

## GAYAZA HIGH SCHOOL

## S.3 MATH WORKSHEET SIX

Percentages, Discounts, Commissions,  
Interest, Profit and Loss

## PART I

## PREREQUISITE KNOWLEDGE:

## • PERCENTAGES

The arithmetical principles learned in studying the topic of **Percentages** can be applied directly in solving problems in Discounts, Commissions, Interest, Profit and Loss.

**Discounts, Profit and Loss, Commissions and Interest.**

You might have seen while buying goods that on every **article/item** there is a **price marked**. This price is known as the **market price (M.P.)/original price** of the article. In order to clear the **stocks** or to increase sale, sometimes shopkeepers offer a certain percent of rebate on the marked price for **cash payments**. This rebate is known as the **discount**. The customer or buyer pays the difference between the marked price and the discount (**selling price (S.P)**).

**DISCOUNT**

Let us see the concept mathematically;

$$S. P = M. P - \text{Discount}$$

$$\text{Rate of discount} = \text{discount in percentage} = \text{percentage discount}$$

$$\text{Percentage discount} = \frac{\text{discount}}{\text{original price}(M.P)} \times 100$$

$$\text{From which: } \text{Discount} = \frac{\% \text{ discount} \times M.P}{100}$$

$$\therefore \text{Discount} = M.P \left( \frac{\% \text{ discount}}{100} \right)$$

$$\text{Percentage discount} = \frac{\text{original price}(M.P) - \text{selling price}}{\text{original price}(M.P)} \times 100$$

$$\text{Percentage discount} = \frac{M.P - S.P}{M.P} \times 100$$

As we know:

$$S. P = M. P - \text{Discount}$$

$$S. P = M. P - \frac{\% \text{ discount} \times M.P}{100}$$

$$S. P = M. P \left( 1 - \frac{\% \text{ discount}}{100} \right)$$

$$S. P = M. P \left( \frac{100 - \% \text{ discount}}{100} \right)$$

$$M. P = S. P \left( \frac{100}{100 - \% \text{ discount}} \right) \quad \text{for a discount ..... (i)}$$

$$C. P = S. P \left( \frac{100}{100 + \% \text{ Gain/profit}} \right) \quad \text{for a profit made ..... (ii)}$$

Also:  $M. P = C. P + \text{Profit}$

$\text{Profit} = \% \text{ Profit} \times C. P$

$$S. P = C. P \left( \frac{100 + \% \text{ Profit}}{100} \right)$$

$$C. P = S. P \left( \frac{100}{100 - \% \text{ Loss}} \right) \quad \text{for a loss made..... (iii)}$$

Formulas (i), (ii) and (iii) can easily be remembered. A student just needs interpret the question well such she or he can apply the formulas appropriately.

**Note:** It should be noted that discount is given on the marked price only.

### QUESTION AND ANSWER

1.

<b>Question.</b>	What is the way of calculating a discount?
<b>Answer.</b>	In order to calculate a discount, one must multiply the original price (market price) by the decimal form of the percentage: $Discount = M. P \left( \frac{\% \text{ discount}}{100} \right)$ In order to calculate the item's sale price, subtract the discount from the original price (market price): $S. P = M. P - Discount$ . One can do this by using a calculator or mental work.

2.

<b>Question.</b>	How can one take 20% off a price?
<b>Answer.</b>	First of all, one must convert the percentage discount to a decimal. So, a 20 per cent discount happens to be 0.20 in decimal format. Secondly, one must multiply the decimal discount by the item's price to determine the savings

3.

<b>Question.</b>	Explain what is a discount with example?
<b>Answer.</b>	Discount refers to reduced prices or something sold at a price that is lower than the normal price. For example, a purse sold for 50 per cent off its normal price or a store that sells designer items at prices that are below market price.

4.

<b>Question.</b>	Explain how one can calculate a 10% discount?
<b>Answer.</b>	The simple way of calculating 10% discount is to first divide the total sale price by 10. This should be followed by subtraction from the price.

### Examples

1. Find the selling price of a toy if the market price (original price) is Shs32000 and discount is 10%.

$$\text{Percentage discount} = \frac{\text{original price} - \text{selling price}}{\text{original price}} \times 100$$

$$10 = \frac{32000 - S.P}{32000} \times 100$$

$$10 = \frac{32000 \times 100 - 100 \times S.P}{32000}$$

$$320000 = 3200000 - 100S.P$$

$$100S.P = 3200000 - 320000$$

$$100S.P = 2880000$$

$$S.P = \frac{2880000}{100}$$

$$S.P = \text{Shs. } 28800$$

2. Find the market price of a chair, if Moses paid shs.171500 after discount of 2%.

$$\text{Percentage discount} = \frac{\text{original price} - \text{selling price}}{\text{original price}} \times 100$$

$$2 = \frac{\text{original price} - 171500}{\text{original price}} \times 100$$

$$2 = \frac{M.P \times 100 - 171500 \times 100}{M.P}$$

$$2M.P = 100M.P - 17150000$$

$$100M.P - 2M.P = 17150000$$

$$98M.P = 17150000$$

$$M.P = \frac{17150000}{98}$$

$$M.P = \text{Shs. } 175,000$$

3. Mr. Ssali paid shs.28125 for T-shirt in a sale, while the price tag shows M.P = shs.31250. Find the discount in percentage.

$$\text{Percentage discount} = \frac{\text{discount}}{\text{original price}} \times 100$$

$$\text{Percentage discount} = \frac{31250 - 28125}{31250} \times 100$$

$$= \frac{3125}{31250} \times 100$$

$$\text{Percentage discount} = \frac{312500}{31250}$$

$$\text{Percentage discount} = 10\%$$

4. A shopkeeper offers his customers 10% discount and still makes a profit of 26%. What is the actual cost to him of an article marked shs.14000.

Calculation for selling price

We know:

$$M.P = \text{shs. } 1400$$

$$\% \text{ discount} = 10$$

$$S.P = M.P \left( \frac{100 - \% \text{ discount}}{100} \right)$$

$$S.P = 14000 \left( \frac{100 - 10}{100} \right)$$

$$S.P = 14000 \left( \frac{90}{100} \right)$$

$$S.P = \text{shs. } 12,600$$

Calculation for cost price

We know:

$$S.P = \text{shs. } 12,600$$

$$\text{profit} = 26\%$$

Therefore,

$$C.P = S.P \left( \frac{100}{100 + \% \text{ Gain/profit}} \right)$$

$$C.P = 12600 \left( \frac{100}{100 + 26} \right)$$

$$C.P = 12600 \left( \frac{100}{126} \right)$$

$$C.P = \text{shs. } 10,000$$

5. A dealer marks his goods at 35% above the cost price and allows a discount of 20% on the marked price. Find his gain or loss per cent.

Let the CP of the goods be  $x$ .

$$M.P = C.P + \text{Profit}$$

$$\text{Profit} = \% \text{ Profit} \times C.P$$

$$\text{Profit} = \frac{35}{100} \text{ of } x$$

$$\text{Marked price of the goods} = x + \left(\frac{35}{100}x\right) = \text{shs. } 1.35x$$

$$\text{Discount} = 20\%$$

$$\text{Selling price} = \text{MP} - \text{Discount}$$

$$\text{Discount} = \frac{\% \text{ discount} \times \text{M.P}}{100}$$

$$\begin{aligned}\text{Discount} &= 20\% \text{ of } 1.35x = 1.35x \times 0.2 \\ &= \text{shs. } 0.27x\end{aligned}$$

$$\text{Selling price} = \text{MP} - \text{Discount}$$

$$\text{SP} = 1.35x - 0.27x$$

$$\text{SP} = \text{Shs. } 1.08x$$

As S.P is more than C.P, there is a profit.

So,

$$\text{Profit} = \text{SP} - \text{CP}$$

$$= 1.08x - x$$

$$= 0.08x$$

$$\text{Profit percentage} = \left(\frac{\text{Profit}}{\text{C.P}}\right) \times 100$$

$$= \left(\frac{0.08x}{x}\right) \times 100$$

$$= 8\%$$

### EXERCISE

1. At a clearance sale, all goods are on sale at 45% discount. If Jacinta buys a skirt marked Shs.30000, how much would I need to pay?

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2. After allowing a discount of 12% on the marked price of an article, it is sold for shs.44000. Find the market price.

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3. Sarah bought a television set at a discount of 12% and sold it at a profit of 25%. If she sold it at shs. 800,000. What was the original price of the television set?

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4. The marked price of a water cooler is Shs. 17,670,000. The shopkeeper offers an off-season discount of 18% on it. Find its selling price.
5. A cell phone was marked at 40% above the cost price and a discount of 30% was given on its marked price. Find the gain or loss percent made by the shopkeeper.
6. The marked price of a television is Shs. 7,300,000. A dealer allows two successive discounts of 20% and 5%. For how much is the television available?
7. Find the rate of discount being given on a shirt whose selling price is shs. 54,600 after deducting a discount of shs. 104,00 on its marked price.

**END.**