Exercise 5.3A

1 Findlay is told that he must get 80% on his homework for a grade 7, 70% for a grade 6, 60% for a grade 5 and 50% for a grade 4.

What grades does he get for

a 36 out of 50 **b** 17 out of 20

c 15 out of 25 **d** 12 out of 15?

2 Jessica sees bargain signs in two bookshops. She wants to buy two books, each costing £6.90.

H W Smith	Stonewaters
Book sale! 25% off	Buy one get one half price!

a Her friend Shannon says it doesn't matter which shop she goes to. Is she correct?

b Chloe wants to buy two books, one costing £5.60, the other £4.68. Stonewaters says the half price offer applies to the cheaper book. Which shop should she go to?

3 Rewrite these sets of numbers in ascending order. Show your working.

a 33.3%, 0.33, 33, $33\frac{1}{3}$ %

b 0.45, 44.5%, 0.454, $0.\dot{4}$

c $0.2\dot{3}$, 0.232, 22.3%, 23.22%, 0.233

d $\frac{2}{3}$, 0.66, $0.6\dot{5}$, 66.6%, 0.6666

e $\frac{1}{7}$, 14%, 0.142, $\frac{51}{350}$, $14.\dot{1}$%

f 86%, $\frac{5}{6}$, $0.8\dot{6}$, 0.866, $\frac{6}{7}$

4 All fractions can be turned into a decimal by dividing the numerator by the denominator. Some produce recurring decimals.

For example $\frac{1}{3} = 1 \div 3 = 0.333\,333\,333\ldots$

a Convert each of the fractions less than 1 with a denominator of 7 into a decimal using your calculator. Write down all the decimal places in your answer.

For example $\frac{1}{7} = 1 \div 7 = 0.142\,857\,142\ldots$

$\frac{2}{7} = 2 \div 7 = \ldots$

b Write what you notice about each of your answers.

5 Shula says, 'I used my calculator to change $\frac{1}{13}$ to a decimal, and I got the answer 0.076 923 08. There is no repeating pattern, so the decimal does not recur.' Explain why Shula is wrong.

6 Jodie says that the recurring decimal $0.\dot{9}$ is a little smaller than 1. Abby says that $0.\dot{9}$ is equal to 1. Who is correct? Explain your reasoning.

7 Convert each of these recurring decimals to a fraction in its simplest form. Show your working.

a $0.1\dot{1}$ **b** $0.2\dot{2}$

c $0.\dot{1}\dot{5}$ **d** $0.\dot{1}2\dot{5}$

e $0.\dot{2}1\dot{6}$ **f** $0.2\dot{1}$

g $0.7\dot{2}$ **h** $0.8\dot{2}\dot{7}$

i $0.6\dot{3}2\dot{1}$ **j** $0.81\dot{7}\dot{5}$

8 **a** Which one of these is a recurring decimal?

$\frac{18}{25}$ $\frac{19}{20}$ $\frac{8}{11}$ $\frac{9}{18}$

b Write $\frac{7}{9}$ as a recurring decimal.

c You are told that $\frac{1}{54} = 0.0\dot{1}8\dot{5}$. Write $\frac{4}{54}$ as a recurring decimal.

9 **a** Prove that $0.\dot{5}\dot{7} = \frac{19}{33}$.

b Hence, or otherwise, write the decimal number $0.3\dot{5}\dot{7}$ as a fraction.

10 Which is closer to 0.5: $0.3\dot{6}$ or $0.6\dot{3}$? Justify your answer.

11 Work out $\frac{22}{7}$ as a decimal.

Now work out

$$4 - \frac{4}{3} + \frac{4}{5} - \frac{4}{7} + \frac{4}{9} - \frac{4}{11} + \ldots$$

Continue the sum following the same pattern with the signs and the denominators.

What special number do you find?

12 Find a fraction equal to the recurring decimal $0.\dot{0}12\,345\,678\dot{9}$, giving your answer in its simplest form. Show your working.

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1a) $\frac{36}{50} \times 100 = 72\%$ Grade 6

1d) $\frac{\cancel{12}^{4}}{\cancel{15}_{1}} \times \cancel{100}^{20} = 80\%$ Grade 7

3 Rewrite these sets of numbers in ascending order. Show your working.

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e $\frac{1}{7}$, 14%, 0.142, $\frac{51}{350}$, $14.\dot{1}$%

f 86%, $\frac{5}{6}$, $0.8\dot{6}$, 0.866, $\frac{6}{7}$

3a) 33.3% = 0.333 2

0.33 = 0.33 1

33 = 33 4

$33\frac{1}{3}$% = $0.3\dot{3}$ 3

0.33, 33.3%, $33\frac{1}{3}$%, 33

3f 86% = 0.86 3

$\frac{5}{6}$ = $0.83\dot{3}$ 1

$0.8\dot{6}$ = $0.86\dot{6}$ 5

0.866 = 0.866 4

$\frac{6}{7}$ = 0.857 2

$\frac{5}{6}$, $\frac{6}{7}$, 86%, 0.866, $0.8\dot{6}$

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b Write what you notice about each of your answers.

$\frac{1}{7}$ = 0.142857142 9

$\frac{2}{7}$ = 0.285714285 7

$\frac{3}{7}$ = 0.428571428 6

$\frac{4}{7}$ = 0.571428571 4

$\frac{5}{7}$ = 0.714285714 3

$\frac{6}{7}$ = 0.857142857 1

b) Recurring Decimals with every 6 digits repeating.

6 Jodie says that the recurring decimal $0.\dot{9}$ is a little smaller than 1. Abby says that $0.\dot{9}$ is equal to 1. Who is correct? Explain your reasoning.

Let $x = 0.\dot{9}$

$x = 0.999\dot{9}$ (1)

$10x = 9.999\dot{9}$ (2)

(2) − (1) $\quad 9x = 9$

$x = 1$

Conclusion $\quad 0.\dot{9} = 1$

Classwork - Exercise above

Homework - Q7 above