

Y9 Maths

Unit 7 Test

Accuracy and Measures

Name: Markscheme.

CALCULATORS ARE ALLOWED



- 1 Work out the speed, in metres per second, of a chipmunk which travelled 25 m in 2.7 seconds.

$$\text{Speed} = \frac{25}{2.7} \text{ m/s}$$

$$= 9.259 \text{ m/s}$$

(A1)

9.259 m/s

(2 marks)



- 2 A force of 65N is applied to an area of 12 cm². if pressure = $\frac{\text{Force}}{\text{Area}}$, calculate the pressure in N/cm². Give your answer to 1 decimal place.

$$P = \frac{F}{A}$$

$$P = \frac{65}{12}$$

$$P = 5.41666$$

$$P = 5.4 \text{ (dp)}$$

(A1)

5.4 g/cm³

(3 marks)



- 3 A satellite travelling at a constant speed travels 480 km in 1 minute. Calculate its speed in km/h.

$$1 \text{ min} = 480 \text{ km}$$

$$60 \text{ min} = 480 \times 60$$

$$= 28800$$

$$\text{Speed} = 28800 \text{ km/h}$$

(A1)

28800 km/h

(3 marks)



- 4 The fastest jet-ski can travel at 128 km/h. What is this in metres per second?

$$128 \text{ km/h} = 128 \times 1000 \text{ m/h}$$

$$= 128 \times \frac{1000}{60 \times 60}$$

$$= 35.5 \text{ m/s}$$

(M1)

(M1)

(A1)

35.5 m/s

(3 marks)



- 5 In 1954, Roger Bannister set an outstanding running record, being the first person to run 1 mile in under 4 minutes. His actual time was 3 mins 59.4 secs.

In 2013, Mo Farah ran the 1500 metres race in 3 mins 28.81 secs.

Given that 1 mile = 1609 metres work out the average speeds of both runners in m/s.

Roger

$$3 \text{ mins } 59.4 \text{ s} = 239.4 \text{ s} \quad (\text{m})$$

$$\text{Speed} = 1609 \div 239.4 \\ = 6.72 \text{ m/s.}$$

Mo

$$3 \text{ mins } 28.81 \text{ s} = 208.81 \text{ secs.} \quad (\text{m})$$

$$\text{Speed} = 1500 \div 208.81 \\ = 7.18 \text{ m/s.}$$

Roger Bannister = 6.72 m/s A₁

Mo Farah = 7.18 m/s A₁

(4 marks)

- 6 a A local newspaper stated that 66 000 people had attended a football match. The number 66 000 had been rounded to the nearest thousand.

Write down the lower and upper bounds of this number.

i lower bound

ii upper bound

65 500 A₁
66 500 A₁

- b A different newspaper stated that 66 100 people had attended the match, having rounded to the nearest hundred.

What is

i the lower bound

ii the upper bound?

66 050 A₁
66 150 A₁

(4 marks)

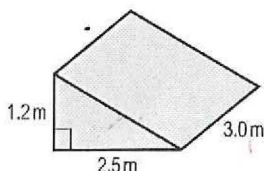
- 7 The upper and lower bounds for the weight, x kg, of an elephant are given as $4950 \leq x < 5050$. Work out the degree of accuracy that the elephant was weighed to.

Nearest 100 kg. A₁

(1 mark)



- 8 This diagram shows a skateboard ramp. It is made up of solid concrete with a density of 2400 kg/m^3 . Calculate the mass of the skateboard ramp.



$$\text{Volume} = \left(\frac{1.2 \times 2.5}{2} \right) 3$$

$$= 4.5 \text{ m}^3 \quad (M_1)$$

$$\text{mass} = \text{Density} \times \text{Volume}$$

$$= 2400 \times 4.5 \quad (M_1)$$

$$= 10800$$

$$\dots\dots\dots 10800 \dots\dots\dots \text{kg}$$

(3 marks)



- 9 $w = 37$ and $v = 21$, both rounded to the nearest whole number.

- a Find the greatest possible value of wv .

$$wv = \text{greatest} \times \text{greatest}$$

$$= 37.5 \times 21.5 \quad (M_1)$$

$$= 806.25$$

$$\dots\dots\dots 806.25 \dots\dots\dots (A_1)$$

- b Find the least possible value of $w^2 - v$.

$$w^2 - v = \text{least} - \text{greatest}$$

$$w^2 = 36.5^2 \quad (M_1)$$

$$w^2 - v = 1332.25 - 21.5 \quad (M_1)$$

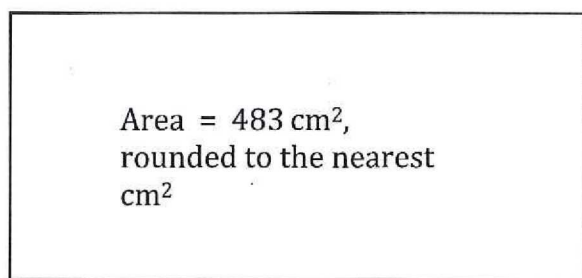
$$= 1310.75$$

$$\dots\dots\dots 1310.75 \dots\dots\dots (A_1)$$

(5 marks)



- 10 Work out the greatest possible length of this rectangle.



$$\text{Length} = \frac{\text{greatest area}}{\text{Smallest Width}}$$

$$= \frac{483.5}{17.75} \quad (M_1)$$

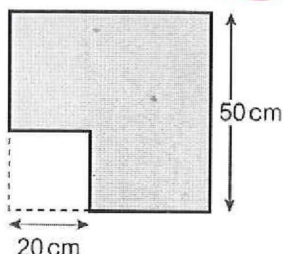
$$= 27.24_4 \text{ cm} \quad (M_1)$$

$$27.2 \quad (\text{Accept } 27.24 \text{ or } 27) \quad (A_1)$$

(3 marks)



- 11 This diagram shows a square of paper. Another square has been cut out of the corner. Both measurements are correct to the nearest cm. Calculate the upper bound for the area of the paper remaining.



Greatest Area Whole Square - Smallest area of missing square

$$50.5 \times 50.5 = 2550.25$$

$$19.5 \times 19.5 = 380.25$$

$$2550.25 - 380.25 = 2170 \text{ cm}^2$$

(5 marks)



- 12 A loaded lorry can travel 8 miles, to the nearest mile, on one gallon of diesel. The driving distance from Dubai to Muscat is 240 miles, to the nearest 10 miles. A driver has 33 gallons of diesel in the tank. Can he definitely complete the journey from Dubai to Muscat?

(you must show your working)

Can travel minimum 7.5 miles per gallon.

$$33 \times 7.5 = 247.5 \text{ miles.}$$

Distance from Dubai to Muscat is maximum 245 miles.

A1 Yes he can travel because $247.5 > 245$

(4 marks)

[TOTAL 40 MARKS]

CHALLENGE QUESTION

(a)

9.719 4 B2 for any 4 of 4.505, 1.25, 29.5, 4.495, 1.35, 30.5 seen

(B1 for any two or three seen)

B1 for 11.710 – 11.7103

5

(b) Round, until lower and upper bounds agree 10 1 B1 for 10 + reason "they agree to this level of accuracy"