

## Topic Check In - 2.04 Ordering fractions, decimals and percentages

1. Arrange the following integers from smallest to largest: 25, -26, 134, -19, 43.
2. Arrange the following decimals from smallest to largest: 0.32, 0.302, -0.4, -0.305, 0.0035.
3. Which symbol from  $>$ ,  $<$  or  $=$  goes between  $\frac{3}{8}$  and  $\frac{1}{3}$ ? Show your working clearly.
4. Arrange the following numbers from smallest to largest:  $\frac{5}{8}$ ,  $\frac{3}{5}$ , 63%, 0.61.
5. Write down all of the integers  $n$  which satisfy the statement  $-2 < n \leq 2$ .
6. Julie thinks that because 3 is less than 18, 0.3 is less than 0.18. Explain why she is wrong.
7. Write down a decimal which is between  $\frac{3}{8}$  and  $\frac{2}{5}$ . Justify why your answer lies between these fractions.
8. A bag of apples weighs more than 0.5 kg but less than 0.51 kg. Write down a possible weight of the bag of apples as a fraction. Justify why your answer lies between 0.5 kg and 0.51 kg.
9. Use the digits 1, 2, 5 and 7 once only to form the largest possible negative 4-digit even number.
10. Find three fractions between  $\frac{1}{5}$  and  $\frac{1}{6}$ . Show your working clearly.

### Extension

a) Show that: (i)  $\frac{1}{2} < \frac{2}{3}$                       (ii)  $\frac{10}{11} < \frac{11}{12}$                       (iii)  $\frac{99}{100} < \frac{100}{101}$

- b) Complete the last three lines using the pattern in the first three.

$$2^2 - 1 = 1 \times 3$$

$$3^2 - 1 = 2 \times 4$$

$$4^2 - 1 = 3 \times 5$$

$$11^2 - 1 = \dots \times \dots$$

$$100^2 - 1 = \dots \times \dots$$

$$n^2 - 1 = (n - 1)(\dots\dots)$$

- c) Use this to show why  $\frac{n-1}{n} < \frac{n}{n+1}$ .



## Answers

1. -26, -19, 25, 43, 134
2. -0.4, -0.305, 0.0035, 0.302, 0.32
3.  $\frac{3}{8} = \frac{9}{24}$ ,  $\frac{1}{3} = \frac{8}{24}$  so  $\frac{3}{8} > \frac{1}{3}$
4.  $\frac{3}{5}$  (= 0.600), 0.61 (= 0.610),  $\frac{5}{8}$  (= 0.625), 63% (= 0.630)
5. -1, 0, 1 and 2
6.  $18 - 3 = 15$  so 3 is less than 18 but  $0.18 - 0.3 = -0.12$  so 0.3 is greater than 0.18 or student makes clear reference to place value.
7.  $\frac{3}{8} = 0.375$  and  $\frac{2}{5} = 0.4$  so  $0.375 < \text{answer} < 0.4$ .

e.g. 0.38 because  $0.38 - 0.375 = 0.005$  so  $0.375 < 0.38$ ; similarly  $0.4 - 0.38 = 0.02$  so  $0.38 < 0.4$ .

8. Any decimal which starts with the digits 0.50..., followed by a digit greater than 0, will do, which would give a fraction with denominator of 1000. Answers may be simplified

e.g.  $\frac{505}{1000} = \frac{101}{200}$ .

Justified by:  $\frac{505}{1000} - \frac{500}{1000} = \frac{5}{1000}$  so  $\frac{505}{1000} > \frac{500}{1000}$ ; similarly  $\frac{510}{1000} - \frac{505}{1000} = \frac{5}{1000}$

so  $\frac{505}{1000} < \frac{510}{1000}$ .

9. Largest negative even number is -1572.
10.  $\frac{1}{5} = \frac{6}{30} = \frac{24}{120}$ ,  $\frac{1}{6} = \frac{5}{30} = \frac{20}{120}$ , so  $\frac{21}{120}$ ,  $\frac{22}{120}$  and  $\frac{23}{120}$  would do (simplifying to  $\frac{7}{40}$ ,  $\frac{11}{60}$  and  $\frac{23}{120}$ ) but there are other answers.



# GCSE (9-1) MATHEMATICS

## Extension

a) (i)  $\frac{1}{2} = \frac{3}{6}$ ,  $\frac{2}{3} = \frac{4}{6}$  so  $\frac{1}{2} < \frac{2}{3}$       (ii)  $\frac{10}{11} = \frac{120}{132}$ ,  $\frac{11}{12} = \frac{121}{132}$  so  $\frac{10}{11} < \frac{11}{12}$

(iii)  $\frac{99}{100} = \frac{9999}{10000}$ ,  $\frac{100}{101} = \frac{10000}{10100}$  so  $\frac{99}{100} < \frac{100}{101}$

b)  $11^2 - 1 = 10 \times 12$   
 $100^2 - 1 = 99 \times 101$   
 $n^2 - 1 = (n - 1)(n + 1)$

c)  $\frac{n-1}{n} = \frac{(n-1)(n+1)}{n(n+1)} = \frac{n^2-1}{n(n+1)}$   
 $\frac{n}{n+1} = \frac{n^2}{n(n+1)}$  so  $\frac{n-1}{n} < \frac{n}{n+1}$



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Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Order positive and negative integers.			
AO1	2	Order positive and negative decimals.			
AO1	3	Compare the size of fractions.			
AO1	4	Order fractions, decimals and percentages.			
AO1	5	Understand the symbols $<$ , $\leq$ .			
AO2	6	Understand place value.			
AO2	7	Convert between fractions and decimals.			
AO2	8	Convert between decimals and fractions.			
AO3	9	Apply understanding of place value to negative integers.			
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