19 615

20 a 3 b 2.5 c 4.2

21 True. These calculations are all equivalent:

$$\frac{15}{100} \times 42 = \frac{15 \times 42}{100} = 15 \times \frac{42}{100} \text{ and so this will always be true.}$$

22 15% of 324

The homework book answers.

8E

- 1 (1, -3), (1, 5), (1, 0)
 2 (-4, -2), (5, -2), (0, -2), (2, -2)
 3 a 7 b 3 c 5
 d 6 e 13 f 10
 4 (5, -2)
 5 (5, -2), (-11, -2)
 6 possible answers: (2, 0), (2, 3), (2, 8)
 7 (-1, 1)
 8 (3, 2)

9A

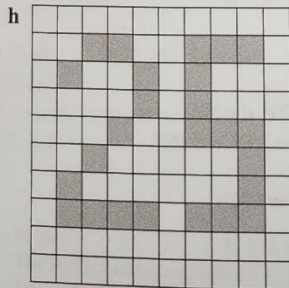
- 1 a 3600 b 41000 c 5700
 d 8.5 e 930000 f 66000
 g 80 h 650000 i 0.0053
 j 0.078 k 0.00366 l 0.000476
 m 0.003 n 0.5 o 0.000003
 2 a 4 b 2 c 8 d 0
 e 4 f 2 g 4 h 4
 3 a 540000 b 100 c 0.72 d 940
 4 34000
 5 a > b <

9B

- 1 a 6.4 b 3.8 c 5.0 d 32.0
 e 0.1 f 7.0 g 5.4 h 18.4
 i 454.0 j 6.0 k 8.9 l 53.0
 2 a 5.36 b 8.44 c 2.04 d 7.78
 e 15.49 f 4.30 g 10.02 h 45.56
 i 0.31 j 0.26 k 0.50 l 0.40
 3 a 5 b 5 c 8 d 16
 e 11 f 30 g 6 h 601
 4 a 25.16cm² b 25.2cm²
 5 a 2.33 b 0.71 c 1.36 d 1.18
 6 4.845

9C

- 1 a 43% b 66% c 40% d 32%
 e 18% f 20%
 g The percentage is the same as the number in the diagram.



- 2 a $\frac{43}{100}$ b $\frac{89}{100}$ c $\frac{77}{100}$ d $\frac{91}{100}$
 3 a 57% b 9% c 13% d 81%
 e 79%

9D

- 1 a $\frac{3}{5} = \frac{60}{100} = 60\%$
 b $\frac{11}{20} = \frac{55}{100} = 55\%$
 c $\frac{49}{50} = \frac{98}{100} = 98\%$
 d $\frac{6}{15} = \frac{2}{5} = \frac{40}{100} = 40\%$
 e $\frac{26}{40} = \frac{13}{20} = \frac{65}{100} = 65\%$
 2 a 20% b 75% c 90% d 85%
 e 84% f 66% g 24% h 75%
 i 95% j 60% k 80% l 74%
 3 a i $\frac{1}{2}$ ii 50%
 b i $\frac{7}{10}$ ii 70%
 c i $\frac{2}{5}$ ii 40%
 d i $\frac{11}{20}$ ii 55%
 4 a 47.5% b 62.5% c 20% d 63.2% (to + d.p.)

9E

1

Decimal	Per cent fraction	%
0.2	$\frac{20}{100}$	20%
0.09	$\frac{9}{100}$	9%
0.66	$\frac{66}{100}$	66%
0.15	$\frac{15}{100}$	15%
0.04	$\frac{4}{100}$	4%
0.7	$\frac{70}{100}$	70%

- 2 a 53% b 7% c 70% d 39%
 e 22% f 19% g 5% h 68%
 i 3.5% j 0.8% k 2.1% l 42.42%
 m 5.16% n 0.35% o 103% p 123.8%
 3 8.3% = 0.083 80% = 0.8
 3% = 0.03 380% = 3.8
 3.8% = 0.038 8% = 0.08
 38% = 0.38 830% = 8.3

The odd one out is 0.83.

- 4 a 19% b $\frac{3}{8}$ c 83% d 21%
 5 the star-shaped diagram
 6 0.64, 64.5%, $\frac{13}{20}$, $\frac{2}{3}$, $\frac{67}{100}$

9F

- 1 a \$40 b 16 m
 c 13 kg d 36 cm
 e 15 litres f \$90
 g 468 g h 23 kg
 i 18 km j \$21
 k 3 eggs l 663 bananas
 2 a 20% b 52
 3

Fruit	banana	mango	orange	pineapple
Percentage	38%	27%	18%	17%
Number of children	152	108	72	68

- 4 85%
 5 60
 6 a \$0.28 b 167.7 km
 7 15% of 342 = 51.3