

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.



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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. | | | |
| AO3 | 10 | Compare the size of fractions using equivalent fractions. | | | |

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