**Percentages**

**Percentage Problems in Context**

**Complete the following exercises. Show the working for your answers.**

1.Gary spends 65% of his wages on food and rent. He sets aside 25% for bills. The rest is spent on his motorbike.

|  |  |
| --- | --- |
|  | Answer  |
| What percentage of his wages does Gary spend on his motorbike? |  |
| Gary’s wages are $480 per week. How much is set aside for bills? |  |

2.In a class of 30 girls, 12 play hockey after school.

|  |  |
| --- | --- |
|  | Answer |
| What fraction of the class plays hockey? |  |
| What percentage of the class plays hockey? |  |

3.At Mountain Valley High School, 240 students voted to select a representative for the Board of Trustees:

|  |  |
| --- | --- |
|  | Answer |
| Megan got 33⅓% of the votes. How many votes did Megan get? |  |
| Todd got 48 votes. What percentage of the votes did Todd get? |  |

4.A total of 45 points were scored in a game of rugby. 30 points were scored through tries.

20% of the points were scored through penalties.

|  |  |
| --- | --- |
|  | Answer |
| What percentage was scored through tries? |  |
| How many points were scored through penalties? |  |
| The remainder of the points were scored through conversions (2 points each). How many conversions were there in this game? |  |

5.Hail damaged 3% of the windows in a high-rise building with 500 windows. How many windows were damaged by hail?

6.There is 12g of dietary fibre in one 75g serving of muesli. What percentage of a serving of muesli is dietary fibre?

7.This an extract from a newspaper article: *“There are about 500 cases of meningitis each year. One in twenty sufferers die from the disease”.*

|  |  |
| --- | --- |
|  | Answer |
| Write 1 in 20 as a percentage. |  |
| How many meningitis sufferers are expected to die from the disease each year? |  |

8.Mrs Brown has health insurance. Eighty percent of her doctor’s bill is refunded by her insurance company. Today Mrs Brown paid $48.50 for a doctor’s visit. How much money will Mrs Brown have to pay herself?

9.New Zealand’s population was about 3,750,000 in the year 2000. 22% of the population were aged 0-14 years old. How many children aged 0-14 years old lived in NZ in 2000?

**ANSWERS:**

1.Gary spends 65% of his wages on food and rent. He sets aside 25% for bills. The rest is spent on his motorbike.

|  |  |
| --- | --- |
|  | Answer  |
| What percentage of his wages does Gary spend on his motorbike? | 100% - 65% -25% = 10% |
| Gary’s wages are $480 per week. How much is set aside for bills? | 480 ÷4 = $120 or,0.25 x 480 = $120 |

2.In a class of 30 girls, 12 play hockey after school.

|  |  |
| --- | --- |
|  | Answer |
| What fraction of the class plays hockey? | 12/30  |
| What percentage of the class plays hockey? | 12/30 = 4/10 = 40/100 or 40%12/30 = 0.4, 40% |

3.At Mountain Valley High School, 240 students voted to select a representative for the Board of Trustees:

|  |  |
| --- | --- |
|  | Answer |
| Megan got 33⅓% of the votes. How many votes did Megan get? | 33⅓% = ⅓ when roundedSo calculate ⅓ x 240 =240÷3 = 80Or $\frac{33.3}{100 }$ x $\frac{240}{1 }$ == $\frac{33.3 x 240}{100 }$ = 80.16 |
| Todd got 48 votes. What percentage of the votes did Todd get? | 48/240 =2/10= 20% |

4.A total of 45 points were scored in a game of rugby. 30 points were scored through tries. 20% of the points were scored through penalties.

|  |  |
| --- | --- |
|  | Answer |
| What percentage was scored through tries? | 30/45 = 2/3 = 66$\frac{2}{3}$ %or 66.7% (1d.p.) |
| How many points were scored through penalties? | 20/100 x 45 = 9or 10% + 10% = 4.5 + 4.5 = 9 |
| The remainder of the points were scored through conversions (2 points each). How many conversions were there in this game? | Total points = 4530 from tries, 9 from penalties, so 6 points remaining, so 3 conversions |

5.Hail damaged 3% of the windows in a high-rise building with 500 windows. How many windows were damaged by hail?

15 windows 1% =5 3% = 5x3 = 15

6.There is 12g of dietary fibre in one 75g serving of muesli. What percentage of a serving of muesli is dietary fibre? 12/75 = 4/25 = 16/100 = 16%

7.This an extract from a newspaper article: *“There are about 500 cases of meningitis each year. One in twenty sufferers die from the disease”.*

|  |  |
| --- | --- |
|  | Answer |
| Write 1 in 20 as a percentage. | 1/20 = 5/100 = 5% |
| How many meningitis sufferers are expected to die from the disease each year? | 5% of 500 10% = 50 50÷2 = 25  |

8.Mrs Brown has health insurance. Eighty percent of her doctor’s bill is refunded by her insurance company. Today Mrs Brown paid $48.50 for a doctor’s visit. How much money will Mrs Brown have to pay herself?

0.8 x 48.50 = **$38.80**, or 10% = $4.85 $ 4.85 x 2 = $9.70 $48.50 - $9.70 = **$38.80**

9.New Zealand’s population was about 3,750,000 in the year 2000. 22% of the population were aged 0-14 years old. How many children aged 0-14 years old lived in NZ in 2000?

22/100 of 3,750,000 = 825,000 3,750,000 ÷ 100 = 37,500 37,500 x 22 = 825,000

Adapted from: Geldof, W. (2010). On Track 2: Mathematics Workbook

Tauranga: Sigma Publications