


Name:			Date: _____
Teacher:			
 <b>Baldivis</b> Secondary College	<b>Year 11 Mathematics Essentials</b>		<b>SCORE:        /40</b>
	<b>Topic – Percentages, Ratios and Rates</b>		
<p align="center"><b><u>Full working out MUST be shown to get full marks for each question.</u></b></p>			
<b>Total Time:</b>	50 minutes		
<b>Weighting:</b>	4 %		
<b>Equipment:</b>	To be provided by the student: Pens and Pencils, scientific calculator, A4 page of notes.		

1. Hillzeez Surf Shop is having a Winter Sale to clear out their Summer gear.

a. If a T-shirt that normally costs \$40 is on sale for 15% off, what is the new sale price? [1 mark]

$$\$40 \times 0.85 = \$34$$

b. Oakley sunglasses used to cost \$250 but are now \$195. What percentage discount is this? [1 mark]

$$\text{discount} = \$55$$

$$= \frac{55}{250} = 22\%$$

c. A pair of Scuba fins is marked down by 30% and now costs \$80. What was the original cost? [1 mark]

$$\$80 \div 0.7 = \$114.29$$

d. Snorkel masks were originally \$49 and were marked down by 25%, but after two weeks they hadn't sold so they were marked down by 25% again. What is the sale price now? [2 marks]

$$\$49 \times 0.75 \times 0.75 = \$27.56$$

e. What is the total percentage discount on the snorkel mask after both discounts? [1 mark]

$$\begin{aligned} & (0.75)^2 = 0.5625 \\ & = 56.25\% \end{aligned}$$

$$\begin{aligned} & \text{or } \frac{49 - 27.56}{49} \\ & = 43.75\% \end{aligned}$$

$$\begin{aligned} \text{So discount} &= 100 - 56.25 \\ &= 43.75\% \end{aligned}$$

## 2. Investing and saving

- a. A bank offers 3% per annum interest on deposits for six months. If Heidi invests \$5000 how much interest will she receive at the end of six months? [2 marks]

$$I = PRT$$

$$= 5000 \times 0.03 \times 0.5$$

$$= \$75$$

- b. Chris owes \$4000 on his credit card but can only pay back \$2000 on time, so has to pay interest on the remainder. If the interest rate is 18% p.a. how much interest does he have to pay after the first month? [2 marks]

$$\text{Balance} = \$4000 - \$2000$$

$$= \$2000$$

$$I = 2000 \times \frac{0.18}{12} \times 1$$

$$= \$30$$

$$I = PRT = 2000 \times 0.18 \times \frac{1}{12} = \$30$$

- c. Tiara has been saving her pay for ten years and has managed to save \$80,000. If she invests that money in shares that pay her 6% p.a. how much money would she receive each year? [2 marks]

$$I = PRT$$

$$= 80\,000 \times 0.06 \times 1$$

$$= \$4800$$

- d. Jaykob would like to retire early and has worked out that he needs \$3000 per month to live on. If the bank will pay 3% p.a. on deposits how much would he have to save up in order to retire? [2 mark]

$$P = \frac{I}{RT}$$

$$= \frac{3000}{0.03 \div 12}$$

$$= \$1\,200\,000$$

$$\$3000/\text{mo} = \$36\,000/\text{yr}$$

$$P = \frac{36000}{0.03}$$

$$= \$1\,200\,000$$

## 3. Ratios

- a. In a class of 40 students there are 15 girls; write this as a simplified ratio of boys to girls. [2 marks]

$$B:G$$

$$25:15$$

$$5:3$$

- b. What fraction of the class are girls? [1 mark]

$$\frac{15}{40} = \frac{3}{8}$$

- c. What percentage of the class was boys? [1 mark]

$$\frac{25}{40} = \frac{5}{8} = 62.5\%$$

d. How many girls would need to join the class to make the ratio 1:1? [1 mark]

10 girls, to make 25:25

4. Three friends bought a lottery ticket that cost \$20; Sophie put in \$10, Karen paid \$6 and Tony paid \$4. They agreed that if they won anything they would split it in the ratio of the money they each put in.

a. What is the simplified ratio of the amount each person paid? [1 mark]

$$\begin{aligned} 20 \rightarrow & S : K : T \\ & 10 : 6 : 4 \\ & 5 : 3 : 2 \end{aligned}$$

b. If they won \$100,000 how much would each person get? [2 marks]

$$100\ 000 \div 20 = 5\ 000$$

$$\begin{aligned} \text{Sophie} &= 5000 \times 10 \\ &= \$50\ 000 \end{aligned}$$

$$\begin{aligned} \text{Karen} &= 5000 \times 6 \\ &= \$30\ 000 \end{aligned}$$

$$\begin{aligned} \text{Tony} &= 5000 \times 4 \\ &= \$20\ 000 \end{aligned}$$



## 5. Rates [8]

- a. If you leave Baldivis heading up the freeway to the city and you drive at 100km/hr how long will the 60km trip take you? [1 mark]

$$\text{Time} = \frac{\text{distance}}{\text{speed}} = \frac{60}{100} = 0.6 \text{ hrs} \\ = 36 \text{ mins}$$

- b. On the return trip there is lots of traffic and the trip take 1hr and 15 minutes. What is your average speed coming home? [1 mark]

$$1 \text{ hr } 15 \text{ mins} = 1.25 \text{ hrs}$$

$$\text{Speed} = \frac{60}{1.25} \\ = 48 \text{ km/hr}$$

6. A local cyclist thinks that she can ride her bike faster than Usain Bolt can run; if the cyclist timed herself over 1km and it took 2 minutes, and Usain Bolt's 200m record is 20 seconds which one is going the fastest? [3 marks]

$$1 \text{ km} / 2 \text{ mins} = 500 \text{ m/min}$$

$$200 \text{ m} / 20 \text{ sec} = 600 \text{ m/min}$$

Usain Bolt is faster.

7. Barry is planning to drive to Kalgoorlie for the long weekend, which is 750km away.

- a. If he drives at 110km/hr how long should the trip take? [1 mark]

$$\text{time} = \frac{750}{110} = 6.8 \text{ hrs}$$

- b. If he stops for two 30 minute fuel/rest breaks on the way what would be his average speed for the whole trip? [2 marks]

$$\text{total time} = 6.8 + 2 \times 0.5 \\ = 7.8 \text{ hrs}$$

$$\text{average speed} = \frac{750 \text{ km}}{7.8 \text{ hrs}} \\ = 96 \text{ km/hr}$$

### Best Buy [6]

8. The Spud Shed normally sells a large (10 kg) bag of Potatoes for \$12, or a medium (4 kg) bag costs \$5. Loose potatoes (pick as many as you want) cost \$1.80 / kg.

- a. Put the three options in order from best value for money to worst value (show your working) [3 marks]

Large bags	$\$12 / 10 \text{ kg} = \$1.20 / \text{kg}$	① Best
medium	$\$5 / 4 \text{ kg} = \$1.25 / \text{kg}$	②
loose	$= \$1.80 / \text{kg}$	③ Worst

- b. If you are cooking a meal that requires 3 kg of potatoes which option would cost the least? [3 marks]

$3 \text{ kg loose} = 3 \times 1.80$	$\therefore$ Better Least cost is to
$= \$5.40$	buy the medium (4 kg) bag
$4 \text{ kg bag} = \$5.00$	

### 9. Buying Petrol [4]

At Mad Mike's Petrol Station there is a special promotion happening that lets customers fill up their tank for a flat price of \$80 regardless of how much fuel they buy.

Next door is Baldy's Boring Petrol Station which has no specials, just the standard price of 147.9 cents/Litre.

- a. If your tank is nearly empty and it normally takes 55 Litres to fill up, which petrol station is going to give you the best value for money? [2 marks]

Mike's costs \$80	
Baldy's costs $55 \times 147.9c = 8134.5c$	$\therefore$ Mike's is the best
$= \$81.35c$	value for money

- b. How much would you save with this option? [1 mark]

$$\$81.35 - \$80.00 = \$1.35$$

- c. In Mad Mike's they sell six-packs of Coke for \$15. How much does each can cost? [1]

$$1 \text{ can costs } \$15 \div 6 = \$2.50$$