# Percent Increase and Decrease

Explore ideas and representations

**Name** _____ **Date** _____ **Score** _____ / 8

### QUICK REVIEW

The change fraction is |new − original|/original. Multiply this fraction by $100$ to find the percent number, then attach $\%$. An increase from $50$ to $60$ has change fraction $10/50 = 0.20 = 20\%$. A $15\%$ decrease multiplies the original by $0.85$, not $0.15$.

**Worked example**

Example changes from $50$ to $60$. Find the percent increase.

**1.** The change has size $|60 - 50| = 10$.
**2.** Use the original value: the percent-change number is $10/50 \times 100 = 20$, so this is a $20\%$ increase.
**3.** Check: $50 + (20/100)(50) = 60$.
**Answer:** $20\%$ increase.

## Practice Problems

Show your thinking.

**1.** Attendance changes from $40$ to $50$. Find the percent increase.

**2.** A water-use total falls by $25\%$ to $60$ L. Recover the original amount and verify the decrease.

**3.** Enrollment changes from $120$ to $138$. Find the percent increase.

**4.** Paper waste changes from $200$ to $170$. Find the percent decrease.

**5.** A price of $120.00 rises $20\%$ and then falls $20\%$. Does it return to its original price?

**6.** A shop starts with $160$ notebooks and sells $35\%$ of them. How many are sold and how many remain?

**7.** Volunteer hours changes from $64$ to $80$. Find the percent increase.

**8.** A price falls $20\%$ to $56$ dollars. Recover the original price.

# Answer Key

1. $25\%$ increase.
2. Original $80$ L; saved $20$ L.
3. $15\%$ increase.
4. $15\%$ decrease.
5. No; final price \$115.20, a $4\%$ decrease.
6. $56$ notebooks sold; $104$ remain.
7. $25\%$ increase.
8. Original $70$ dollars; saved $14$ dollars.

## Step-by-Step Solutions

Follow each calculation, then check your own work.

### Problem 1

1. The change has size $|50 - 40| = 10$.
2. Use the original value: the percent-change number is $10/40 \times 100 = 25$, so this is a $25\%$ increase.
3. Check: $40 + (25/100)(40) = 50$.

### Problem 2

1. After a $25\%$ reduction, $75\%$ remains: $0.75w = 60$.
2. $w = 60/0.75 = 80$ L.
3. Check $80 - 60 = 20$ L and $20/80 = 25\%$.

### Problem 3

1. The change has size $|138 - 120| = 18$.
2. Use the original value: the percent-change number is $18/120 \times 100 = 15$, so this is a $15\%$ increase.
3. Check: $120 + (15/100)(120) = 138$.

### Problem 4

1. The change has size $|170 - 200| = 30$.
2. Use the original value: the percent-change number is $30/200 \times 100 = 15$, so this is a $15\%$ decrease.
3. Check: $200 - (15/100)(200) = 170$.

### Problem 5

1. After the increase: $120(1.20) = 144$ dollars.
2. After the decrease: $144(0.80) = \frac{576}{5}$ dollars.
3. Net percent-change number: $(120 - \frac{576}{5})/120 \times 100 = 4$; therefore the final price is a $4\%$ decrease from the original.

### Problem 6

1. The sold share is $35/100 = 0.35$.
2. Sold: $160(0.35) = 56$ notebooks.
3. Remaining: $160 - 56 = 104$ notebooks.

### Problem 7

1. The change has size $|80 - 64| = 16$.
2. Use the original value: the percent-change number is $16/64 \times 100 = 25$, so this is a $25\%$ increase.
3. Check: $64 + (25/100)(64) = 80$.

### Problem 8

1. The remaining multiplier is $1 - 0.20 = 0.80$, so $0.80p = 56$.
2. $p = 56/0.80 = 70$ dollars.
3. Saving $70 - 56 = 14$ dollars.

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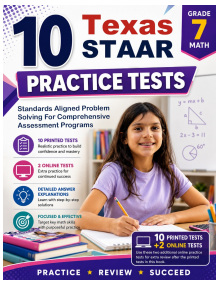


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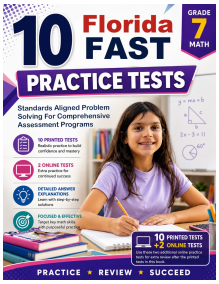


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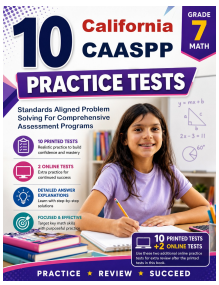


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