

# Grade 7 · Percent Increase, Percent Decrease and Percent Error · Worksheet Answer Key

Common Core 7.RP.A.3 · mathovore.fr

Every solution shows the change, the division by the original amount, and the check. Compare each step with your own work, especially the choice of the original amount, which is the most common source of mistakes in percent change.

## Grade 7 Common Core: 7.RP.A.3

### Problem 1: Percent increase

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Change:  $5 - 4 = 1$ . Divide by the original:  $\frac{1}{4} = 0.25 = 25\%$ .

The price rose, so **a 25% increase**.

### Problem 2: Gas price drop

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Change:  $4.00 - 3.60 = 0.40$  dollars. Divide by the original price:  $\frac{0.40}{4.00} = 0.10 = 10\%$ .

**A 10% decrease.**

### Problem 3: Percent decrease

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Change:  $50 - 40 = 10$  gallons. Divide by the original:  $\frac{10}{50} = 0.2 = 20\%$ .

**A 20% decrease.**

### Problem 4: Growth of a seedling

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Change:  $28 - 25 = 3$  inches. Divide by the original height:  $\frac{3}{25} = 0.12 = 12\%$ .

**A 12% increase.**

### Problem 5: Falling attendance

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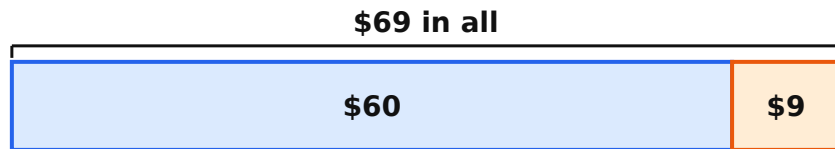
Change:  $250 - 215 = 35$  fans. Divide by the original attendance:  $\frac{35}{250} = 0.14 = 14\%$ .

**A 14% decrease.**

### Problem 6: Price after a raise

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Increase:  $0.15 \times 60 = 9$ . New price:  $60 + 9 = 69$ . Check with the multiplier:  $1.15 \times 60 = 69$ .



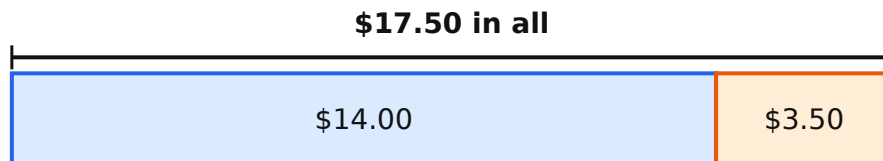
The \$9 increase is added to \$60.

**The new price is \$69.**

### **Problem 7: New monthly fee**

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Increase:  $0.25 \times 14 = 3.50$ . New fee:  $14 + 3.50 = 17.50$ . Check with the multiplier:  $1.25 \times 14 = 17.50$ .



The \$3.50 increase is added to \$14.00.

**The new fee is \$17.50.**

### **Problem 8: Time after a decrease**

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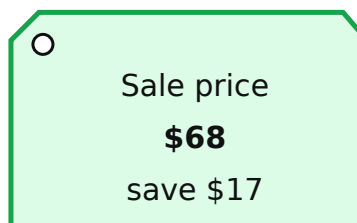
Decrease:  $0.30 \times 90 = 27$  minutes. New time:  $90 - 27 = 63$  minutes. Check:  $0.70 \times 90 = 63$ .

**63 minutes.**

### **Problem 9: Sale price**

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Discount:  $0.20 \times 85 = 17$ . Sale price:  $85 - 17 = 68$ .



The sale price tag.

**The sale price is \$68.**

### Problem 10: Estimate error

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Error:  $|450 - 500| = 50$  people. Divide by the actual value:  $\frac{50}{500} = 0.10 = 10\%$ .

**The percent error is 10%.**

### Problem 11: Percent error

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Error:  $|12.6 - 12| = 0.6$ . Divide by the actual value:  $\frac{0.6}{12} = 0.05 = 5\%$ .

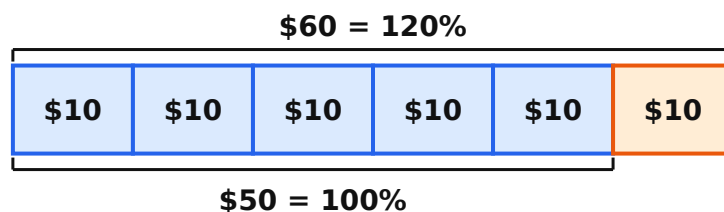
**The percent error is 5%.**

### Problem 12: Find the original

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The new price is 120% of the original, so  $1.20 \times \text{original} = 60$ .

$\text{original} = 60 \div 1.20 = 50$ .



Each block is 20% of the original, worth \$10.

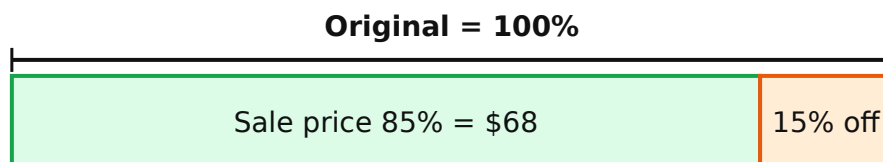
Check: 20% of \$50 is \$10 and  $50 + 10 = 60$ . **The original price was \$50.**

### Problem 13: Price before the sale

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The sale price is  $100\% - 15\% = 85\%$  of the regular price, so  $0.85 \times \text{regular price} = 68$ .

$\text{regular price} = 68 \div 0.85 = 80$ .



The sale price is 85% of the regular price.

Check: 15% of \$80 is \$12 and  $80 - 12 = 68$ . **The regular price was \$80.**

### Problem 14: Which rose more?

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- a. Theater A:  $\frac{36-30}{30} = \frac{6}{30} = 0.20 = 20\%$ . Theater B:  $\frac{58-50}{50} = \frac{8}{50} = 0.16 = 16\%$ .  
b. Theater A has the greater percent increase. Theater B rose by more dollars (\$8 compared with \$6), but its original price is much larger, so each dollar is a smaller part of it.

**(a) 20% and 16% (b) Theater A.**

### Problem 15: Population change

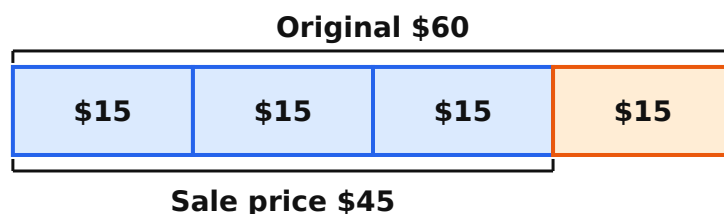
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- a. Change:  $9,200 - 8,000 = 1,200$ .  $\frac{1,200}{8,000} = 0.15 = 15\%$ . **A 15% increase.**  
b. Decrease:  $0.10 \times 9,200 = 920$ .  $9,200 - 920 = 8,280$ . **8,280 residents.**

### Problem 16: Discount and tax

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- a.  $0.75 \times \text{original} = 45$ , so  $\text{original} = 45 \div 0.75 = 60$ . Check: 25% of \$60 is \$15 and  $60 - 15 = 45$ .  
b. Tax:  $0.08 \times 45 = 3.60$ . Total:  $45 + 3.60 = 48.60$ , or  $1.08 \times 45 = 48.60$ .



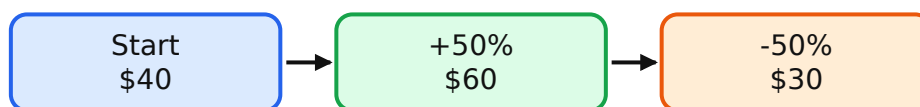
Each block is 25% of the original.

**(a) \$60 (b) \$48.60.**

### Problem 17: Up then down

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- a. Rise:  $0.50 \times 40 = 20$ . Value:  $40 + 20 = 60$ .  
b. Fall:  $0.50 \times 60 = 30$ . Value:  $60 - 30 = 30$ .  
c. Overall change:  $30 - 40 = -10$ .  $\frac{-10}{40} = -0.25$ , a 25% decrease.



The second change applies to \$60, not to \$40.

**(a) \$60 (b) \$30 (c) 25% decrease overall.**

### Problem 18: Markup and discount

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- Markup:  $0.75 \times 24 = 18$ . Marked price:  $24 + 18 = 42$ .
- Discount:  $0.20 \times 42 = 8.40$ . Sale price:  $42 - 8.40 = 33.60$ .
- Change from the cost:  $33.60 - 24 = 9.60$ .  $\frac{9.60}{24} = 0.40 = 40\%$ .

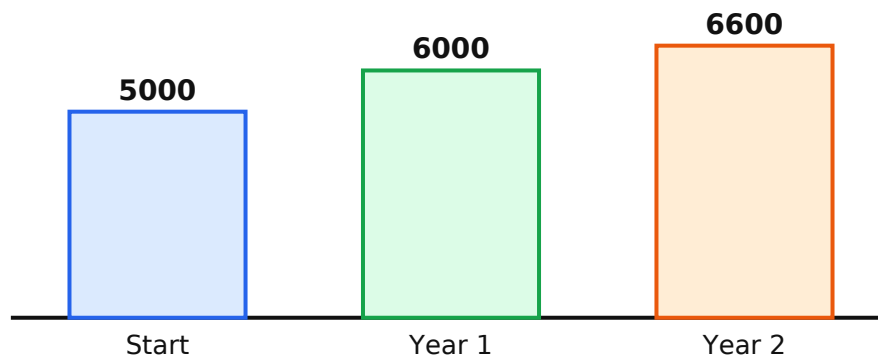


The two changes in order.

**(a) \$42 (b) \$33.60 (c) 40% greater.**

### Problem 19: Two years of growth

- Year 1:  $1.20 \times 5,000 = 6,000$ . Year 2:  $1.10 \times 6,000 = 6,600$ .
- Change:  $6,600 - 5,000 = 1,600$ .  $\frac{1,600}{5,000} = 0.32 = 32\%$ .
- The second 10% is taken of 6,000, not of 5,000, so it adds 600 instead of 500. The increases do not simply add:  $1.20 \times 1.10 = 1.32$ .

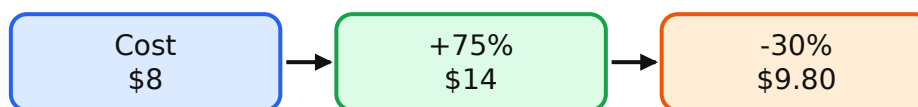


Population after each year.

**(a) 6,000 and 6,600 (b) 32% (c) the percents apply to different amounts.**

### Problem 20: Bookstore markup

- Markup:  $14 - 8 = 6$ .  $\frac{6}{8} = 0.75 = 75\%$ .
- Discount:  $0.30 \times 14 = 4.20$ . Reduced price:  $14 - 4.20 = 9.80$ .
- Change from the cost:  $9.80 - 8 = 1.80$ .  $\frac{1.80}{8} = 0.225 = 22.5\%$ .



The two changes in order.

**(a) 75% (b) \$9.80 (c) 22.5% greater.**