

Name _____

Date _____

10.3 Percentage increase and decrease — worksheet

Increase and decrease a quantity by a percentage, and express a change as a percentage of the original. · 52 questions · Show your working.

Remember

- To **increase** by $p\%$: find $p\%$ and add it. To **decrease**: find $p\%$ and subtract it.
- In one step: increase by 20% is $\times 1.2$; decrease by 20% is $\times 0.8$.
- **Percentage change = $\text{change} \div \text{original} \times 100$.**
- Always divide by the **original** amount, not the new one. This is the single most important rule in the section.
- $40 \rightarrow 50$ is a 25% increase; $50 \rightarrow 40$ is a 20% decrease. The same change, different starting points.
- Up 10% then down 10% does **not** return you to the start: $100 \rightarrow 110 \rightarrow 99$.
- Increasing by 100% doubles an amount; decreasing by 100% leaves nothing.
- Always say whether the change is an increase or a decrease — the number alone is not an answer.

A · Fluency — Increase, decrease and express as a percentage.

- 1 Increase **200** by **10%**.

- 2 Decrease **200** by **10%**.

- 3 Increase **150** by **20%**.

- 4 Decrease **150** by **20%**.

- 5 Increase **80** by **25%**.

- 6 Decrease **80** by **25%**.

- 7 Increase **340** by **5%**.

- 8 Decrease **340** by **5%**.

- 9 Increase **96** by **50%**.

- 10 Decrease **96** by **50%**.

- 11 Increase **400** by **15%**.

- 12 Decrease **400** by **15%**.
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- 13 What is **15** as a percentage of **20**?
-
- 14 What is **9** as a percentage of **12**?
-
- 15 What is **18** as a percentage of **24**?
-
- 16 What is **7** as a percentage of **10**?
-
- 17 What is **30** as a percentage of **40**?
-
- 18 What is **12** as a percentage of **50**?
-
- 19 What is **21** as a percentage of **30**?
-
- 20 What is **36** as a percentage of **48**?
-
- 21 What is **16** as a percentage of **80**?
-
- 22 What is **45** as a percentage of **60**?
-
- 23 A price changes from **40** to **50**. What is the percentage increase? Give the number only.
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- 24 A price changes from **80** to **60**. What is the percentage decrease? Give the number only.
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- 25 A price changes from **25** to **30**. What is the percentage increase? Give the number only.
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- 26 A price changes from **200** to **150**. What is the percentage decrease? Give the number only.
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- 27 A price changes from **60** to **75**. What is the percentage increase? Give the number only.
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- 28 A price changes from **120** to **90**. What is the percentage decrease? Give the number only.
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B · Reasoning — Which amount you divide by, and why.

- 29 To increase an amount by 20%, you can ...
- ☐ multiply by 20
 - ☐ find 20% and add it on
 - ☐ multiply by 0.2
 - ☐ divide by 20
- 30 To decrease an amount by 20%, you can ...
- ☐ find 20% and subtract it
 - ☐ multiply by 20
 - ☐ divide by 20
 - ☐ add 80%

- 31** When you work out a percentage change, what do you divide by?
- ☐ The new amount
 - ☐ The original amount
 - ☐ 100
 - ☐ The change
- 32** A price rises from 40 to 50. Why is that a 25% increase and not a 20% one?
- ☐ It is 20%
 - ☐ The rise of 10 is compared with the original 40, not the new 50
 - ☐ Because $50 - 40 = 10$
 - ☐ Because 25 is halfway
- 33** If a price goes up 10% then down 10%, do you get back to the start?
- ☐ Yes
 - ☐ No
- 34** Increasing by 100% means the amount ...
- ☐ stays the same
 - ☐ doubles
 - ☐ trebles
 - ☐ halves
- 35** Decreasing by 100% leaves you with ...
- ☐ the same
 - ☐ half
 - ☐ nothing
 - ☐ double
- 36** What must you always state alongside a percentage change?
- ☐ The date
 - ☐ Whether it is an increase or a decrease
 - ☐ The units
 - ☐ Nothing

C · Challenge — Two changes in a row.

- 37** A price of \$250 rises by 12%. What is the new price, in dollars?
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- 38** A price of \$250 falls by 12%. What is the new price, in dollars?
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-
- 39** A price rises from 80 to 100. What is the percentage increase?
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- 40** A price falls from 100 to 80. What is the percentage decrease?
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- 41** A price goes up 10% then down 10%, starting at 200. What is the final price, in dollars?
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- 42** A shop increases a price by 20% then offers 20% off. Starting at 50, what is the final price, in dollars?

D · Word problems — Sales, salaries and populations.

- 43** A jacket costing \$90 is reduced by 30%. What is the sale price, in dollars?

- 44** A salary of \$30 000 rises by 4%. What is the new salary, in dollars?

- 45** A class of 25 grows to 30. What is the percentage increase?

- 46** A journey of 50 minutes is cut to 40 minutes. What is the percentage decrease?

- 47** A learner scores 18 out of 25. What percentage is that?

- 48** A shop sells 240 of 300 tickets. What percentage is sold?

- 49** A bike costing \$200 is reduced by 15%. What is the sale price, in dollars?

- 50** A town of 8000 grows by 2.5%. What is the new population?

- 51** A phone bill falls from \$60 to \$45. What is the percentage decrease?

- 52** A recipe for 4 is increased by 50% to serve more. How many does it now serve?
