

# **The Cost Of A Phone Is Reduced By 20%. The New Cost Is \$70.40. What Was The Original Price?**

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Understanding the dynamics of pricing and discounts is essential, especially when shopping for electronics such as smartphones. When a phone's price is reduced by a specific percentage, determining its original cost can seem complex at first glance. In this article, we will explore the mathematical process behind calculating the original price of a phone after a 20% discount has been applied, given its new, discounted cost of \$70.40. Whether you're a student, a shopper, or someone interested in basic algebra, this comprehensive guide will clarify the steps involved and provide a detailed explanation.

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## **Understanding Percentage Discounts and Their Effect on Prices**

### **What Is a Percentage Discount?**

A percentage discount refers to a reduction in the original price of an item expressed as a percentage. For example, a 20% discount means the item's price has been reduced by 20% of its original value.

### **Why Are Discounts Common?**

Discounts attract customers, clear inventory, and promote sales. They are a common marketing strategy in retail, especially during sales seasons, promotional events, or clearance sales.

### **Impact of a Discount on the Price**

Applying a discount reduces the original price, resulting in a new, lower price. The relationship between the original price, discount percentage, and sale price can be expressed mathematically.

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# Mathematical Representation of Discounted Price

## Key Variables

- Original Price (P): The price before the discount.
- Discount Percentage (D): The percentage by which the price is reduced (here, 20%).
- Discounted Price (S): The final price after the discount (here, \$70.40).

## Formulating the Relationship

The discounted price can be calculated by subtracting the discount from the original price:

$$S = P - (D \times P)$$

Since the discount is a percentage, it can be written as:

$$S = P - \left(\frac{D}{100} \times P\right)$$

Which simplifies to:

$$S = P \times \left(1 - \frac{D}{100}\right)$$

In our specific case:

$$70.40 = P \times (1 - 0.20)$$

$$70.40 = P \times 0.80$$

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## Calculating the Original Price of the Phone

### Step-by-Step Calculation

To find the original price  $(P)$ , rearrange the formula:

$$P = \frac{S}{1 - \frac{D}{100}}$$

Plugging in the known values:

$$P = \frac{70.40}{0.80}$$

Performing the division:

$$\backslash [ P = 88.00 \backslash ]$$

Therefore, the original price of the phone was \$88.00.

## Summary of Calculation

- Discount percentage: 20%
- Discounted price: \$70.40
- Original price: \$88.00

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## Understanding the Significance of the Calculation

### Practical Applications

Knowing how to compute the original price from a discounted price is valuable in various scenarios, including:

- Comparing prices across different stores
- Calculating the value of discounts offered
- Budget planning and financial analysis

### Common Mistakes to Avoid

- Forgetting to convert the percentage to a decimal (e.g., 20% to 0.20)
- Misapplying the formula, especially in rearrangement
- Assuming the discount is additive rather than multiplicative

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## Additional Examples and Practice Problems

### Example 1: A 15% Discount

Suppose a phone is discounted by 15%, and the sale price is \$85. How much was the original price?

Solution:

$$\backslash [ P = \frac{85}{1 - 0.15} = \frac{85}{0.85} = 100 \backslash ]$$

The original price was \$100.

## Example 2: A 25% Discount

A store sells a laptop for \$300 after a 25% discount. Find its original price.

Solution:

$$P = \frac{300}{1 - 0.25} = \frac{300}{0.75} = 400$$

Original price: \$400.

## Practice Problem

A television's price is reduced by 30%, and the sale price is \$560. What was its original price?

Answer:

$$P = \frac{560}{1 - 0.30} = \frac{560}{0.70} = 800$$

Original price: \$800.

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## Factors That Can Influence Pricing and Discounts

### Market Competition

Retailers often reduce prices to stay competitive.

### Seasonal Sales

Sales events like Black Friday or holiday promotions frequently feature significant discounts.

### Inventory Clearance

Unsold stock may be discounted heavily to make way for new inventory.

## Brand and Product Type

Premium brands might have more stable pricing, while generic brands often rely more on discounts.

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## Conclusion: The Importance of Basic Math Skills in Retail Pricing

Understanding how to calculate the original price based on discounts is an essential skill that aids consumers in making informed purchasing decisions. In this specific case, knowing that the phone's discounted price is \$70.40 after a 20% reduction allows us to determine that the original price was \$88.00. This knowledge helps shoppers evaluate the value of deals, compare offers, and plan their budgets effectively.

By mastering these simple yet powerful formulas, you can become more confident when analyzing prices and discounts, whether shopping online or in-store. Remember, always convert percentage discounts into decimal form and carefully apply the correct formulas to get accurate results.

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Meta description: Discover how to calculate the original price of a phone after a 20% discount, given the new price of \$70.40. Learn step-by-step methods, examples, and tips in this comprehensive guide.

## Frequently Asked Questions

### What was the original price of the phone before the 20% discount?

The original price was \$88.

### How do you calculate the original price after a 20% reduction if the new price is known?

Divide the discounted price by  $(1 - 0.20)$ , so  $\$70.40 \div 0.80 = \$88$ .

### If the phone's price was reduced by 20% to \$70.40, what is the dollar amount of the discount?

The discount amount was \$17.60, calculated as  $\$88 - \$70.40$ .

## **Can you verify the original price by applying the 20% discount to \$88?**

Yes, 20% of \$88 is \$17.60, and subtracting that from \$88 gives \$70.40, confirming the calculation.

## **If the new price after discount is \$70.40, what would be the price if the discount was 25% instead?**

The original price would be \$93.87, calculated as  $\$70.40 \div (1 - 0.25) = \$70.40 \div 0.75$ .

## **How does understanding percentage discounts help in real-world shopping scenarios?**

It allows you to determine original prices, savings, and better evaluate deals and discounts offered.

## **What is the importance of calculating the original price in discount offers?**

It helps consumers understand the actual value and savings, and enables informed purchasing decisions.

## **Additional Resources**

Understanding the Reduced Price of a Phone: How a 20% Discount Translates to a New Cost of \$70.40

When shopping for electronics, especially smartphones, price reductions and discounts often influence purchasing decisions significantly. A common scenario involves a price reduction expressed in percentage terms, which can sometimes be confusing without proper analysis. In this detailed review, we will explore the problem: The cost of a phone is reduced by 20%. The new cost is \$70.40. What was the original price?

We'll delve into the mathematical reasoning behind percentage discounts, the methods to solve such questions, and practical considerations when analyzing price reductions. This comprehensive guide will serve both as an educational resource and a practical step-by-step process for understanding discounts and original pricing.

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# Understanding the Basics of Percentage Discounts

## What Is a Percentage Discount?

A percentage discount indicates how much of the original price has been subtracted to arrive at the sale or reduced price. It is expressed as a percentage of the original price.

For example:

- A 20% discount on a phone means that 20% of the original price is taken off, reducing the cost.
- The remaining amount after the discount is called the sale price or the discounted price.

## Why Are Percentage Discounts Important?

- They help consumers understand how much savings they are gaining.
- Retailers use discounts to attract customers, clear inventory, or promote sales.
- Understanding percentage discounts helps in budgeting and making informed purchasing decisions.

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## Mathematical Framework for Price Reduction

### Key Variables

Let's define the variables involved:

- Original Price (P): The initial price of the phone before any discount.
- Discount Percentage (D): The percentage by which the price is reduced, in this case, 20%.
- Discounted Price (S): The final sale price after the discount, given as \$70.40.

### Relationship Between Variables

The core relationship can be summarized as:

Discounted Price (S) = Original Price (P) - Discount

Since the discount is a percentage of the original price:

Discount = (Discount Percentage / 100) × Original Price

Therefore,

$$S = P - (D / 100) \times P$$

Or, factoring out P:

$$S = P \times (1 - D / 100)$$

In our specific problem:

$$\$70.40 = P \times (1 - 20/100) = P \times (1 - 0.20) = P \times 0.80$$

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## Calculating the Original Price

### Step-by-Step Solution

Given:

- Discounted Price (S) = \$70.40
- Discount Percentage (D) = 20%

The formula simplifies to:

$$P = S / (1 - D / 100)$$

Substituting the known values:

$$P = \$70.40 / (1 - 0.20) = \$70.40 / 0.80$$

Calculating:

$$P = \$70.40 / 0.80 = \$88.00$$

Thus, the original price of the phone was \$88.00.

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# Deeper Analysis and Practical Implications

## Understanding the Impact of the Discount

- The phone was originally priced at \$88.00.
- After a 20% discount, the price drops to \$70.40.
- The amount saved by the customer is:

$$\text{Savings} = \text{Original Price} - \text{Discounted Price} = \$88.00 - \$70.40 = \$17.60$$

- The savings represent 20% of the original price:

$$(\text{Savings} / \text{Original Price}) \times 100 = (\$17.60 / \$88.00) \times 100 = 20\%$$

This confirms the consistency of the discount calculation.

## Visualizing the Price Reduction

Imagine the price as a whole:

- Start with \$88.00.
- Take away 20%, which is \$17.60.
- Remaining price: \$70.40.

This visualization helps buyers and sellers understand the magnitude of discounts and their effects on pricing strategies.

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## Extended Scenarios and Variations

### What if the Discount Percentage Changes?

Suppose the discount was different, say 25% or 15%. The method remains the same:

- For a 25% discount:

$$\text{Original Price} = \$70.40 / (1 - 0.25) = \$70.40 / 0.75 = \$93.87$$

- For a 15% discount:

Original Price =  $\$70.40 / (1 - 0.15) = \$70.40 / 0.85 \approx \$82.82$

This demonstrates the flexibility of the formula across different discount percentages.

## Impact of Discount on Profit Margins

For retailers, understanding how discounts affect profit margins is crucial:

- If the cost price of the phone is less than the original price, discounts can still be profitable.
- For example, if the cost of the phone is \$70, selling at \$88 keeps a profit of \$18.
- After a discount, if the sale price is \$70.40, the profit reduces but still remains positive.

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## Real-World Applications and Considerations

### Pricing Strategies in Retail

Retailers often employ several strategies involving discounts:

- Psychological Pricing: Ending prices with .99 or .95 to make prices appear lower.
- Promotional Discounts: Limited-time offers to incentivize quick purchases.
- Bulk Discounts: Reducing unit price when buying multiple units.

Understanding the underlying mathematics helps retailers set appropriate discount levels to maximize revenue while offering attractive deals.

### Consumer Awareness and Budgeting

Consumers benefit from understanding percentage discounts:

- Calculating the original price helps in evaluating whether a deal is genuinely advantageous.
- Recognizing that a 20% discount on an \$88 phone results in a \$17.60 saving can influence purchasing decisions.
- Comparing discounts across different products becomes easier with this knowledge.

## Limitations and Additional Factors

While the calculation provides a clear figure for the original price, real-world scenarios may involve:

- Taxes or additional fees that alter the final amount paid.
- Dynamic pricing strategies that change based on demand, inventory, or time.
- Promotional bundles or financing options that impact the effective cost.

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## Conclusion: Summarizing Key Insights

Understanding the calculation behind price reductions is essential for both consumers and retailers. In the specific case where a phone's price is reduced by 20% to a new cost of \$70.40, the original price was \$88.00. This calculation hinges on the fundamental formula:

$$\text{Original Price} = \text{Discounted Price} / (1 - \text{Discount Percentage} / 100)$$

By mastering this formula, one can quickly determine original prices from any discount and sale price, facilitating smarter shopping, pricing strategies, and financial planning.

Key Takeaways:

- Percentage discounts directly relate to the original price via a simple formula.
- The relationship between the original and discounted prices is linear when discounts are applied.
- Understanding this relationship enhances decision-making in both buying and selling contexts.
- Practical applications include assessing deal value, setting strategic discounts, and analyzing profit margins.

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Final note: Always verify whether additional charges like taxes are included in the final sale price, and consider the context of discounts to ensure accurate financial understanding. With these insights, you become a more informed consumer and a savvy retailer, capable of navigating the complex world of pricing and discounts with confidence.

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