education equals

Topic: Applications of Rates, Ratios and Percentage

Time: 45 mins Marks: /45 marks

No calculator allowed

Question One: [4, 3, 3: 10 marks]

Skye, Travis and Aisha are planning a holiday to Canada. They have decided to budget and save in order to have enough money for the trip.

a) Travis uses a weekly budget to save his money. He earns $400/week and divides his money between his bills, food, and holiday fund in the ratio of 5 : 2 : 1.

i) How much money does Travis use for his bills, food and holiday fund each week?

ii) If Travis aims to save $1500 for his holiday, what percentage has he saved in one week?

b) Aisha was lucky enough to win some money in a competition. Her entire holiday fund of $1500 comes from her prize money. If this is 5% of her total prize money, how much money did she win?

c) Skye is making and selling hair accessories to try and make enough money for the holiday. She spends $100 on materials and with this she makes 300 hair accessories.

i) If she sells each one for $2.00, how much profit does she make?

ii) What is her percentage profit?

ii) How many hair accessories does Skye need to make and sell in order to make enough money for the holiday?

Question Two: [5, 3, 3: 11 marks]

Michael is driving at 60 km/hr. Jesse is cycling and travelling at 30 km/hr and Jaime is walking at a pace of 6 km/hr.

a) If they all leave the city together and are planning to meet at Michelle's house, how long will it take each of them to arrive, if Michelle lives 15 km from the city?

b) Michael's car uses petrol at a rate of 10 km/L. After 45 minutes traveling at 60 km/hr, how much petrol would Michael have used?

c) What is Jaime's walking pace in m/min?

Question Three: [3, 2: 5 marks]

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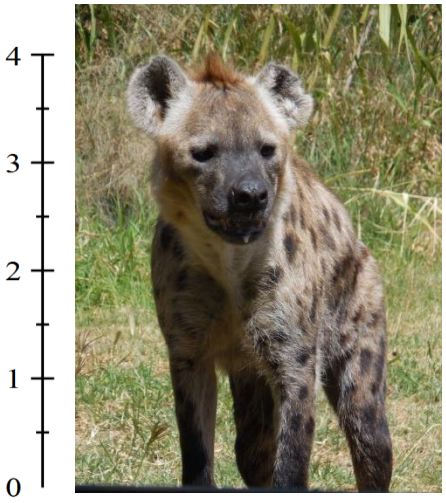

a) If the ruler on the side is in centimetres and the scale is 1 : 30, what is the height of the animal in metres?

b) If there was a mistake made in the scale and the actual height of the animal is 84 cm, what should the scale actually be?

Question Four: [2, 3: 5 marks]

Currently Money-Bank's standard interest rates are at 5% p.a simple interest.

a) How much interest is earned on a $2000 investment which is invested for 4 years with Money-Bank's simple interest account?

b) The Bartlet's have a $400 000 mortgage with Money-Bank. How much do they save per month if the interest rates drop by 1%?

Question Five: [2, 7, 5: 14 marks]

The following is a recipe for cupcakes.

200g unsalted butter, softened

2 teaspoon vanilla extract

3/4 cup caster sugar

4 eggs

2 1/2 cups self-raising flour, sifted

1/2 cup milk

Makes 20 cupcakes

a) If Alana wants to make 30 cupcakes how much self-raising flour does she need?

b) While Jenna is baking she accidentally puts one extra egg into the mixture. She knows that she needs to keep all the ratios intact so how much extra of each other ingredient does she now need to add in order to maintain the correct ratios?

c) If Russell only has 2 cups of flour, how many cupcakes can he make and what percentage of the original recipe is this?

Applications of Rates, Ratios and Percentage SOLUTIONS

Time: 45 mins Marks: /45 marks

No calculator allowed

Question One: [4, 3, 3: 10 marks]

Skye, Travis and Aisha are planning a holiday to Canada. They have decided to budget and save in order to have enough money for the trip.

a) Travis uses a weekly budget to save his money. He earns $400/week and divides his money between his bills, food and holiday fund in the ratio of 5 : 2 : 1.

i) How much money does Travis use for his bills, food and holiday fund each week?

$400 \div 8 = \$50$

Bills = $250 ✓

Holiday = $50 ✓

Food = $ 100

ii) If Travis aims to save $1500 for his holiday, what percentage has he saved in one week?

$\frac{50}{1500} \times 100$ ✓

$= \frac{1}{3} \times 10 = 3.3\%$ ✓

b) Aisha was lucky enough to win some money in a competition. Her entire holiday fund of $1500 comes from her prize money. If this is 5% of her total prize money, how much money did she win?

$0.05 \times x = 1500$

$x = 1500 \times \frac{100}{5}$ $= \$30000$

✓ ✓ ✓

c) Skye is making and selling hair accessories to try and make enough money for the holiday. She spends $100 on materials and with this she makes 300 hair accessories.

i) If she sells each one for $2.00, how much profit does she make?

$300 \times 2 - 100 = \$500$ ✓

ii) What is her percentage profit?

$\frac{500}{100} \times 100 = 500\%$ ✓

ii) How many hair accessories does Skye need to make and sell in order to make enough money for the holiday?

900 ✓

Question Two: [5, 3, 3: 11 marks]

Michael is driving at 60 km/hr. Jesse is cycling and travelling at 30 km/hr and Jaime is walking at a pace of 6 km/hr.

a) If they all leave the city together and are planning to meet at Michelle's house, how long will it take each of them to arrive, if Michelle lives 15 km from the city?

$Michael: \frac{15}{60} = 15\ mins$ ✓

$Jesse: \frac{15}{30} = 30\ mins$ ✓✓

$Jaime: \frac{15}{6} = 2\ hours\ 30\ mins$ ✓✓

b) Michael's car uses petrol at a rate of 10km/L. After 45 minutes traveling at 60 km/hr, how much petrol would Michael have used?

Distance = 45 km ✓ 4.5L ✓✓

c) What is Jaime's walking pace in m/min?

$\frac{6\ km}{1\ h} = \frac{6000\ m}{60\ mins}$ ✓✓

$= 100\ m/min$ ✓

Question Three: [3, 2: 5 marks]

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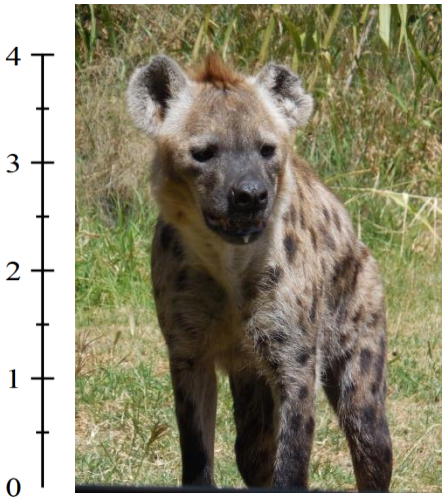

a) If the ruler on the side is in centimetres and the scale is 1 : 30, what is the height of the animal in metres?

1 : 30

4 : 120 ✓ ✓

1.2 m ✓

b) If there was a mistake made in the scale and the actual height of the animal is 84 cm, what should the scale actually be?

4 : 84

1 : 21 ✓ ✓

Question Four: [2, 3: 5 marks]

Currently Money-Bank's standard interest rates are at 5% p.a simple interest.

a) How much interest is earned on a $2000 investment which is invested for 4 years with Money-Bank's simple interest account?

✓

$\frac{2000 \times 5 \times 4}{100} = \$400$ ✓

b) The Bartlet's have a $400 000 mortgage with Money-Bank. How much do they save per month if the interest rates drop by 1%?

$\frac{400000 \times 5 \times 1}{100} = \$20000$

$\frac{400000 \times 4 \times 1}{100} = \$16000$

$\$20000 - \$16000 = \$4000$ ✓

$\frac{4000}{12} = \$333.33 \; per \; month$

✓ ✓

Question Five: [2, 7, 5: 14 marks]

The following is a recipe for cupcakes.

200g unsalted butter, softened

2 teaspoon vanilla extract

3/4 cup caster sugar

4 eggs

2 1/2 cups self-raising flour, sifted

1/2 cup milk

Makes 20 cupcakes

a) If Alana wants to make 30 cupcakes how much self-raising flour does she need?

$2\frac{1}{2} \times 1\frac{1}{2}$ ✓

$= \frac{5}{2} \times \frac{3}{2}$

$= \frac{15}{4}$

$= 3\frac{3}{4}\ cups$ ✓

b) While Jenna is baking she accidentally puts one extra egg into the mixture. She knows that she needs to keep all the ratios intact so how much extra of each other ingredient does she now need to add in order to maintain the correct ratios?

25% increase

50g butter ✓

½ teaspoon vanilla ✓

$\frac{3}{16}$ cup sugar ✓ ✓

$\frac{5}{8}$ cup flour ✓ ✓

$\frac{1}{8}$ cup milk ✓

c) If Russell only has 2 cups of flour, how many cupcakes can he make and what percentage of the original recipe is this?

2.5 cups of flour to 20 cupcakes

2.5 : 20

25: 200

1 : 8 cupcakes ✓ ✓

He can make 16 cupcake ✓

$\frac{16}{20} = \frac{3}{4} = 75\%$

✓ ✓