



3.3F Estimating: Foundation Tier Practice

EDEXCEL Edexcel 1MA1 · Calculator allowed · about 50 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Round 46 to the nearest 10.

(Total for Question 1 is 1 mark)

- 2** Round 3.76 to 1 decimal place.

(Total for Question 2 is 1 mark)

- 3** Write down the upper and lower bounds for the measurement 12 cm to the nearest centimetre.

(a) Lower bound (1)

(b) Upper bound (1)

(Total for Question 3 is 2 marks)

- 4** Estimate $298 + 127$ by rounding each number to 1 significant figure before adding.

(Total for Question 4 is 2 marks)

- 5** Estimate 6.37×4.9 by rounding each number to 1 significant figure.

(Total for Question 5 is 2 marks)

6 A small shop sells jars of jam priced at 2.49 each. A customer buys 8 jars. Use rounding to estimate the total cost. State your rounded price and the estimated total.

(a) Rounded price used (1)

(b) Estimated total cost (2)

(Total for Question 6 is 3 marks)

7 A delivery van travels 47.6 km, then 32.9 km, then 19.8 km. Estimate the total distance by rounding each distance to the nearest 10 km before adding.

(Total for Question 7 is 3 marks)

8 Estimate the value of $83 \div 4.1$ by rounding the divisor to 1 significant figure and carrying out the division. Show the rounded divisor you use.

(a) Rounded divisor used (1)

(b) Estimated quotient (3)

(Total for Question 8 is 4 marks)

- 9** A recipe needs 0.345 kg of flour for one batch. Estimate how much flour is needed for 12 batches by rounding the quantity for one batch to 1 significant figure first.

(Total for Question 9 is 4 marks)

- 10** A school orders 156 exercise books priced at 1.95 each. The finance team decide to estimate the total cost by rounding the price to the nearest whole pound and rounding the number of books to 2 significant figures. Give the estimated cost.

(a) Rounded price and rounded number of books used (2)

(b) Estimated total cost (2)

(Total for Question 10 is 4 marks)

- 11** You have three measurements: 4.87 m, 5.12 m and 4.95 m. Use appropriate rounding to estimate the mean (average) of these three measurements. State your rounding and your estimated mean.

(a) State the rounded values you will use (2)

(b) Calculate the estimated mean using your rounded values (4)

(Total for Question 11 is 6 marks)

12 Stretch question. A gardener needs to buy soil. Bags are labelled 18.6 kg. He plans to buy 9 bags. He estimates using upper and lower bounds for one bag to give a range for the total mass of soil he will have. Work out the lower and upper bounds for the total mass of 9 bags, giving your answers to 3 significant figures where appropriate. Show your working clearly.

(a) Write the lower and upper bounds for one bag labelled 18.6 kg to the nearest 0.1 kg. (2)

(b) Find the lower bound for the total mass of 9 bags. Give your answer to 3 significant figures. (3)

(c) Find the upper bound for the total mass of 9 bags. Give your answer to 3 significant figures. (3)

(Total for Question 12 is 8 marks)

Mark scheme · 3.3F Estimating: Foundation Tier Practice

Question 1

- **B1** 50 cao
- **Answer: 50 (nearest 10). Check: 46 rounds up to 50 because the units digit 6 $\geq$ 5.**

Question 2

- **B1** 3.8 cao
- **Answer: 3.8 (1 decimal place). Check: 3.76 $\rightarrow$ 3.8 because hundredths 6 $\geq$ 5.**

Question 3

- (a) **B1** 11.5 cm oe
- (a) **Answer: 11.5 cm**
- (b) **B1** 12.5 cm oe
- (b) **Answer: 12.5 cm**

Question 4

- **M1** round 298 $\rightarrow$ 300 and 127 $\rightarrow$ 100 or state both rounded values
- **A1** 400 cao
- **Answer: 400. Working: 298 $\rightarrow$ 300, 127 $\rightarrow$ 100, 300 + 100 = 400. Check: rounded values 300 and 100 sum to 400.**

Question 5

- **M1** round 6.37 $\rightarrow$ 6 and 4.9 $\rightarrow$ 5 or equivalent 1 sf rounding
- **A1** 30 cao
- **Answer: 30. Working: 6.37 $\rightarrow$ 6, 4.9 $\rightarrow$ 5, $6 \times 5 = 30$. Check: product 30.**

Question 6

- (a) **B1** 2.5 cao
- (a) **Answer: 2.5**
- (b) **M1** multiply rounded price by 8, e.g. 2.5×8
- (b) **A1** 20.0 or 20 pounds cao
- (b) **Answer: £20.00**

Question 7

- **M1** round 47.6 $\rightarrow$ 50, 32.9 $\rightarrow$ 30, 19.8 $\rightarrow$ 20 or state rounded values
- **M1** add rounded values
- **A1** 100 km cao
- **Answer: 100 km. Working: 47.6 $\rightarrow$ 50, 32.9 $\rightarrow$ 30, 19.8 $\rightarrow$ 20; $50 + 30 + 20 = 100$. Check: exact total 100.3 km so estimate 100 km is sensible.**

Question 8

- (a) **B1** 4.0 oe
- (a) **Answer: 4.0**
- (b) **M1** divide 83 by rounded divisor 4.0 or equivalent method
- (b) **M1** show calculation $83 \div 4 = 20.75$ or state intermediate
- (b) **A1** 20.8 awrt or 21 oe
- (b) **Answer: Approximately 20.8 (using 4.0). Working: $83 \div 4.0 = 20.75$ so estimate 20.8 or 21. Check: exact $83 \div 4.1 = 20.244...$, using 4 gives 20.75 so 20.8 awrt is acceptable.**

Question 9

- **M1** round 0.345 to 0.3 or 0.35 depending on 1 sf instruction (1 sf gives 0.3)
- **M1** multiply rounded amount by 12
- **A1** 3.6 kg cao if using 0.3
- **B1** allow 4.2 kg if candidate rounds to 0.35 and gets 4.2 oe (follow through)
- **Answer: Using 1 significant figure: 0.345 → 0.3 so $0.3 \times 12 = 3.6$ kg (estimate). Check: exact $0.345 \times 12 = 4.14$ kg, so 3.6 is the estimate when rounding to 1 sf.**

Question 10

- (a) **B1** price rounded to £2.00 cao
- (a) **B1** 156 to 2 sf = 160 oe
- **(a) Answer: Price = £2.00, Number = 160**
- (b) **M1** multiply rounded values 2×160
- (b) **A1** £320 cao
- **(b) Answer: £320**

Question 11

- (a) **B1** round values to 1 dp or 1 sf given a clear choice (eg 4.9, 5.1, 5.0)
- (a) **B1** state the chosen rounded numbers explicitly
- **(a) Answer: Use 4.9, 5.1 and 5.0 (rounded to 1 dp).**
- (b) **M1** add the rounded values correctly
- (b) **M1** divide the sum by 3 or show method to find mean
- (b) **A1** 4.999... oe or 5.0 awrt
- (b) **B1** allow 5.0 cao as final rounded estimate
- **(b) Answer: Estimated mean = 5.0. Working: $4.9 + 5.1 + 5.0 = 15.0$; $15.0 \div 3 = 5.0$.**

Question 12

- (a) **B1** lower bound 18.55 kg oe
- (a) **B1** upper bound 18.65 kg oe
- **(a) Answer: Lower bound (one bag) = 18.55 kg, Upper bound (one bag) = 18.65 kg**
- (b) **M1** multiply lower bound for one bag by 9
- (b) **M1** show calculation $18.55 \times 9 = 166.95$
- (b) **A1** 167 kg awrt to 3 sf
- **(b) Answer: Lower bound total = 166.95 kg → 167 kg to 3 sf**
- (c) **M1** multiply upper bound for one bag by 9
- (c) **M1** show calculation $18.65 \times 9 = 167.85$
- (c) **A1** 168 kg awrt to 3 sf
- **(c) Answer: Upper bound total = 167.85 kg → 168 kg to 3 sf**