Recurring Decimals to Fractions Worksheet

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Questions in past papers often come up combined with other topics.
Topic tags have been given for each question to enable you to know if you can do the question or whether you need to wait to cover the additional topic(s).

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Qualification: IGCSE Edexcel A Higher

Areas: Number

Subtopics: Recurring Decimal To Fraction

Paper: Paper-2HR / Series: 2022-June / Difficulty: Medium / Question Number: 17

17 Use algebra to show that $0.\dot{3}\dot{4}\dot{5} = \frac{19}{55}$

(Total for Question 17 is 2 marks)

15 Prove algebraically that the recurring decimal $0.2\dot{5}$ has the value $\frac{23}{90}$

(Total for Question 15 is 2 marks)

Qualification: GCSE Edexcel Higher

Areas: Number

Subtopics: Recurring Decimal To Fraction

Paper: Paper-2H-Calculator / Series: 2023-November / Difficulty: Medium / Question Number: 13

13 Prove algebraically that $0.\dot{0}7\dot{2}\dot{3}$ can be written as $\frac{241}{3330}$

(Total for Question 13 is 3 marks)

Qualification: GCSE Edexcel Higher
Areas: Number
Subtopics: Recurring Decimal To Fraction
Paper: Paper-3H-Calculator / Series: Specimen-Set-2 / Difficulty: Medium / Question Number: 19

19 Prove algebraically that the recurring decimal $0.3\dot{1}\dot{8}$ can be written as $\frac{7}{22}$

(Total for Question 19 is 2 marks)

Qualification: IGCSE Edexcel A Higher

Areas: Number

Subtopics: Recurring Decimal To Fraction

Paper: Paper-2HR / Series: 2024-June / Difficulty: Medium / Question Number: 18

18 Use algebra to show that $0.\dot{3}0\dot{6} = \frac{34}{111}$

(Total for Question 18 is 2 marks)

20 Prove algebraically that $0.1\dot{2}\dot{3}$ can be written as $\frac{61}{495}$

(Total for Question 20 is 3 marks)

Qualification: IGCSE Edexcel A Higher

Areas: Number

Subtopics: Recurring Decimal To Fraction

Paper: Paper-1HR / Series: 2023-June / Difficulty: Medium / Question Number: 16

16 Use algebra to show that $0.1\dot{7}\dot{6} = \frac{35}{198}$

(Total for Question 16 is 2 marks)

Qualification: IGCSE Edexcel A Higher
Areas: Number
Subtopics: Recurring Decimal To Fraction
Paper: Paper-2H / Series: 2023-January / Difficulty: Medium / Question Number: 16

16 Use algebra to show that $0.4\dot{3}\dot{8} = \frac{217}{495}$

(Total for Question 16 is 2 marks)

Qualification: IGCSE Edexcel A Higher

Areas: Number

Subtopics: Recurring Decimal To Fraction

Paper: Paper-1HR / Series: 2023-January / Difficulty: Medium / Question Number: 13

13 Use algebra to show that $0.3\dot{8}\dot{1} = \frac{21}{55}$

(Total for Question 13 is 2 marks)

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14 Using algebra, prove that $1.06\dot{2}$ can be written as $1\frac{14}{225}$

(Total for Question 14 is 3 marks)

12 Express $0.1\dot{1}\dot{7}$ as a fraction.
You must show all your working.

.....

(Total for Question 12 is 3 marks)

Qualification: GCSE Edexcel Higher

Areas: Number

Subtopics: Recurring Decimal To Fraction

Paper: Paper-1H-Non-Calculator / Series: 2018-November / Difficulty: Medium / Question Number: 16

16 Prove algebraically that $0.2\dot{5}\dot{6}$ can be written as $\frac{127}{495}$

(Total for Question 16 is 3 marks)

15 Prove algebraically that $0.7\dot{3}$ can be written as $\frac{11}{15}$

(Total for Question 15 is 2 marks)

Qualification: IGCSE Edexcel A Higher
Areas: Number
Subtopics: Recurring Decimal To Fraction
Paper: Paper-2H / Series: 2020-November / Difficulty: Medium / Question Number: 13

13 Use algebra to show that $0.6\dot{8}\dot{1} = \frac{15}{22}$

(Total for Question 13 is 2 marks)

16 Use algebra to show that the recurring decimal $0.28\dot{1}\dot{3} = \frac{557}{1980}$

(Total for Question 16 is 2 marks)

Qualification: GCSE Edexcel Higher

Areas: Number

Subtopics: Recurring Decimal To Fraction

Paper: Paper-1H-Non-Calculator / Series: 2019-November / Difficulty: Medium / Question Number: 15

15 Express $0.4\dot{1}\dot{8}$ as a fraction.
You must show all your working.

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(Total for Question 15 is 3 marks)

15 Use algebra to show that the recurring decimal $0.2\dot{5}\dot{4} = \frac{14}{55}$

(Total for Question 15 is 2 marks)

15 $x = 0.4\dot{3}\dot{6}$

Prove algebraically that x can be written as $\frac{24}{55}$

(Total for Question 15 is 3 marks)

13 (a) Use algebra to show that $0.5\dot{7}\dot{2} = \frac{63}{110}$

(2)

Given that y is a prime number,

(b) express $\frac{3}{2-\sqrt{y}}$ in the form $\frac{a+b\sqrt{y}}{c-y}$ where a, b and c are integers.

.....

(2)

(Total for Question 13 is 4 marks)

15 (a) Use algebra to show that $0.3\dot{7}\dot{2} = \frac{41}{110}$

(2)

(b) Express $\frac{\sqrt{125} + \sqrt{80}}{\sqrt{3}}$ in the form $\sqrt{n}$ where n is an integer.

Show your working clearly.

.....

(3)

(Total for Question 15 is 5 marks)

17 (a) Use algebra to show that $0.4\dot{3}\dot{6} = \frac{24}{55}$

(2)

(b) Show that $\frac{\sqrt{20} + \sqrt{80}}{\sqrt{3}}$ can be expressed in the form $\sqrt{a}$ where a is an integer.

Show your working clearly.

(3)

(Total for Question 17 is 5 marks)

Qualification: IGCSE Edexcel A Higher
Areas: Number
Subtopics: Recurring Decimal To Fraction, Surds
Paper: Paper-1HR / Series: 2021-January / Difficulty: Medium / Question Number: 15

15 (a) Use algebra to show that $4.\dot{5}\dot{7} = 4\frac{19}{33}$

(2)

(b) Show that $\frac{2}{6-3\sqrt{2}}$ can be written in the form $\frac{a+\sqrt{a}}{b}$

where a and b are integers.
Show your working clearly.

(3)

(Total for Question 15 is 5 marks)

14 (a) Use algebra to show that $0.3\dot{2}\dot{4} = \frac{107}{330}$

(2)

(b) Rationalise the denominator of $\frac{4}{7-\sqrt{5}}$

Show each stage of your working.

Give your answer in the form $a + b\sqrt{5}$ where a and b are fractions in their simplest forms.

(3)

(Total for Question 14 is 5 marks)

13 Ted is trying to change $0.\dot{4}\dot{3}$ to a fraction.

Here is the start of his method.

$$x = 0.\dot{4}\dot{3}$$

$$10x = 4.\dot{3}\dot{4}$$

$$10x - x = 4.\dot{3}\dot{4} - 0.\dot{4}\dot{3}$$

Evaluate Ted's method so far.

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(Total for Question 13 is 1 mark)

Qualification: IGCSE Edexcel A Higher
Areas: Number
Subtopics: Recurring Decimal To Fraction, Algebraic Fractions
Paper: Paper-1H / Series: 2021-November / Difficulty: Medium / Question Number: 18

18 $0.4\dot{x}$ is a recurring decimal.
x is a whole number such that $1 \leqslant x \leqslant 9$

Find, in terms of x, the recurring decimal $0.4\dot{x}$ as a fraction.
Give your fraction in its simplest form.
Show clear algebraic working.

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(Total for Question 18 is 3 marks)

Qualification: GCSE Edexcel Higher

Areas: Number

Subtopics: Recurring Decimal To Fraction

Paper: Paper-1H-Non-Calculator / Series: 2024-June / Difficulty: Medium / Question Number: 18

18 Show that $0.\dot{1}\dot{5} + 0.2\dot{2}\dot{7}$ can be written in the form $\frac{m}{66}$ where m is an integer.

(Total for Question 18 is 3 marks)

16 Using algebra, prove that $0.1\dot{3}\dot{6} \times 0.\dot{2}$ is equal in value to $\frac{1}{33}$

(Total for Question 16 is 3 marks)

15 (a) Prove that the recurring decimal $0.\dot{1}\dot{5}$ has the value $\frac{5}{33}$

(2)

(b) $x = \frac{1}{2^{183} \times 5^{180}}$

Show that, when x is written as a terminating decimal, there are 180 zeros after the decimal point.

(2)

The reciprocal of any prime number p (where p is neither 2 nor 5) when written as a decimal, is always a recurring decimal.

A theorem in mathematics states

The period of a recurring decimal is the least value of n for which p is a factor of $10^n - 1$

Hugo tests this theorem.

He uses his calculator to show that 37 is a factor of $10^3 - 1$

Hugo then makes this statement,

"The period of the recurring decimal equal to the reciprocal of 37 is 3 because 37 is a factor of $10^3 - 1$. This shows the theorem to be true in this case."

(c) Explain why Hugo's statement is incomplete.

(2)

(Total for Question 15 is 6 marks)