

Name:

Exam Style Questions

Recurring Decimals



Corbettmaths

Equipment needed: Calculator, pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

www.corbettmaths.com/contents

Video 96



Answers and Video Solutions



1. Shown below are four fractions.



$$\frac{5}{8} \quad \left(\frac{1}{3}\right) \quad \left(\frac{2}{7}\right) \quad \frac{11}{20}$$

Circle any fractions which are recurring decimals.

(2)

2. Write the fraction $\frac{1}{6}$ as a recurring decimal.



$$6 \overline{) 1.0404040}$$

$$1 \div 6 = 0.16666\dots$$

$$\underline{0.\dot{1}6} \quad \text{or } 0.1666\dots$$

(2)

3. (a) Write $\frac{2}{3}$ as a recurring decimal.



$$\frac{2}{3} = 0.6666\dots$$

$$\underline{0.\dot{6}}$$

(1)

(b) Write $\frac{2}{30}$ as a recurring decimal.

$$2 \div 30 = 0.0666\dots$$

$$30 \overline{) 2.0000}$$

$$\underline{0.0\dot{6}}$$

$$\text{or } 0.6 \div 10 = 0.0\dot{6}$$

(1)

4. Write $\frac{4}{7}$ as a recurring decimal.



$$\begin{array}{r} 0.571428\overline{571428} \\ 7 \overline{) 4.000000} \\ \underline{7} \\ 40 \\ \underline{35} \\ 50 \\ \underline{49} \\ 10 \\ \underline{7} \\ 30 \\ \underline{28} \\ 20 \\ \underline{14} \\ 60 \\ \underline{56} \\ 40 \\ \underline{35} \\ 50 \\ \underline{49} \\ 10 \\ \underline{7} \\ 30 \\ \underline{28} \\ 20 \\ \underline{14} \\ 60 \\ \underline{56} \\ 40 \\ \underline{35} \\ 50 \\ \underline{49} \\ 10 \\ \underline{7} \\ 30 \\ \underline{28} \\ 20 \end{array}$$

$$4 \div 7 = 0.571428\overline{}$$

$$\begin{array}{r} 0.571428\overline{571428} \\ \hline (2) \end{array}$$

5. Write $\frac{3}{11}$ as a recurring decimal.



$$\begin{array}{r} 0.272727\overline{27} \\ 11 \overline{) 3.000000} \\ \underline{22} \\ 80 \\ \underline{77} \\ 30 \\ \underline{27} \\ 30 \\ \underline{27} \\ 30 \\ \underline{27} \\ 30 \\ \underline{27} \\ 30 \\ \underline{27} \\ 30 \\ \underline{27} \\ 30 \\ \underline{27} \\ 30 \\ \underline{27} \\ 30 \end{array}$$

$$3 \div 11 = 0.272727\overline{}$$

$$\begin{array}{r} 0.27\overline{27} \\ \hline (2) \end{array}$$

6. Circle the largest number.



$1.\overline{85}$ $1.8\overline{5}$ 1.85 1.8
 $1.8585\overline{}$ $1.855\overline{}$

(1)

7. Circle the smallest number.



$0.\overline{7}$ $0.7\overline{8}$ $0.77\overline{5}$ $0.74\overline{9}$
 $0.777\overline{}$ $0.788\overline{}$ $0.74999\overline{}$

(1)

8. Write the following numbers in order of size, starting with the smallest.



$$0.\dot{7}0\dot{5} \quad 0.70\dot{5} \quad 0.705 \quad 0.7\dot{0}\dot{5}$$

$$0.705705\text{--} \quad 0.70555\text{--} \quad 0.70505\text{--}$$

$$0.705, 0.7\dot{0}\dot{5}, 0.70\dot{5}, 0.\dot{7}0\dot{5}$$

(2)

9. Write $0.\dot{8}1$ as a fraction.
Give your answer in its simplest form.



$$x = 0.818181\text{--}$$

$$100x = 81.8181\text{--}$$

$$99x = 81$$

$$x = \frac{81}{99}$$

$$100x = 81.8181\text{--}$$

$$\text{sub } x = 0.8181\text{--}$$

$$99x = 81$$

$$x = \frac{81}{99}$$

$$\frac{9}{11}$$

(3)

10. Convert $0.3\dot{4}$ to a fraction.
Give your answer in its simplest form.



$$x = 0.3444\text{--}$$

$$10x = 3.444\text{--}$$

$$100x = 34.444\text{--}$$

$$90x = 31$$

$$x = \frac{31}{90}$$

$$100x = 34.444\text{--}$$

$$\text{sub } 10x = 3.444\text{--}$$

$$90x = 31$$

$$\frac{31}{90}$$

(3)

11. Prove algebraically that $0.5\bar{1}2$ can be written as $\frac{169}{330}$



$$\begin{aligned}x &= 0.51212\dots \\10x &= 5.1212\dots \\1000x &= 512.1212\dots\end{aligned}$$

$$\begin{array}{r}1000x = 512.121212 \\10x = 5.121212 \\ \hline 990x = 507\end{array}$$

$$x = \frac{507}{990} = \frac{169}{330}$$

(3)

12. Convert $0.4515151\dots$ to a fraction. Give your answer in its simplest form.



$$\begin{aligned}x &= 0.4515151\dots \\10x &= 4.515151\dots \\1000x &= 451.515151\dots\end{aligned}$$

$$\begin{array}{r}1000x = 451.515151 \\10x = 4.515151 \\ \hline 990x = 447\end{array}$$

$$x = \frac{447}{990} = \frac{149}{330}$$

$$\begin{array}{r}149 \\ \hline 330 \\ \hline \dots\end{array}$$

(3)

13. Write $1.2\bar{4}$ as a mixed number. Give your answer in its simplest form.



$$\begin{aligned}x &= 1.24444\dots \\10x &= 12.444\dots \\100x &= 124.4444\dots\end{aligned}$$

$$\begin{array}{r}100x = 124.444\dots \\10x = 12.444\dots \\ \hline 90x = 112\end{array}$$

$$x = \frac{112}{90} = \frac{56}{45}$$

$$1 \frac{11}{45}$$

$$\begin{array}{r}1 \frac{11}{45} \\ \hline \dots\end{array}$$

(3)

14. Prove algebraically that $0.3\dot{0}9$ can be written as $\frac{17}{55}$



$$\begin{aligned} x &= 0.3090909... \\ 10x &= 3.090909... \\ 1000x &= 309.0909... \end{aligned}$$

$$\begin{aligned} 1000x &= 309.0909... \\ 10x &= 3.0909... \\ \hline 990x &= 306 \end{aligned}$$

$$x = \frac{306}{990} = \frac{153}{495} = \frac{51}{165} = \frac{17}{55}$$

(3)

15. Prove algebraically that $0.21\dot{6}$ can be written as $\frac{13}{60}$



$$\begin{aligned} x &= 0.21666... \\ 100x &= 21.6666... \\ 1000x &= 216.666... \end{aligned}$$

$$\begin{aligned} 1000x &= 216.666... \\ 100x &= 21.666... \\ \hline 900x &= 195 \end{aligned}$$

$$x = \frac{195}{900} = \frac{39}{180} = \frac{13}{60}$$

(3)

16. Write $2.1\dot{6}5$ as a mixed number.
Give your answer in its simplest form.



$$\begin{aligned} x &= 2.1656565... \\ 10x &= 21.656565... \\ 1000x &= 2165.6565... \end{aligned}$$

$$\begin{aligned} 1000x &= 2165.6565... \\ 10x &= 21.6565... \\ \hline 990x &= 2144 \end{aligned}$$

$$x = \frac{2144}{990} = \frac{1072}{495}$$

$$2 \frac{82}{495}$$

$$\frac{1072}{495} = 2 \frac{82}{495}$$

(3)

17. Write the numbers below in order.
Start with the smallest.



23
46
69
92
115
138
161
184
207
230

$$\frac{11}{23}$$

$$0.4\dot{7}\dot{2}$$

$$0.47272\dots$$

$$\frac{5}{11}$$

$$11 \overline{) 0.454\dots}$$

$$11 \overline{) 5.5650}$$

$$23 \overline{) 00.4782}$$

$$23 \overline{) 11.180000}$$

$$\frac{5}{11}, 0.4\dot{7}\dot{2}, \frac{11}{23}$$

(3)

18. Work out $0.\dot{3} - 0.0\dot{5}$



Give your answer as a fraction in its simplest form.

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

$$y = 0.0\dot{5}$$

$$x = 0.3333\dots$$

$$y = 0.0555\dots$$

$$10x = 3.333\dots$$

$$10y = 0.555\dots$$

$$9x = 3$$

$$100y = 5.55\dots$$

$$x = \frac{3}{9} = \frac{1}{3}$$

$$90y = 5$$

$$y = \frac{5}{90} = \frac{1}{18}$$

$$\frac{1}{3} - \frac{1}{18}$$

$$\frac{6}{18} - \frac{1}{18} = \frac{5}{18}$$

$$\frac{5}{18}$$

(4)

19. Work out $0.1\dot{4} + 0.2\dot{3}$



Give your answer as a fraction in its simplest form.

$$x = 0.14444\dots$$

$$y = 0.232323\dots$$

$$10x = 1.444\dots$$

$$100y = 23.2323\dots$$

$$100x = 14.444\dots$$

$$99y = 23$$

$$90x = 13$$

$$y = \frac{23}{99}$$

$$x = \frac{13}{90}$$

$$\frac{13}{90} + \frac{23}{99}$$

$$\frac{143}{990} + \frac{230}{990} = \frac{373}{990}$$

$$\frac{373}{990}$$

(4)

20. Work out $1.5\dot{4} \times 0.2$



Give your answer as a fraction in its simplest form.

$$x = 1.54444\dots$$

$$y = 0.2222\dots$$

$$10x = 15.444\dots$$

$$y = \frac{2}{9}$$

$$100x = 154.444\dots$$

$$90x = 139$$

$$x = \frac{139}{90}$$

$$\frac{139}{90} \times \frac{2}{9} = \frac{278}{810}$$

$$\frac{139}{405}$$

(4)

$\frac{1}{3}$

21. Work out $0.\dot{1}8 + 0.\dot{3} \div 0.4\dot{6}$



Give your answer as a fraction in its simplest form.

$$\begin{aligned}
 x &= 0.181818\dots \\
 100x &= 18.1818\dots \\
 99x &= 18 \\
 x &= \frac{18}{99} = \frac{2}{11}
 \end{aligned}$$

$$\begin{aligned}
 y &= 0.4666\dots \\
 10y &= 4.666\dots \\
 100y &= 46.666\dots \\
 90y &= 42 \quad y = \frac{7}{15}
 \end{aligned}$$

B
O
DM
AS

$$\frac{2}{11} + \frac{1}{3} = \frac{7}{15}$$

$$\frac{1}{3} = \frac{7}{21}$$

$$\frac{2}{11} + \frac{15}{21}$$

$$\begin{aligned}
 \frac{1}{3} \times \frac{15}{7} &= \frac{15}{21} \\
 &= \frac{5}{7}
 \end{aligned}$$

$$\frac{2}{11} + \frac{5}{7}$$

$$\frac{69}{77}$$

$$\frac{14}{77} + \frac{55}{77} = \frac{69}{77}$$

(5)

22. Work out $3^{-2} \div 0.27\dot{0}$



Give your answer as a fraction in its simplest form.

$$3^{-2} = \frac{1}{3^2} = \frac{1}{9}$$

$$x = 0.270270270270\dots$$

$$1000x = 270.270270\dots$$

$$999x = 270$$

$$x = \frac{270}{999} = \frac{30}{111} = \frac{10}{37}$$

$$\frac{1}{9} \div \frac{10}{37}$$

$$= \frac{1}{9} \times \frac{37}{10} = \frac{37}{90}$$

$$\frac{37}{90}$$

(4)