Recurring Decimals to Fractions - Worksheet

Skill

Group A - Converting recurring decimals less than one

Convert the following recurring decimals into fractions. Express your fractions in their simplest form.

1) $0.\dot{7}$

2) $0.\dot{8}$

3) $0.\dot{0}\dot{4}$

4) $0.\dot{2}\dot{4}$

5) $0.\dot{7}\dot{8}$

6) $0.\dot{9}\dot{7}$

7) $0.\dot{0}\dot{4}\dot{7}$

8) $0.\dot{0}\dot{4}\dot{7}$

9) $0.\dot{5}\dot{3}\dot{3}$

10) $0.\dot{9}\dot{8}\dot{7}$

11) $0.\dot{0}\dot{7}\dot{8}\dot{7}$

12) $0.\dot{5}\dot{9}\dot{7}\dot{3}$

Group B - Converting recurring decimals greater than one.

Convert the following recurring decimals into fractions. Express your fractions as improper fractions in their simplest form.

1) $1.\dot{5}$

2) $2.\dot{3}$

3) $5.\dot{2}$

4) $4.\dot{1}\dot{2}$

5) $7.\dot{4}\dot{5}$

6) $6.\dot{1}\dot{3}$

7) $2.\dot{0}\dot{3}\dot{2}$

8) $4.\dot{0}\dot{3}\dot{4}$

9) $5.\dot{3}\dot{2}\dot{1}$

10) $4.\dot{4}\dot{1}\dot{5}$

11) $8.\dot{0}\dot{2}\dot{2}\dot{5}$

12) $2.\dot{0}\dot{5}\dot{5}\dot{2}$

Group C - Calculations involving recurring decimals

Work out the following equations. Express your fractions in their simplest form.

1) $1.\dot{2} + 1.\dot{4}$

2) $0.\dot{8} + 0.\dot{7}$

3) $4.\dot{2} - 1.\dot{3}$

4) $2.\dot{4} \times 3.\dot{3}$

5) $6.\dot{2} \div 6.\dot{3}$

6) $1.\dot{2} + 3.\dot{6} - 2.\dot{7}$

7) $3.\dot{2}\dot{5} + 2.\dot{3}\dot{6} - 2.\dot{6}\dot{7}$

8) $(3.\dot{2} + 2.\dot{7})^2$

9) $5.\dot{1} \times 6.\dot{2} + 2.\dot{3}$

10) $(2.\dot{3}\dot{1} - 1.\dot{5})$

11) $2.\dot{3}\dot{6} \times 6.\dot{3}\dot{1} - 9.\dot{2}$

12) $(4.\dot{5}\dot{8} - 9.\dot{2}\dot{5}) \times 3.\dot{2}$

Recurring Decimals to Fractions - Worksheet

Applied

1) **(a)** Write the fraction below as a recurring decimal:

$\frac{6}{11}$

(b) Write the fraction below as a recurring decimal:

$\frac{5}{22}$

2) **(a)** Order the following is descending order:

$\frac{3}{8}$, $0.\dot{2}\dot{4}$, $\frac{5}{17}$, $0.3\dot{6}$, $\frac{1}{4}$

(b) Order the following values in ascending order:

$\frac{3}{7}$, $0.\dot{3}\dot{4}$, $\frac{5}{14}$, $0.3\dot{4}\dot{2}$, $\frac{1}{3}$, 2

3) **(a)** The equation below can be expressed as a fraction.

What is the sum of the numerator and denominator of the simplified fraction?

$$0.\dot{4} + 4.\dot{2} =$$

(b) The equation below can be expressed as a fraction.

What is the product of the numerator and denominator of the simplified fraction?

$$2.\dot{3} + 7.\dot{3}\dot{2} =$$

4) Mandy answered the question below in her exam. Correct her response and clearly explain where she has made the mistake(s).

Convert $0.\dot{9}\dot{2}$ into a simplified fraction.

Equation 1:

$0.\dot{9}\dot{2} = x$

Multiply both sides by 10

Equations 2:

$9.2 = 10x$

Subtract Equation 1 from Equation 2

$9.2 - 0.92 = 10x - x$

$8.28 = 9x$

$x = \frac{9}{8.28}$

Recurring Decimals to Fractions - Exam Questions

1) Write $0.\dot{2}$ as a fraction in its simplest form.

..... **(2 marks)**

---

2) Write the numbers on the right in ascending order:

$0.\dot{2}, \frac{9}{22}, 0.\dot{3}\dot{1}, \frac{8}{21}$

..... **(3 marks)**

---

3) Write $1.\dot{1}\dot{5}$ as a mixed number. Give your answer in its simplest form.

..... **(3 marks)**

---

4) Work out the following giving your answer as a fraction in simplest terms.

$0.\dot{2} \times 0.\dot{6}\dot{3} \div 0.\dot{4}\dot{0}\dot{7}$

..... **(4 marks)**

---

5) Prove algebraically that Prove algebraically that $0.4\dot{5}\dot{1} = \frac{149}{330}$

..... **(3 marks)**

Recurring Decimals to Fractions - Answers

	Question	Answer
	Skill Questions	
Group A	Work out: **1)** $0.\dot{7}$ **2)** $0.\dot{8}$ **3)** $0.\dot{0}4$ **4)** $0.\dot{2}\dot{4}$ **5)** $0.\dot{7}\dot{8}$ **6)** $0.\dot{9}\dot{7}$ **7)** $0.0\dot{4}\dot{7}$ **8)** $0.0\dot{5}\dot{9}$ **9)** $0.\dot{5}3\dot{3}$ **10)** $0.\dot{9}8\dot{7}$ **11)** $0.\dot{0}7\dot{8}\dot{7}$ **12)** $0.\dot{5}9\dot{7}3$	**1)** $\frac{7}{9}$ **2)** $\frac{8}{9}$ **3)** $\frac{2}{45}$ **4)** $\frac{8}{33}$ **5)** $\frac{26}{33}$ **6)** $\frac{97}{99}$ **7)** $\frac{2}{165}$ **8)** $\frac{59}{990}$ **9)** $\frac{533}{999}$ **10)** $\frac{329}{333}$ **11)** $\frac{787}{9990}$ **12)** $\frac{2984}{4995}$
Group B	Work out: **1)** $1.\dot{5}$ **2)** $2.\dot{3}$ **3)** $5.\dot{2}$ **4)** $4.\dot{1}\dot{2}$ **5)** $7.\dot{4}\dot{5}$ **6)** $6.\dot{1}\dot{3}$ **7)** $2.0\dot{3}\dot{2}$ **8)** $4.0\dot{3}\dot{4}$ **9)** $5.\dot{3}2\dot{1}$ **10)** $4.\dot{4}1\dot{5}$	**1)** $\frac{14}{9}$ **2)** $\frac{7}{3}$ **3)** $\frac{47}{9}$ **4)** $\frac{136}{33}$ **5)** $\frac{82}{11}$ **6)** $\frac{607}{99}$ **7)** $\frac{1006}{495}$ **8)** $\frac{1997}{495}$ **9)** $\frac{1772}{333}$ **10)** $\frac{4411}{999}$

	11) $8.0\dot{2}\dot{2}\dot{5}$ **12)** $2.0\dot{5}\dot{5}\dot{2}$	**11)** $\frac{1781}{222}$ **12)** $\frac{3422}{1665}$

Recurring Decimals to Fractions - Answers

Group C	Work out:	
	1) $1.\dot{2} + 1.\dot{4}$	**1)** $\frac{8}{3}$
	2) $0.\dot{8} + 0.\dot{7}$	**2)** $\frac{5}{3}$
	3) $4.\dot{2} - 1.\dot{3}$	**3)** $\frac{26}{9}$
	4) $2.\dot{4} \times 3.\dot{3}$	**4)** $\frac{220}{27}$
	5) $6.\dot{2} \div 6.\dot{3}$	**5)** $\frac{56}{57}$
	6) $1.\dot{2} + 3.\dot{6} - 2.\dot{7}$	**6)** $\frac{19}{9}$
	7) $3.\dot{2}\dot{5} + 2.\dot{3}\dot{6} - 2.\dot{6}\dot{7}$	**7)** $\frac{97}{33}$
	8) $(3.\dot{2} + 2.\dot{7})^2$	**8)** 36
	9) $5.\dot{1} \times 6.\dot{2} + 2.\dot{3}$	**9)** $\frac{2765}{81}$
	10) $(2.\dot{3}\dot{1} - 1.\dot{5})$	**10)** $\frac{1089}{625}$
	11) $2.\dot{3}\dot{6} \times 6.\dot{3}\dot{1} - 9.\dot{2}$	**11)** $\frac{2069}{363}$
	12) $(4.\dot{5}\dot{8} - 9.\dot{2}\dot{5}) \times 3.\dot{2}$	**12)** $\frac{5684}{81}$

Recurring Decimals to Fractions - Answers

	Question	Answer
	Applied Questions	
1)	**a)** Write the fraction below as a recurring decimal: $\frac{6}{11}$ **b)** Write the fraction below as a recurring decimal: $\frac{5}{22}$	**a)** $0.\dot{5}\dot{4}$ **b)** $0.2\dot{2}\dot{7}$
2)	**a)** Order the following is descending order: $\frac{3}{8}$, $0.\dot{2}\dot{4}$, $\frac{5}{17}$, $0.3\dot{6}$, $\frac{1}{4}$ **b)** Order the following values in ascending order: $\frac{3}{7}$, $0.\dot{3}\dot{4}$, $\frac{5}{14}$, $0.3\dot{4}\dot{2}$, $\frac{1}{3}$, 2	**a)** $\frac{3}{8}$, $0.3\dot{6}$, $\frac{5}{17}$, $\frac{1}{4}$, $0.\dot{2}\dot{4}$ **b)** 2, $\frac{1}{3}$, $0.3\dot{4}\dot{2}$, $0.\dot{3}\dot{4}$, $\frac{5}{14}$, $\frac{3}{7}$
3)	**a)** The equation below can be expressed as a fraction. What is the sum of the numerator and denominator of the simplified fraction? $0.\dot{4} + 4.\dot{2} =$ **b)** The equation below can be expressed as a fraction. What is the product of the numerator and denominator of the simplified fraction? $2.\overline{3} + 7.\overline{32} =$	**a)** $\frac{14}{3}$; $14 + 3 = 17$ **b)** $\frac{956}{99}$; $956 \times 99 = 94644$
4)	Mandy answered the question below in her exam. Correct her response and clearly explain where she has made the mistake(s). **Convert $0.\dot{9}\dot{2}$ into a simplified fraction.** *Equation 1:* $0.\dot{9}\dot{2} = x$ *Multiply both sides by 10*	Correct answer should be as follows: *Equation 1:* $0.\dot{9}\dot{2} = x$ *Multiply both sides by **100*** *Equations 2:* $92.\dot{9}\dot{2} = 100x$

	Equations 2: $9.2 = 10x$ Subtract Equation 1 from Equation 2 $9.2 - 0.92 = 10x - x$ $8.28 = 9x$ $x = \frac{9}{8.28}$	Subtract Equation 1 from Equation 2 $92.\dot{9}\dot{2} - 0.\dot{9}\dot{2} = 100x - x$ $92 = 99x$ $x = \frac{92}{99}$

Recurring Decimals to Fractions - Mark Scheme

	Question	Answer	
	Exam Questions		
1)	Write $0.\dot{2}$ as a fraction in its simplest form.	$x = 0.\dot{2}$ *Multiplying* $0.\dot{2}$ *by 10 or* $2.\overline{2}$ *seen* $10x = 2.\dot{2}$ *Subtracting 2 equations to create* $2 = 9x$ **(1)** $\frac{2}{9}$ seen **(1)**	**(2)**
2)	Write the numbers on the right in ascending order: $0.\dot{2},\ \frac{9}{22},\ 0.\dot{3}\dot{1},\ \frac{8}{21}$	$\frac{9}{22} = 0.40...$ $\frac{8}{21} = 0.38...$ *For converting at least one fraction to a decimal* **(1)** *For 3 values in the correct order* **(1)** $0.\overline{22},\ 0.\overline{31}, \frac{8}{21},\ \frac{9}{22}$ **(1)**	**(3)**
3)	Write $1.\dot{1}\dot{5}$ as a mixed number. Give your answer in its simplest form.	$x = 1.\dot{1}\dot{5}$ *Multiplying* $1.\dot{1}\dot{5}$ *by 100 or* $115.\dot{1}\dot{5}$ *seen* $100x = 115.\dot{1}\dot{5}$ *Making 2 equations which can be used to eliminate the decimals* **(1)** $114 = 99x$ $x = \frac{114}{99}$ **(1)** $1\frac{5}{33}$ **(1)**	**(3)**
4)	Work out the following giving your answer as a fraction in simplest terms. $0.\dot{2} \times 0.\dot{6}\dot{3} \div 0.\dot{4}\dot{0}\dot{7}$	$0.\dot{2} = \frac{2}{9}$ $0.\dot{6}\dot{3} = \frac{7}{11}$ $0.\dot{4}\dot{0}\dot{7} = \frac{11}{27}$ One correct fraction (**1** mark) All 3 correct fractions (**2** marks)	**(4)**

		Workings: $\frac{2}{9} \times \frac{7}{11} \div \frac{11}{27} = \frac{14}{99} \div \frac{11}{27}$ **(1)** Final answer: $\frac{42}{121}$ *seen* **(1)**	
5)	Prove algebraically that $0.45\dot{1}\dot{1} = \frac{149}{330}$	$x = 0.45\dot{1}\dot{1}$ $10x = 4.5\dot{1}\dot{1}$ $1000x = 451.5\dot{1}\dot{1}$ *Making 2 equations which can be used to eliminate the decimals* **(1)** $447 = 990x$ $x = \frac{447}{990}$ **(1)** *Evidence of simplifying* seen to get $\frac{149}{330}$ **(1)**	**(3)**