EQUITY
LEARNING PLACE

Elementary Math Topical (Percentage)

Question 1:

A salesman earns a 3% commission on the sales he makes. He earned $36 after selling a laptop that was on a 25% discount. Find the original selling price of the laptop.

$$3\% \text{ of selling price} \rightarrow \$36$$

$$100\% \text{ of selling price} \rightarrow \$1200$$

$$75\% \text{ of original price} \rightarrow \$1200$$

$$100\% \text{ of original price} \rightarrow \frac{1200}{75} \times 100 = \$1600$$

Question 2:

Yu Jiang bought a limited-edition book in 2015. In 2016, he sold it for $310 at a profit of 150%. Find the price at which he bought the book in 2015.

$$250\% \text{ of 2015 price} \rightarrow \$310$$

$$100\% \text{ of 2015 price} \rightarrow \frac{310}{250} \times 100 = \$124$$

Question 3:

The same high definition television model is being sold at two stores

Store ***A*** charges $1599 inclusive of 7% GST.

Store ***B*** charges $1526 without GST.

What is the difference in price, inclusive of GST, the customer has to pay if the television was bought from Store ***B***.

$$100\% \text{ of Store B} \rightarrow \$1526$$

$$107\% \text{ of Store B} \rightarrow \frac{1526}{100} \times 107 = \$1632.82$$

$$\text{Price difference} = 1632.82 - 1599 = \$33.82$$

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Question 4:

Crystal works part time in a famous watch shop. She is paid $8.50 an hour she works. She is also paid a bonus 9% of the value of the products she sells. During a particular week, she works for 43 hours and sells watches worth $1820, Calculate her total earnings for the week.

$$\text{Total earnings} = 8.5 \times 43 + \frac{9}{100} \times 1920 = \$2093.50$$

Question 5:

At Carousell (an online marketplace), a TV console is being sold at $273. The buyer states that he makes a loss of 17% on the price he paid for. Calculate the price at which the buyer purchased the TV console.

$$83\% \text{ of buyer purchased} \rightarrow \$273$$

$$100\% \text{ of buyer purchased} \rightarrow \frac{273}{83} \times 100 = \$328.92$$

Question 6:

In Germany, Mary spends €215 using her credit card. he has to pay a 2.8% credit card fee on the converted Singapore dollar for the foreign currency transactions. The credit card company uses an exchange rate between Singapore dollars ($) and euro (€) of $1 = €0.62. Calculate the total cost in Singapore dollar that Mary has to pay the credit card company. Give your answer correct to the nearest cent.

$$€0.62 = \$1$$

$$€215 = \frac{215}{0.62} = \$346.7742$$

$$\text{Credit card fees} = \frac{2.8}{100} \times 346.7742 = \$9.71$$

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Question 7:

A store charges a Goods and Services Tax (GST) of 7% for all items sold. Mr Tan paid a total of $2306.92 for a washing machine and a digital television, inclusive of GST. Given that the price of the digital television excluding GST was $1588, find the price of the washing machine excluding GST.

$$107\% \rightarrow \$2306.92$$

$$100\% \rightarrow \frac{2306.92}{107} \times 100 = \$2156$$

$$\text{Price of Washing Machine} = 2156 - 1588 = \$568$$

Question 8:

The cash price of a camera is $1020. If a customer wants to pay by hire purchase, he will have to pay a down payment of 20% . The balance will be charged with interest and has to be paid over the next 18 months.

a) Calculate the amount of downpayment he has to pay.

b) Given that the interest rate charged per annum is 9% , calculate the monthly instalment.

a)

$$\text{Downpayment} = \frac{20}{100} \times 1020 = \$204$$

b)

$$\text{Loan amount} = 1020 - 204 = \$816$$

$$I = \frac{816 \times 9 \times 1.5}{100} = \$110.16$$

$$\text{Total amount payable} = 816 + 110.16 = 926.16$$

$$\text{Monthly Instalment} = \frac{926.16}{18} = \$51.45$$

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Question 9:

Paul bought a painting for $345. Ten years later he sold it for a profit of 280% of the cost price. Calculate the selling price.

$$100\% \text{ of original price} \rightarrow \$345$$

$$380\% \text{ of original price} \rightarrow \frac{380}{100} \times 345 = \$1311$$

Question 10:

The height of a right circular cone is increased by 9% and the radius of its base area is decreased by 6%. Ernest claims that there is a percentage increase in the volume of the cone. Do you agree with his claim? Justify your answer with working.

$$\text{Original cone} = \frac{1}{3}\pi r^2 h$$

$$\text{New cone} = \frac{1}{3}\pi(0.94r)^2(1.09h)$$

$$= \frac{1}{3}\pi r^2 h(0.963124)$$

The new cone is only 96.3124% of the original cone. Therefore I disagree with his claim.

Question 11:

The length of each side of a square is increased by 20%. Find the percentage increase in the area.

$$\text{Original Area} = L^2$$

$$\text{New Area} = (1.2L)^2 = 1.44L^2$$

$$\text{The area increased by } 44\%$$

Question 12:

When p is decreased by 20% and then increased by 10%, it becomes q. Express the ratio of p : q in its simplest form.

$$\text{Decreased by } 20\% = 0.8p$$

$$\text{Increase by } 10\% = 1.1 \times 0.8p = 0.88p$$

$$p : q$$

$$p : 0.88p$$

$$25 : 22$$

Question 13:

A shopkeeper buys 1440 pencils at 25 cents each. He sells 40 dozens at \$3.60 per dozen and another 30 dozens at \$4.20 per dozen. At what price must he sell each of the remaining pencils in order to make a profit of $16\frac{2}{3}$%?

$$\text{Cost price} = 0.25 \times 1440 = \$360$$

$$\text{Target profit} = \frac{116\frac{2}{3}}{100} \times 360 = \$420$$

$$\text{Money recieved} = 40 \times 3.60 + 30 \times 4.20 = \$270$$

$$\text{Remaining amount} = 420 - 270 = 150$$

$$\text{Remaining pencils} = 1440 - 70 \times 12 = 600$$

$$\text{Selling price} = \frac{270}{600} = \$0.45$$

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Question 14:

Jake and Tom visited a car showroom together and each decided to buy a car of the same model. The list price of the car in the showroom was $80 000.

a) Jake paid for the new car in cash and was given a discount. If he paid $70 400, calculate the percentage discount.

b) Tom traded in his old car for $30 000. He then paid cash deposit of 40% of the net price and paid the balance in equal monthly instalments over 5 years with a simple interest of 3.5% per annum. Calculate the monthly instalment.

a)

$$\text{Percentage discount} = 100\% - \frac{70400}{80000} \times 100\% = 12\%$$

b)

$$\text{Amount after trading in} = 80000 - 30000 = 50000$$

$$\text{Remaining amount after deposit} = \frac{60}{100} \times 50000 = 30000$$

$$I = \frac{30000 \times 3.5 \times 5}{100} = \$5250$$

$$\text{Total amount} = 5250 + 50000 = 55250$$

$$\text{Monthly instalment} = 55250 \div 60 = \$920.83$$

Question 15:

If a woman sells an art piece at $200, she would make a loss of 20%. Evaluate the selling price of the art piece if she wants to make a profit of 15%.

$$80\% \text{ of cost price} \rightarrow \$200$$

$$115\% \text{ of cost price} \rightarrow \frac{200}{80} \times 115 = \$287.50$$

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Question 16:

Siti imported a piece of jewellery at $228. She decided to sell it at a profit of 135% of its cost. Find the selling price of the jewellery **inclusive** of 7% GST.

$$\text{Selling price without GST} = \frac{235}{100} \times 228 = \$535.80$$

$$\text{Selling price with GST} = \frac{107}{100} \times 535.80 = \$573.31$$

Question 17:

a) Express 0.08 as a percentage.

b) Adam bought a camera for $262.15. The price was inclusive of the 7% Goods and Services Tax (GST). How much GST did Adam pay?

a) $0.08 = 8\%$

b)

$$107\% \rightarrow 262.15$$

$$7\% \rightarrow \frac{262.15}{107} \times 7 = \$17.15$$

Question 18:

Jason answered 75% of the first 60 questions correctly in a Mathematics Test consisting of 100 questions. Find the percentage of the other 40 questions that he needs to answer correctly for his result for the entire test to be 80%.

$$\text{Marks from 1st 60 questions} = \frac{75}{100} \times 60 = 45$$

$$\text{Remaining question to be correct} = 80 - 45 = 35$$

$$\text{Percentage of 40 questions} = \frac{35}{40} \times 100\% = 87.5\%$$

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Question 19:

During the Great Singapore Sale, a retailer made the following offer ***A***:

Buy 2 shirts,
Get 1 free!

After the Great Singapore Sale, he changed his offer to ***B***:

Buy 1 shirt,
Get the 2nd one at 50% off!

By considering the percentage of the original price the customer needs to pay for each shirt, determine whether offer ***A*** or ***B*** is the better deal for the customer.

Let original price be $\$x$

During Sales,

$\text{Paid: } \$2x$

$\text{Original Price: } \$3x$

$$\text{Percentage discount} = \frac{3x - 2x}{3x} \times 100\%$$

$$= 33.3\%$$

After Sales,

$$\text{Paid} = x + 0.5x = \$1.5x$$

$$\text{Original} = \$2x$$

$$\text{Percentage discount} = \frac{2x - 1.5x}{2x} \times 100\%$$

$$= 25\%$$

$\therefore$ Offer A is a better deal.

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Question 20:

On average, a bakery sells 500 chicken burgers at $2.50 each a day. When the price of each burger is increased by 20%, the total sales volume drops by 25%.

a) Find the new price of each burger.

b) Find the number of burgers sold at the new price.

c) What is the percentage change in the total sales by the bakery with this increase in price?

a)

$$\text{New price of burger} = \frac{120}{100} \times 2.5 = \$3$$

b)

$$\text{Number of burger} = \frac{75}{100} \times 500 = 375$$

c)

$$\text{New total sales} = 3 \times 375 = \$1125$$

$$\text{Original Sales} = 500 \times 2.5 = \$1250$$

$$\text{Percentage change} = \frac{1125 - 1250}{1250} \times 100\%$$

$$= -10\%$$

$$\therefore \text{the total sales decreases by } 10\%$$