Topics covered: It would be a good idea to use these as sub-headings on your 1 page of notes

- Rates
  - Converting rates into different units
  - Appropriate unit of rates
  - Using rates in practical situations
  - Unitary method
- Number review
  - Leading digit estimation
  - Solve problems relating to percentage increase/decrease and profit/loss eg discounts, GST
  - Best buy problems
  - Using formulas- substituting
  - BIDMAS- order of operations

In major tests you will be using the knowledge you have reviewed over the past 7 weeks and applying it in real-life situations.

1. Convert:
   a. 60 km/h to m/s

   $16.67m/s$

   $\dfrac{60 \times 1000}{60 \times 60 \times 60} = 16.67 \text{ km/s}$

   b. 40 m/s to km/h

   $\dfrac{40m}{1s} \overset{\times 60}{=} \dfrac{2400m}{1m} \overset{\times 60}{} = \dfrac{144000m}{1hr} \overset{\div 100}{} = 144 \text{ km/hr}$

2. The maximum speed of an escalator in a commercial building is set at 0.4m/s. Convert this to the following units.

   a) Metres per minute

   $\dfrac{0.4m}{1s} \overset{\times 60}{\underset{\times 60}{}} = \dfrac{24m}{1min} \quad \therefore 24m/min$

   b) Metres per hour

   $\dfrac{0.4m}{1s} \overset{\times 60}{\underset{\times 60}{}} = \dfrac{24m}{1min} \overset{\times 60}{\underset{\times 60}{}} = \dfrac{1440m}{1hr} \quad 1440m/hr$

   c) Kilometres per hour.

   $\dfrac{1440m}{1hr} \overset{\div 1000}{} = 1.44 \text{ km/hr}$

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.

a) $15.40

0.1×15.40
$= \$1.54$

$\therefore 15.40 + 1.54$
Final price $= \$16.94$

b) $145

0.1×145
$= \$14.50$

$\therefore 145 + 14.50$
Final price $= \$159.50$

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

a. $22 discounted by 1/4

0.25×22
$= \$5.50$

$22 - 5.50$
$= \$16.50$

b. $85 discounted by 7.5%

85×0.075
$= \$6.38$

$85 - 6.38$
$= \$78.62$

7. For each question, calculate the unit rate for each option and determine which one is the BEST buy. Write your final choice in the last column.

The first one is done as an example for you to follow Round all answers to TWO decimal places if necessary

	Option 1	Option 2	Unit Rate 1	Unit Rate 2	BEST BUY
Question #1	3 batteries for $4.80	12 batteries for $14.76	$4.80 / 3 = $1.60	$14.76 / 12 = $1.23	OPTION # 2 (cheaper)
Question #2	22 staplers for $330	4 staplers for $80	330/22 =$15	80/4 =$20	option 1 is cheaper
Question # 3	5 calculators for $105	24 calculators for $552	105/5 =$21	552/24 =$23	option 1 is cheaper

2. What are the units you would use to measure the speed of;

a) a car

$km/hr.$

b) running race

m/s

d) a worm

cm/hr

3. Lauren's parents have aCommodore that has a fuel consumption rate of 11.5L/100km on city cycle and 7.5L/100km in highway cycle.

a. If they purchase petrol at 82.5c/L, how much will it cost them for fuel to travel 450km in the country (highway cycle)?

$$\frac{7.5L \;^{\times 4.5}\; \overbrace{33.75L}}{100km \quad 450km}$$
$\times 4.5$

$\therefore\ 33.75 \times 0.825$
$= \$27.84$

b. How far could they travel in the country with a 55L fuel tank?

$$\frac{7.5L \;\overline{\times 7.33}\; \cancel{55}\; 5}{100L \quad \underbrace{733km}}$$
$\times 7.33$

733km with 55L in fuel tank.

c. If they purchase petrol at 75.5c/L, how much will it cost them for fuel to travel 450km in the city (city cycle)?

$$\frac{11.5L \;\;4.5\; \overbrace{51.75L}}{100km \quad 450}$$
$\times 4.5$

51.75×0.755
$= \$39.07$

d. How far could they travel in the city with a 55L fuel tank?

$$\frac{11.5L \;^{\times 4.78}\; 55L}{100km \quad \underbrace{478}}$$
$\times 4.78$

478km with 55L in fuel tank.

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

a) 147 x 67

100×70
$= 7000$

b) 318 + 408 + 97

$300 + 400 + 100$
$= 800$

c) 480 ÷ 52

$500 \div 50$
$= 10$

d) 5786 – 1792

$6000 - 2000$
$= 4000$

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) Toby is a 37 year old male who weighs 100kg and is 181 cm. How many calories does he need each day?

$$BMR = 66 + (13.7 \times 100) + (5 \times 181) - (6.8 \times 37)$$
$$= 66 + 1370 + 905 - 251.6$$
$$= 2089.4 \text{ calories}$$

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)?

$$2089.4 \times 4.182 = 8737.87$$
$$= 8738 kJ$$

c) How many kilojoules does Toby use every hour (rounded to the nearest kj)?

$$8738 kJ \div 24$$
$$= 364.08 kJ/hr.$$

d) Toby is a computer programmer who has an office job and spends most of his day sitting down. However he does casually walk to and from work each day. He estimates he does the following activities over a 24 hour period.
- 6 hours sleeping
- Sitting or standing 12 hours
- Walking to or from work at a slow pace for a total of 1 hour a day
- Cleaning the house and other chores 1 hour

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

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

$$TEE = (1 \times 6) + (12 \times 1.5) + (1 \times 3) + (1 \times 4)$$
$$= 6 + 18 + 3 + 4$$
$$= 31$$

$$31 \times 364.08$$
$$TEE = 11286.48 kJ \text{ in } 24hrs.$$

9. Shannon earns $20 per hour. She works 24 hours a week at regular pay and another 8 hours a week at time and a half. Luke earns $5600 per month.

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

Shannon

Time+half
= 20+10
= $30/hr

$(24 \times \$20) + (8 \times \$30)$
$= 480 + 240$
$= \$720/week$.

Luke

$5600 \div 4$
$= \$1400/week$.

Luke earns more.

10. Calculate the following. Show working out.

a) $14 + 19 \times 10 \div 5 =$

$= 14 + 190 \div 5$
$= 14 + 38$
$= 52$

b) $((5+4)^2 + 4) + 12 - 3^2 =$

$(9^2 + 4) + 12 - 3^2$
$= 81 + 4 + 12 - 3^2$
$= 81 + 4 + 12 - 9$
$= 88$