

## Estimating

### Starter

1. (Review of last lesson)

Round: (a) 56.607 to 3 s.f. (b) 789312 to 2 s.f. (c) 3095.83 to 3 s.f.

**Working:** (a) 56.6 : 07  
The 0 does not change the 6.  
Non-significant digits *after* the decimal point → *disappear*.  
56.607 = 56.6 to 3 s.f.

(b) 78 : 9312  
The 9 changes the 8 to a 9.  
Non-significant digits *before* the decimal point → *zeros*.  
789312 = 790000 to 2 s.f.

(c) 309 : 5.83  
The 5 changes the 9 to a 0, and the next 0 to a 1.  
Non-significant digits *before* the decimal point → *zeros*.  
Non-significant digits *after* the decimal point → *disappear*.  
3095.83 = 3100 to 3 s.f.

2. In each question (i)-(iv), you are given different ways to estimate the calculation. Decide with a partner which one would be the best way to estimate the answer. Give a reason for your answer.

(i) 203 ÷ 5.7  
(a) 200 ÷ 5 (b) 200 ÷ 6

(ii) 8.6 ÷ 0.139  
(a) 9 ÷ 0 (b) 9 ÷ 0.1 (c) 8.6 ÷ 0.1

(iii) 1.5 × 3.5  
(a) 2 × 4 (b) 1 × 3 (c) 2 × 3 (d) 1 × 4

(iv) 83.2 ÷ 8.5  
(a) 81 ÷ 9 (b) 80 ÷ 8 (c) 85 ÷ 10

**Working:** (i) (a), because the calculation can be done in your head  
Not (b), because it is difficult to do the calculation in our heads.

(ii) Not (a), because we cannot divide by 0  
(c) is probably better than (b) but (b) would also be ok.

(iii) Choose (c), because one number goes up and the other goes down

(iv) Choose (b), because both numbers go down

2. The shortest street in the UK, Ebenezer Place in Wick, is 2.06 m long. The Trans-Canada Highway, one of the world's longest roads, is approximately 7821 km in length. Approximately, how many times longer than the street is the highway?

A 4, 000,000      B 400,000      C 40,000      D 4,000      E 400

**Working:** Since 1 km = 1000 m, it follows that 7821 km = 7821 × 1000 m.  
Therefore,  $\frac{7821 \times 1000}{2.06} \approx \frac{8000 \times 1000}{2} = 4000000$   
Therefore the highway is approximately 4 000 000 times longer than the street.

**E.g. 1** Write down the calculation that is the best way to estimate these calculations. Give the estimate as well.

(a)  $8.98 \times 24.6$

(b)  $6.35^2$

(c)  $\frac{198 \times 71.6}{11.3 \times 0.83}$

(d)  $0.09 \times 59.6$

**Working:** (a)  $8.98 \times 24.6 \approx 10 \times 25 = 250$   
 $8.98 \times 24.6 \approx 9 \times 25 = 225$  might be ok but  $9 \times 25$  is harder than  $10 \times 25$

(b)  $6.35^2 \approx 6 \times 7 = 42$  is better than  $6.35^2 \approx 6 \times 6 = 36$  since one number is rounded up and the other is rounded down. We wouldn't do this though it is was  $6.1^2$ .

(c)  $\frac{198 \times 71.6}{11.3 \times 0.83} \approx \frac{200 \times 70}{10 \times 1} = 1400$

(d)  $0.09 \times 59.6 \approx 0.1 \times 60 = \frac{1}{10} \times 60 = 6$

**E.g. 2** A nautical mile is approximately 1.853 km. Estimate how many km are in 214 nautical miles.

**Working:**  $214 \times 1.853 \approx 200 \times 2 = 400$  km

**E.g. 3** An ounce is about 28.35 grams. Estimate the number of ounces in 614 grams.

**Working:**  $614 \div 28.35 \approx 600 \div 30 = 20$  ounces

**Video:** [Estimating](#)

[Solutions to Starter and E.g.s](#)

### Exercise

p75 Ex 4.6 Qu 1-10

[Textbook answers \(only available during a lockdown\)](#)