# Year 9 Fractions and Decimals – Challenge

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Answers and worked solutions · 8 questions

## A. Think like a mathematician

1. **No. Counter-example: the reciprocal of 1/2 is 2, which is bigger.**
   Test some examples
   Counter-example: the reciprocal of 1/2 is 2, which is bigger.
   Decide whether it is always true

2. **Yes. Such a fraction can be written with a denominator that is a power of 10, e.g. 3/40 = 75/1000 = 0.075.**
   Test some examples
   Such a fraction can be written with a denominator that is a power of 10, e.g. 3/40 = 75/1000 = 0.075.
   Decide whether it is always true

3. **Change to improper fractions first: 9/2 × 16/3 = 24.**
   Error: the parts cannot be multiplied separately
   4 1/2 × 5 1/3 = 9/2 × 16/3
   = 24

4. **There are 3 decimal places in the question, so 1.2 × 0.03 = 0.036.**
   Error: the decimal point is in the wrong place
   12 × 3 = 36
   3 decimal places: 0.036

5. **Both are 22 1/2: dividing by 2/5 is multiplying by its reciprocal, 5/2.**
   There are 5/2 lots of 2/5 in 1
   So 9 ÷ 2/5 = 9 × 5/2
   = 45/2 = 22 1/2

6. **No: $24 = 2^3 \times 3$ has a prime factor 3, so the fraction is a recurring decimal.**
   $24 = 2^3 \times 3$
   In simplest form the 3 cannot cancel
   A prime factor other than 2 and 5 means recurring

7. **5 5/8 cups**
   2 1/4 × 2 1/2 = 9/4 × 5/2
   = 5 5/8 cups

8. **1 44/45**
   Order of operations, the power and × before +: $(1/3)^2 = 1/9$ and 7/5 × 4/3 = 28/15
   = 1 44/45