

Year 11 Essentials

Major Test 1

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Resources allowed: Calculator and 1 page of notes

Show your working – points will be lost for no working out!

Total Marks: /45

Total Time: 45mins

Weighting:

1. A car is moving at 500m every 30 seconds. Convert this to the following units. [1,1,1,1]

a) Metres per second

$$500 \div 30 = 16.67 \text{ m/s}$$

b) Metres per minute

$$500 \times 2 = 1000 \text{ m/min}$$

$$16.67 \times 60$$

c) Metres per hour

$$1000 \times 60 = 60000 \text{ m/hr}$$

d) Kilometres per hour.

$$60000 \div 1000 = 60 \text{ km/hr}$$

2. What are the units you would use to measure the speed of; [1,1,1,1]

a) a helicopter

Km/hr or knots

b) someone running

m/s m/min

c) a motorbike

Km/hr m/s

d) a snail

cm/hr mm/min

Any other sensible suggestion allowed.

3. While flying to Bali, a Boeing 747 jumbo jet uses fuel at about 11 litres per km. Show working out for each section. [1,2,2,1,1]

a) how much fuel is needed for the flight to Bali if it is a distance of 2,582km.

$$11 \times 2582 = 28402 \text{ litres}$$

b) If the Boeing 747 carries 50,000 litres of fuel, what percentage of the aeroplanes fuel is used on the flight?

$$\frac{28402}{50,000} \times 100 = 56.8\%$$

1 mark for working out
1 mark for answer

- c) If the aeroplanes fuel is stored in 15 tanks of equal size, how many of the tanks are emptied during the flight (round to 1d.p.)?

$-\frac{1}{2}$ for wrong rounding $50\ 000 \div 15 = 3\ 333$ litres per tank. 1 mark
 $28\ 402 \div 3\ 333 = \underline{8.5}$ tanks emptied. 1 mark

- d) If the fuel used cost \$1.90 per litre, calculate the cost of the fuel used for the entire flight to the nearest \$1?

$$28\ 402 \times \$1.90$$

$$= \$53\ 964$$

- e) If the flight holds an average of 350 passengers, what is the cost per person (to the nearest \$1) for fuel for the entire flight?

$$\$53\ 964 \div 350$$

$$= \$154 \text{ per passenger.}$$

5. Use leading digit estimation to answer these. **DO NOT GIVE EXACT ANSWERS.** Show working out. [1,1,1,1]

- a) 345×47

$$300 \times 50$$

$$= 15\ 000$$

- b) $456 + 209 + 198$

$$500 + 200 + 200 = 900$$

- c) $379 \div 42$

$$400 \div 40 = 10$$

- d) $6656 - 1982$

$$7000 - 2000 = 5000$$

6. a) GST of 10% needs to be added to all the following prices. What will the final prices be once GST has been added? Show working out. [1,1]

- a) \$5.60

$$\$5.60 + 56c = \$6.16$$

b) \$122

$$122 + 12.2 = \$134.20$$

b) A shop is advertising a sale. Given the original prices calculate the sales price for each of the following. [1,1]

a. \$210 discounted by $\frac{1}{3}$

$$210 - 210 \times \frac{1}{3} = \$140 \quad \text{or} \quad 210 \times \frac{2}{3} = \$140$$

b. \$45 discounted by 15%

$$45 - 45 \times \frac{15}{100} = \\ 45 - 6.75 = \$38.25$$

7. Michelle is selling biscuits at a weekend stall. You can get one biscuit for \$0.75 or for \$7 you can get a box of 12 biscuits. Show working out. [2,2,2]

a) What is the cost ^{in \$} per biscuit in the 12 biscuit box (to 2d.p)?

$$\$7 \div 12 = \$0.58$$

$-\frac{1}{2}$ for incorrect rounding

^{want to}
b) If you buy 12 biscuits, how much do you save by getting a box instead of buying individually?

$$12 \times 0.75 = \$9$$

$$\$9 - \$7 = \$2$$

c) You are having a party and want to buy 30 biscuits, what is the cheapest way of buying them? Show your working to explain your answer.

$$30 \times \$0.75 = \$22.50$$

$$2 \times \$7 + 6 \times \$0.75 = \$18.50$$

$$3 \times \$7 = \$21.00$$

2 boxes + 6 single biscuits

1 mark for correct answer
& mark for working that shows they checked it was the cheapest

8. To calculate the number of calories we need each day we use the Base Metabolic rate formula.

For males **BMR = 66 + (13.7 x weight) + (5 x height) - (6.8 x age)**

For females **BMR = 655 + (9.6 x weight) + (1.8 x height) - (4.7 x age)**

- a) Steve is a 25 year old male who weighs 73kg and is 182 cm. How many calories does he need each day? [2]

$$66 + (13.7 \times 73) + (5 \times 182) - (6.8 \times 25) = 1806.1 \text{ calories}$$

- b) To convert his calories to Kilojoules he needs to multiply his answer by 4.182. How many kilojoules does Steve require (to the nearest kJ)? [1]

$$1806.1 \times 4.182 = 7553 \text{ kJ}$$

$-\frac{1}{2}$ for incorrect rounding

- c) How many kilojoules does Steve use every hour (rounded to the nearest kJ)? [1]

$$7553 \div 24 = 314.7 = 315 \text{ kJ}$$

$-\frac{1}{2}$ for incorrect rounding

- d) Steve has an office job and spends most of his day sitting down. However he does ride to and from work each day. He estimates he does the following activities over a 24 hour period.

- 7 hours sleeping
- Sitting or standing 12 hours
- Riding to or from work at a moderate pace for a total of 1 hour a day
- Cleaning the house and other chores 2 hours
- Walking around slowly 2 hours

Use the list of multipliers below to calculate his exact daily energy needs. [4]

Physical Activity Level	Multiplier
Sleep	1.0
Sitting or standing	1.5
Walking Slowly	3.0
Cleaning and light household chores	4.0
Cycling at a moderate pace	8.0

$$\begin{array}{rcl}
 7 & = & 2205 \\
 12 & = & 5670 \\
 2 & = & 1890 \\
 2 & = & 2520 \\
 1 & = & 2520 \\
 \hline
 & & 14805
 \end{array}$$

-1 for each error.

14 805 kJ

- e) Using a Kilojoule counting app, Steve estimates he eats around 13,500kJ per day. Would you expect him to gain or lose weight? Explain your answer. [2]

Since he eats less kilojoules than he uses he should lose weight.

1 mark for correct answer
1 mark for a reasonable explanation

9. Mark earns \$20 per hour. He works 36 hours a week at regular pay and another 10 hours a week at time and a half. Melissa earns \$4600 per month.

Express both pays as a weekly rate and state who earns the most money. Show working out. [3]

Mark

$$\$20 \times 36 = 720$$

$$\$20 \times 10 \times 1.5 = 300$$

$$\underline{1020}$$

1 mark for each weekly rate
1 mark for answering question

$$4600 \div 4 = \$1150$$

OR

$$4600 \times 12 \div 52 = \$1062$$

Answer may vary depending on how they have been taught this

10. Calculate the following. Show working out. [1,1,1]

a) $4(3 + 2) \div 2^2 =$

$$= 4(5) \div 4$$

$$= 20 \div 4$$

$$= 5 \quad \checkmark$$

b) $4 + 3(2)^2 - 4 \times 4 =$

$$4 + 3 \times 4 - 16$$

$$= 4 + 12 - 16$$

$$= 16 - 16 = 0 \quad \checkmark$$

c) $((4^2 - 3^2)^2 + 2) \div (6 - 3) =$

$$= ((16 - 9)^2 + 2) \div (3)$$

$$= (5^2 + 2) \div 3 \quad \checkmark$$

$$= 27 \div 3$$

$$= 9$$

