

Name _____

Date _____

10.2 Percentages of a quantity — worked answers

Find a percentage of a quantity, using mental methods built from 10% and 1%. · 52 questions

A · Fluency — Percentages of whole numbers and money.

- 1 Work out **50% of 80**.

Answer: 40

50% is $\frac{1}{2}$, so 50% of 80 is $80 \div 2 = 40$.

- 2 Work out **25% of 60**.

Answer: 15

25% is $\frac{1}{4}$, so 25% of 60 is $60 \div 4 = 15$.

- 3 Work out **10% of 90**.

Answer: 9

10% is $\frac{1}{10}$, so 10% of 90 is $90 \div 10 = 9$.

- 4 Work out **20% of 45**.

Answer: 9

20% is $\frac{1}{5}$, so 20% of 45 is $45 \div 5 = 9$.

- 5 Work out **75% of 40**.

Answer: 30

75% is $\frac{3}{4}$, so 75% of 40 is $40 \div 100 \times 75 = 30$.

- 6 Work out **5% of 300**.

Answer: 15

5% is $\frac{1}{20}$, so 5% of 300 is $300 \div 20 = 15$.

- 7 Work out **10% of 250**.

Answer: 25

10% is $\frac{1}{10}$, so 10% of 250 is $250 \div 10 = 25$.

- 8 Work out **50% of 36**.

Answer: 18

50% is $\frac{1}{2}$, so 50% of 36 is $36 \div 2 = 18$.

- 9 Work out **25% of 48**.

Answer: 12

25% is $\frac{1}{4}$, so 25% of 48 is $48 \div 4 = 12$.

- 10 Work out **20% of 150**.

Answer: 30

20% is $\frac{1}{5}$, so 20% of 150 is $150 \div 5 = 30$.

- 11** Work out **75% of 200**.

Answer: 150

75% is $\frac{3}{4}$, so 75% of 200 is $200 \div 100 \times 75 = 150$.

- 12** Work out **5% of 80**.

Answer: 4

5% is $\frac{1}{20}$, so 5% of 80 is $80 \div 20 = 4$.

- 13** Work out **15% of 60**.

Answer: 9

1% of 60 is 0.6, so 15% is $0.6 \times 15 = 9$.

- 14** Work out **35% of 80**.

Answer: 28

1% of 80 is 0.8, so 35% is $0.8 \times 35 = 28$.

- 15** Work out **12% of 50**.

Answer: 6

1% of 50 is 0.5, so 12% is $0.5 \times 12 = 6$.

- 16** Work out **30% of 70**.

Answer: 21

1% of 70 is 0.7, so 30% is $0.7 \times 30 = 21$.

- 17** Work out **45% of 120**.

Answer: 54

1% of 120 is 1.2, so 45% is $1.2 \times 45 = 54$.

- 18** Work out **60% of 85**.

Answer: 51

1% of 85 is 0.85, so 60% is $0.85 \times 60 = 51$.

- 19** Work out **8% of 250**.

Answer: 20

1% of 250 is 2.5, so 8% is $2.5 \times 8 = 20$.

- 20** Work out **65% of 40**.

Answer: 26

1% of 40 is 0.4, so 65% is $0.4 \times 65 = 26$.

- 21** Work out **18% of 150**.

Answer: 27

1% of 150 is 1.5, so 18% is $1.5 \times 18 = 27$.

- 22** Work out **95% of 60**.

Answer: 57

1% of 60 is 0.6, so 95% is $0.6 \times 95 = 57$.

- 23** Work out **10% of \$45.50**. Give the number of dollars.

Answer: 4.55

10% of 45.50 = 4.55.

- 24** Work out **20% of \$32.80**. Give the number of dollars.

Answer: 6.56

20% of 32.80 = 6.56.

- 25** Work out **25% of \$19.60**. Give the number of dollars.

Answer: 4.9

25% of 19.60 = 4.9.

- 26** Work out **5% of \$128.40**. Give the number of dollars.

Answer: 6.42

5% of 128.40 = 6.42.

- 27** Work out **50% of \$17.30**. Give the number of dollars.

Answer: 8.65

50% of 17.30 = 8.65.

- 28** Work out **15% of \$240.00**. Give the number of dollars.

Answer: 36

15% of 240.00 = 36.

B · Reasoning — The mental methods, and why they work.

- 29** What is the quickest way to find 10% of a number?

- ☐ Divide by 10
- ☐ Multiply by 10
- ☐ Divide by 100
- ☐ Subtract 10

Answer: Divide by 10

10% is one tenth.

- 30** What is the quickest way to find 1% of a number?

- ☐ Divide by 10
- ☐ Divide by 100
- ☐ Multiply by 100
- ☐ Subtract 1

Answer: Divide by 100

1% is one hundredth. From 1% you can build any percentage.

- 31** How would you find 35% of a number without a calculator?

- ☐ Find 35 lots
- ☐ Find 10%, treble it, then add half of the 10%
- ☐ Divide by 35
- ☐ Multiply by 3.5

Answer: Find 10%, treble it, then add half of the 10%

10% + 10% + 10% + 5% = 35%. Building from 10% and 5% handles most percentages mentally.

32 Why is finding 50% the same as halving?

- ☐ It is not
- ☐ 50% is $\frac{1}{2}$
- ☐ 50 is half of 100 so it is a coincidence
- ☐ Because $50 \times 2 = 100$

Answer: 50% is $\frac{1}{2}$

50/100 simplifies to $\frac{1}{2}$.

33 25% of a number is the same as ...

- ☐ dividing by 4
- ☐ dividing by 25
- ☐ multiplying by 4
- ☐ dividing by 2

Answer: dividing by 4

25% is $\frac{1}{4}$.

34 Is 20% of 50 the same as 50% of 20?

- ☐ Yes
- ☐ No

Answer: Yes

Both are 10. Percentages are commutative: $p\%$ of $n = n\%$ of p , because both are $p \times n \div 100$.

35 A quantity is 200 and you take 150% of it. Is the answer bigger or smaller than 200?

- ☐ Bigger
- ☐ Smaller
- ☐ The same
- ☐ It cannot be done

Answer: Bigger

Anything over 100% gives more than you started with: 150% of 200 is 300.

36 Why is it useful to find 10% first?

- ☐ It is the easiest to work out and other percentages build from it
- ☐ It is the biggest
- ☐ It is always the answer
- ☐ It is not useful

Answer: It is the easiest to work out and other percentages build from it

10% is a single division. 5% is half of it, 20% is double it, 30% is treble it.

C · Challenge — Awkward percentages, and going backwards.

37 Find 17.5% of 240.

Answer: 42

10% is 24, 5% is 12, 2.5% is 6. Adding: $24 + 12 + 6 = 42$.

38 Find 12.5% of 96.

Answer: 12

12.5% is $\frac{1}{8}$, and $96 \div 8 = 12$.

39 Find 65% of 180.

Answer: 117

10% is 18, so 60% is 108. 5% is 9. Adding: $108 + 9 = 117$.

- 40 30% of a number is 24. What is the number?

Answer: 80

10% is $24 \div 3 = 8$, so 100% is 80.

- 41 15% of a number is 45. What is the number?

Answer: 300

5% is 15, so 100% is $15 \times 20 = 300$.

- 42 A number increased by 10% gives 88. What was the number?

Answer: 80

88 is 110% of the original, so 1% is 0.8 and 100% is 80.

D · Word problems — Discounts, rises and shares.

- 43 A jacket costs \$80 with 25% off. How much is taken off, in dollars?

Answer: 20

25% of 80 = 20.

- 44 A jacket costs \$80 with 25% off. What is the sale price, in dollars?

Answer: 60

$80 - 20 = 60$.

- 45 A class of 30 has 20% absent. How many are absent?

Answer: 6

20% of 30 = 6.

- 46 A bill of \$60 has 15% service added. How much is the service charge, in dollars?

Answer: 9

15% of 60 = 9.

- 47 A phone costs \$450 and the price rises by 8%. How much does it rise, in dollars?

Answer: 36

8% of 450 = 36.

- 48 A tank holds 240 litres and is 35% full. How many litres is that?

Answer: 84

35% of 240 = 84.

- 49 A town of 12 000 people grows by 5%. How many extra people?

Answer: 600

5% of 12 000 = 600.

- 50 A book of 320 pages has been 45% read. How many pages is that?

Answer: 144

45% of 320 = 144.

- 51 A salary of \$2400 rises by 12%. What is the rise, in dollars?

Answer: 288

12% of 2400 = 288.

- 52 A shop takes 30% off a \$65 coat. What is the discount, in dollars?

Answer: 19.5

30% of 65 = 19.50.