3.3D Estimating: Fluency and Exam Drill

Total Marks

EDEXCEL Edexcel 1MA1 · Calculator allowed · about 40 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Round 47 to 1 significant figure.

(Total for Question 1 is 1 mark)

2 Round 0.083 to 1 significant figure.

(Total for Question 2 is 1 mark)

3 Round 359 to 1 significant figure.

(Total for Question 3 is 1 mark)

4 Round 0.0067 to 1 significant figure.

(Total for Question 4 is 1 mark)

5 Estimate 47 + 86 + 392 by rounding each number to 1 significant figure, then adding.

(Total for Question 5 is 2 marks)

6 Estimate 12.7×3.9 by rounding each number to 1 significant figure, then multiply.

(Total for Question 6 is 2 marks)

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7 Estimate $0.049 \div 0.012$ to 1 significant figure. Show your rounding and the calculation.

(Total for Question 7 is 2 marks)

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8 A delivery van has load mass 1270 kg. Each parcel has mass about 3.6 kg. Using 1 significant figure for each value, estimate how many parcels the van could carry.

(Total for Question 8 is 3 marks)

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9 A square rug has side length 4.8 m. Estimate the area by rounding the side to 1 significant figure, and state whether your estimate is an over-estimate or an under-estimate of the exact area.

(Total for Question 9 is 2 marks)

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10 A small cylinder has radius 1.4 cm and height 12 cm. Estimate its volume to 1 significant figure for each measurement. Give your estimate (to 3 significant figures where appropriate) and say whether it is an over- or under-estimate.

(Total for Question 10 is 3 marks)

11 A bakery uses 18.7 g of yeast for each loaf. They bake 320 loaves. Use 1 significant figure to estimate the total mass of yeast used and state whether this estimate is an over-estimate or an under-estimate.

(Total for Question 11 is 3 marks)

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12 The prices of three dishes are £4.95, £12.40 and £23.80. Estimate the total cost by rounding each price to 1 significant figure. Give your estimate and explain whether it is likely to be an over-estimate or an under-estimate.

(Total for Question 12 is 4 marks)

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13 Estimate 246 × 78 by rounding each number to 1 significant figure before multiplying.

(Total for Question 13 is 2 marks)

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14 Estimate 5325 ÷ 18 by rounding each number to 1 significant figure before dividing.

(Total for Question 14 is 2 marks)

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15 A large cylindrical water tank has radius 3.6 m and height 8.4 m. Estimate the volume using 1 significant figure for radius and height. State whether your estimate is an over-estimate or an under-estimate.

(Total for Question 15 is 3 marks)

16 A model car travels at 14.6 m/s for 3.2 s. Estimate the distance travelled by rounding both values to 1 significant figure. Say whether your estimate is likely to be an over-estimate or an under-estimate.

(Total for Question 16 is 3 marks)

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17 Three wooden boards measure 4.12 m, 6.89 m and 5.47 m. Using 1 significant figure for each length, estimate the total length required and decide how many 5 m rolls of material the builder should buy. Show your working.

(Total for Question 17 is 4 marks)

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18 Round 0.995 to 1 significant figure.

(Total for Question 18 is 1 mark)

Mark scheme · 3.3D Estimating: Fluency and Exam Drill

Question 1

- **B1** 50 cao
- **Answer: 50 (to 1 s.f.)**

Question 2

- **B1** 0.08 cao
- **Answer: 0.08 (to 1 s.f.)**

Question 3

- **B1** 400 cao
- **Answer: 400 (to 1 s.f.)**

Question 4

- **B1** 0.007 cao
- **Answer: 0.007 (to 1 s.f.)**

Question 5

- **M1** round 47->50, 86->90, 392->400 and set up the addition oe
- **A1** 540 cao
- **Answer: 540**

Question 6

- **M1** round 12.7->10 and 3.9->4 and multiply oe
- **A1** 40 cao
- **Answer: 40**

Question 7

- **M1** round 0.049->0.05 and 0.012->0.01 and set up division oe
- **A1** 5 cao
- **Answer: 5**

Question 8

- **M1** round total mass 1270->1000 to 1 s.f.
- **M1** round parcel mass 3.6->4 to 1 s.f. and divide 1000/4 oe
- **A1** 250 cao
- **Answer: 250 parcels**

Question 9

- **M1** round 4.8->5 and calculate area 5×5 oe
- **A1** 25 and over-estimate cao
- **Answer: Estimated area = 25 m^2; this is an over-estimate**

Question 10

- **M1** round radius 1.4->1 and height 12->10 to 1 s.f.
- **M1** use $V = \pi r^2 h$ and substitute to give $V = \pi \times 1^2 \times 10 = 10pi$
- **A1** 31.4 cm^3 awrt and under-estimate cao
- **Answer: Approximately 31.4 cm^3 (under-estimate)**

Question 11

- **M1** round 18.7->20 g and 320->300 to 1 s.f.
- **M1** multiply 20 × 300 = 6000 g
- **A1** 6000 g cao; over-estimate (6000 > exact 5984 g) oe
- **Answer: 6000 g (6.0 kg), over-estimate**

Question 12

- **M1** round 4.95->5, 12.40->10, 23.80->20 to 1 s.f.
- **M1** add the rounded values 5 + 10 + 20
- **M1** state whether under/over with reason, e.g. two numbers were rounded down and one up so total is likely down
- **A1** 35 pounds cao
- **Answer: £35; under-estimate (net rounding down)**

Question 13

- **M1** round 246->200 and 78->80 to 1 s.f. and multiply oe
- **A1** 16000 cao
- **Answer: 16000**

Question 14

- **M1** round 5325->5000 and 18->20 to 1 s.f. and divide oe
- **A1** 250 cao
- **Answer: 250**

Question 15

- **M1** round radius 3.6->4 and height 8.4->8 to 1 s.f.
- **M1** substitute into $V = \pi r^2 h$ to give $V = \pi \times 4^2 \times 8 = 128pi$
- **A1** 402.1 m^3 awrt; over-estimate cao
- **Answer: Approximately 402.1 m^3; over-estimate**

Question 16

- **M1** round 14.6->10 and 3.2->3 to 1 s.f.
- **M1** multiply 10 × 3 = 30 oe
- **A1** 30 m cao; under-estimate
- **Answer: 30 m; under-estimate**

Question 17

- **M1** round 4.12->4, 6.89->7, 5.47->5 to 1 s.f.
- **M1** add rounded lengths 4 + 7 + 5 = 16 m
- **M1** divide by roll length 16/5 = 3.2 and use correct method to find number of rolls
- **A1** 4 rolls cao
- **Answer: Estimated total 16 m, so 4 rolls**

Question 18

- **B1** 1.0 or 1 cao
- **Answer: 1.0 (to 1 s.f.), i.e. 1**