1. Berenika wants to buy 35 T-shirts.

Each T-shirt costs £5.80
Berenika does the calculation $40 \times 6 = 240$ to estimate the cost of 35 T-shirts.

(a) Explain how Berenika's calculation shows the actual cost will be less than £240

Because both values have been overestimated

(1)

There is a special offer.

T-shirts £5.80 each. Buy 30 or more T-shirts. Get 10% off the total cost.

(b) Work out the actual cost of buying 35 T-shirts using the special offer.

35 × 5·80

×	30	5
5	150	25
0·8	24	4

150
25
24
4 +
203

= £203·00

£203 = 100%.

£20·30 = 10%.

203 − 20·30 = 182·70

203·00
20·30 −
182·70

£ 182·70

(4)

(Total for Question is 5 marks)

2. Ami and Josh use a calculator to work out $\dfrac{595}{4.08^2 + 5.3}$

Ami's answer is 27.1115
Josh's answer is 271.115

One of these answers is correct.

Use approximations to find out which answer is correct.

↳ 1.S.F

$= \dfrac{600}{4^2 + 5}$

$= \dfrac{600}{16 + 5}$

$= \dfrac{600}{21}$

$= \dfrac{600}{20}$

$= \dfrac{60}{2}$

$= 30$

Ami's answer is correct because it's closest to approximate value.

(Total for Question is 3 marks)

3. A cycle race across America is 3069.25 miles in length.

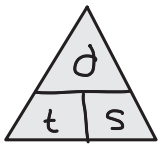
Juan knows his average speed for his previous races is 15.12 miles per hour.
For the next race across America he will cycle for 8 hours per day.

(a) Estimate how many days Juan will take to complete the race.

↳ = must use rounded values to obtain marks - do not use the values in the question

3069.25 miles → 3000 miles

15.12 mph → 15 mph



$$\text{time} = \frac{\text{distance}}{\text{speed}} = \frac{3000 \text{ miles}}{15 \text{ mph}} \quad (1)$$

$$= 200 \text{ hours}$$

$$\frac{200}{8} = 25 \text{ days} \quad (1)$$

8 hours per day

25 (1)

(3)

Juan trains for the race.
The average speed he can cycle at increases.
It is now 16.27 miles per hour.

$t = \frac{d}{s}$ $\uparrow s = \downarrow t$

(b) How does this affect your answer to part (a)?

less days required

or the answer is not affected (16.27 can be rounded down to 15 still)

time and speed are inversely proportional, so an increase in average speed results in the time taken decreasing.
So less time is required to complete the race.

(1)

(Total for Question is 4 marks)

120 × 5 = 600 minutes
1 tap takes 600 minutes
600 ÷ 3 = 200 minutes ✓

200 ✓

Each tap fills up pool at the same rate ✓

4. A plane travels at a speed of 213 miles per hour.

(a) Work out an estimate for the number of seconds the plane takes to travel 1 mile.

213 → 200

200 miles per 1 hour
200 miles per 60 minutes
200 miles per 3600 seconds ✓
÷200 ÷200
1 mile per 18 seconds ✓

18 ✓ seconds

(3)

(b) Is your answer to part (a) an underestimate or an overestimate?
Give a reason for your answer.

Overestimate, because we rounded the speed down ✓

(1)

(Total for Question is 4 marks)

5. Work out an estimate for $\dfrac{790 \times 289}{49}$

↳ round to 1.s.f

$790 \approx 800$

$289 \approx 300$

$49 \approx 50$ ✓

$$\frac{790 \times 289}{49} \approx \frac{800 \times 300}{50} = \frac{240000}{50}$$

$$= \frac{24000}{5} \checkmark$$

$$= 4800$$

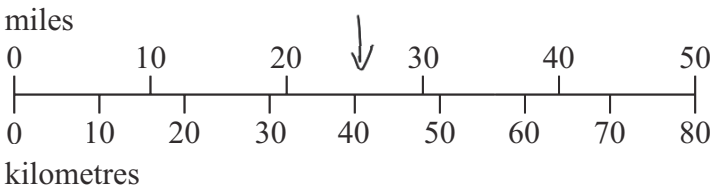
$5 \overline{)\,24000}$ → 4800

$20 \downarrow$, 40, $40 \downarrow$, 00, $0 \downarrow$, 00, 00, 0

4800 ✓

(Total for Question is 3 marks)

6. This scale can be used to change between kilometres and miles.



(a) Use the scale to change 40 kilometres to miles.

25 ✓1 miles

(1)

Here is an approximate rule to change from kilometres to miles.

Divide the distance in kilometres by 10 and then multiply by 6

(b) Use this approximate rule to change 40 kilometres to miles.

$\frac{(km)}{10} \times 6 \rightarrow \frac{40}{10} \times 6$ ✓1 $\rightarrow 4 \times 6 = 24$

24 ✓2 miles

(2)

(c) Compare your answer to part (b) with your answer to part (a).

part a) gave us 25, part b) gave us 24

The two answers are quite close ✓1

(1)

(Total for Question is 4 marks)