COMPOUND PERCENTAGE CHANGE

Mastery Worksheet

I DO

Elena bought a commercial printing machine for £85,000.
In the first year, the value of the machine depreciated by 15%.
In the second year, the value of the machine depreciated by 12%.
In the third year, the value of the machine increased by x%.
At the end of the third year, the value of Elena's machine was £66,759.

Work out the value of x.

WE DO

Marcus bought a delivery van for £40,000.
In the first year, the value of the van depreciated by 20%.
In the second year, the value of the van depreciated by 15%.
In the third year, the value of the van increased by x%.
At the end of the third year, the value of Marcus's van was £29,376.

Work out the value of x.

YOU DO 1

Sarah bought a catering oven for £12,000.
In the first year, the value of the oven depreciated by 10%.
In the second year, the value of the oven depreciated by 5%.
In the third year, the value of the oven increased by x%.
At the end of the third year, the value of Sarah's oven was £11,799.

Work out the value of x.

YOU DO 2

David bought an industrial laser cutter for £65,000.
In the first year, the value of the cutter depreciated by 18%.
In the second year, the value of the cutter depreciated by 10%.
In the third year, the value of the cutter increased by x%.
At the end of the third year, the value of David's cutter was £49,888.80.

Work out the value of x.

CHALLENGE 1 (CURRENCY CONVERSION)

Priya bought a manufacturing robot in Germany for €150,000.
The exchange rate was £1 = €1.20.
In the first year, the value of the robot depreciated by 15%.
In the second year, the value of the robot depreciated by 10%.
In the third year, the value of the robot increased by x%.
At the end of the third year, the value of Priya's robot was £103,275.

Work out the value of x.

CHALLENGE 2 (COMPARISON)

Leo bought a tractor for £80,000.
In the first year, it depreciated by 20%. In the second year, it depreciated by 15%.
In the third year, its value increased by x%.
At the end of the third year, Leo's tractor was valued at £58,752.

Hannah bought a combine harvester for £120,000.
It depreciates at a flat rate of 12% each year for 3 years.

Whose machinery retained a higher percentage of its original value after 3 years, and what was the value of x for Leo's tractor?

ANSWERS & WORKED SOLUTIONS

I Do

Step 1: £85,000 × 0.85 = £72,250

Step 2: £72,250 × 0.88 = £63,580

Step 3: £66,759 ÷ 63,580 = 1.05

Step 4: 1.05 means an increase of 5%

Answer: 5

We Do

Step 1: £40,000 × 0.80 = £32,000

Step 2: £32,000 × 0.85 = £27,200

Step 3: £29,376 ÷ 27,200 = 1.08

Step 4: 1.08 means an increase of 8%

Answer: 8

You Do 1

Step 1: £12,000 × 0.90 = £10,800

Step 2: £10,800 × 0.95 = £10,260

Step 3: £11,799 ÷ 10,260 = 1.15

Step 4: 1.15 means an increase of 15%

Answer: 15

You Do 2

Step 1: £65,000 × 0.82 = £53,300

Step 2: £53,300 × 0.90 = £47,970

Step 3: £49,888.80 ÷ 47,970 = 1.04

Step 4: 1.04 means an increase of 4%

Answer: 4

Challenge 1

Step 1: Original value in Pounds = €150,000 ÷ 1.20 = £125,000

Step 2: Value after Year 1 = £125,000 × 0.85 = £106,250

Step 3: Value after Year 2 = £106,250 × 0.90 = £95,625

Step 4: £103,275 ÷ 95,625 = 1.08

Answer: 8

Challenge 2

Step 1: Leo's tractor after Year 2 = £80,000 × 0.80 × 0.85 = £54,400

Step 2: Leo's x = £58,752 ÷ 54,400 = 1.08 ⇒ $x = 8$

Step 3: Leo's retained % = (£58,752 ÷ £80,000) × 100 = 73.44%

Step 4: Hannah's retained % = 0.88^3 = 0.681472 = 68.15%

Answer: Leo retained more (73.44% vs 68.15%), x = 8