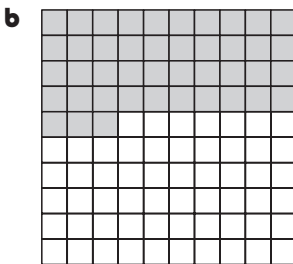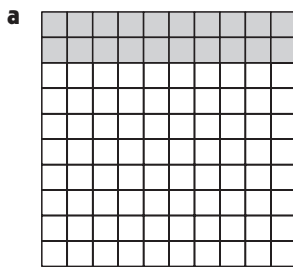# CHAPTER 8: PERCENTAGE

8A   UNDERSTANDING PERCENTAGES

REMINDER

All fractions and decimals may be converted into percentage form by first writing them as fractions with a denominator of 100.

$$\frac{x}{100} = x\%$$

1 What percentage is represented by the following shaded diagrams?

  a

  b

2 Convert to a percentage:

  a $\dfrac{27}{100}$ **b** $\dfrac{98}{100}$

  c $\dfrac{225}{100}$

3 Write the following as fractions with denominator 100, and then convert to percentages:

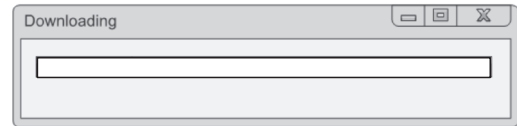 **a** $\dfrac{22}{50}$ **b** $\dfrac{18}{25}$

  c 0.6   **d** 0.72

  e 3   **f** $\dfrac{2}{5}$

  g $1\dfrac{1}{2}$ **h** 8.45

4 Shade in the bar below to show a 40% complete download.

5 Annie, Beth, and Caitlin each have their own water bottle when exercising.

  Annie's   Beth's   Caitlin's

Whose bottle is:

  a 10% full

  b 50% full

  c 75% full?

8B   INTERCHANGING NUMBER FORMS

REMINDER

To convert fractions and decimals into percentage form, we multiply the fraction or decimal by 100%.

1 Convert to percentage form by multiplying by 100%:

  a $\dfrac{9}{100}$ **b** $\dfrac{49}{50}$

  c $\dfrac{11}{20}$ **d** $1\dfrac{1}{4}$

2 Convert to percentage form:

   a 0.1   **b** 3.5

   c 0.82   **d** 0.021

   e 1.05

REMINDER

To convert a percentage to a fraction, we write the percentage as a fraction with denominator 100, then simplify the fraction.

To convert a percentage to a decimal, we divide by 100%.

---

3 Express as a fraction in lowest terms:

   a 50%   **b** 80%

   c 35%   **d** 170%

4 Write as a fraction in lowest terms:

   a $1\frac{1}{2}\%$ **b** $33\frac{1}{3}\%$

   c $4\frac{7}{10}\%$ **d** $2\frac{1}{8}\%$

5 Write as a decimal:

   a 10%   **b** 59%

   c 16%   **d** 4%

   e 500%   **f** 0.003%

6 Michael is writing a 20 chapter textbook. He has written 17 of the chapters.

   a What fraction of the chapters has been written?

   b What percentage of the chapters *has not* been written?

8C   **ONE QUANTITY AS A PERCENTAGE OF ANOTHER**

REMINDER

To express one quantity as a percentage of another, we first write them as a fraction with the same units and then convert the fraction to a percentage.

---

1 Express the first quantity as a percentage of the second:

   a 4 km, 8 km

   b $3, $5

   c 30 minutes, 40 minutes

   d 150 mL, 400 mL

   e 48 minutes, 1 hour

   f 8 months, 1 year

   g 5 mm, 2.5 m

2 Express as a percentage:

  a 22 marks out of a possible 40 marks

  b 350 sheets of paper out of 500 sheets of paper

  c 3 staff members sick out of 20 staff members.

3 Express as a percentage:

  a $90 out of $225

  b 15 m out of 60 m

  c 15 hours out of 2 days

4 Due to bad weather one day, 35% of the flights leaving Adelaide Airport were delayed. Of the 60 flights leaving the Airport that day, how many were delayed?

5 For milk to be labelled "reduced fat", it must contain 1.5% fat or less. A 2 L bottle of milk contains 25 mL of fat. Can this bottle of milk be labelled "reduced fat"?

8D   **FINDING A PERCENTAGE OF A QUANTITY**

REMINDER

To find a **percentage of a quantity**, we first convert the percentage to a **decimal**. We then **multiply** to find the required fraction *of* the quantity.

---

1 Find:

  a 30% of 40 marks

  b 58% of 50 people

  c 210% of $20

  d 98% of 4 tonnes

  e 0.75% of 2 m (in mm)

2 Bob donates 10% of his pay each week to charity. Last week he earned $720. How much did he donate to charity?

3 A 600 mL carton of strawberry milk contains 4% strawberry pulp. How many mL is this?

4 A school has 60 Year 7 students. Of these, 40% play school sport, 55% are girls, 30% ride their bike to school, and 15% catch the bus to school. Calculate the number of students who:

  a are girls

  b do not play school sport
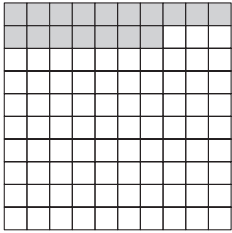
  c catch the bus to school

  d ride their bike *or* catch the bus to school.

REVIEW OF CHAPTER 8

1 What percentage is represented by the following diagram?

2 Write as a percentage:

   a $\dfrac{62}{100}$ **b** $\dfrac{1}{8}$

   c 0.0018   **d** 4

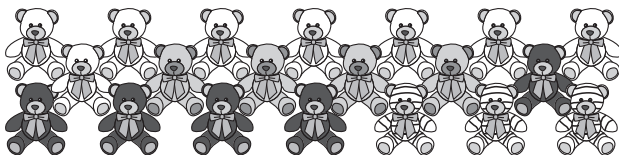**3** Write 42% as a fraction in lowest terms.

4 Write 330% as a decimal.

5 Express 6 hours as a percentage of one day.

6 Find 48% of $300.

7 85% of grapes harvested at a vineyard are fit for sale. If the harvest is 440 tonnes, how many tonnes are fit for sale?

8 A sideshow has the following in its prize display:

   What percentage of teddy bears are:
   a white

b light grey

c either dark grey or striped?

9 In a carpark with 160 vehicles, 65% are cars, 20% are vans, and the remainder are utes. Find:
   a the number of utes

   b the number of cars.

10 A house occupies 236 square metres of a 400 square metre block of land. What percentage is this?