Percentage Increase then Decrease

Core Worksheet

Worked Examples & Guided Practice

I Do (Teacher Model) An item priced at £80 is increased by 20% and then decreased by 20%. Calculate the final price.

We Do (Guided Practice) A salary of £30 000 increases by 10% in Year 1, but decreases by 15% in Year 2. Calculate the final salary.

You Do (Independent Practice) An investment of £5000 grows by 25% in Month 1 and then drops by 20% in Month 2. Find the final value and state the overall percentage change.

Challenge (Extension) The price of a stock increases by $p\%$ and then decreases by $p\%$. Show that the net overall change is always a percentage decrease of $\frac{p^2}{100}\%$.

Practice Perfect Questions

Q1. An item costing £50 increases by 10% and then decreases by 10%. Find the final price.

Q2. A coat originally priced at £120 is increased by 15% and then reduced by 25% in a sale. Find the sale price.

Q3. The population of a village increases by 8% to 2160 in Year 1, and then decreases by 5% in Year 2. Calculate the population at the end of Year 2.

Q4. A car valued at £16 000 increases in value by 5% due to high demand, but then depreciates by 12% the following year. Calculate its value after the two changes.

Q5. A price of £200 is decreased by 30% and then increased by 30%. Is the final price greater than, less than, or equal to £200? Show working.

Q6. An asset increases by 40% in Year 1. By what percentage must it decrease in Year 2 to return to its original starting value?

Answers & Worked Solutions

Model Solutions

- **I Do:** $80 \times 1.20 = 96 \implies 96 \times 0.80 = £76.80$
- **We Do:** $30000 \times 1.10 = 33000 \implies 33000 \times 0.85 = £28,050$
- **You Do:** $5000 \times 1.25 = 6250 \implies 6250 \times 0.80 = £5000$. Overall percentage change $= 0\%$.
- **Challenge:** Multiplier $= \left(1 + \frac{p}{100}\right)\left(1 - \frac{p}{100}\right) = 1 - \frac{p^2}{10000}$. Net change $= 1 - \left(1 - \frac{p^2}{10000}\right) = \frac{p^2}{10000} = \frac{p^2}{100}\%$ decrease. ■

Practice Perfect Questions Solutions

Q1. $50 \times 1.10 \times 0.90 = £49.50$

Q2. $120 \times 1.15 \times 0.75 = £103.50$

Q3. $2160 \times 0.95 = 2052$ residents

Q4. $16000 \times 1.05 \times 0.88 = £14,784$

Q5. $200 \times 0.70 \times 1.30 = £182$. Less than £200 (decreased by 9%).

Q6. $1.40 \times (1 - x) = 1.00 \implies 1 - x = \frac{1}{1.4} = \frac{5}{7} \implies x = \frac{2}{7} \approx 28.6\%$ decrease.