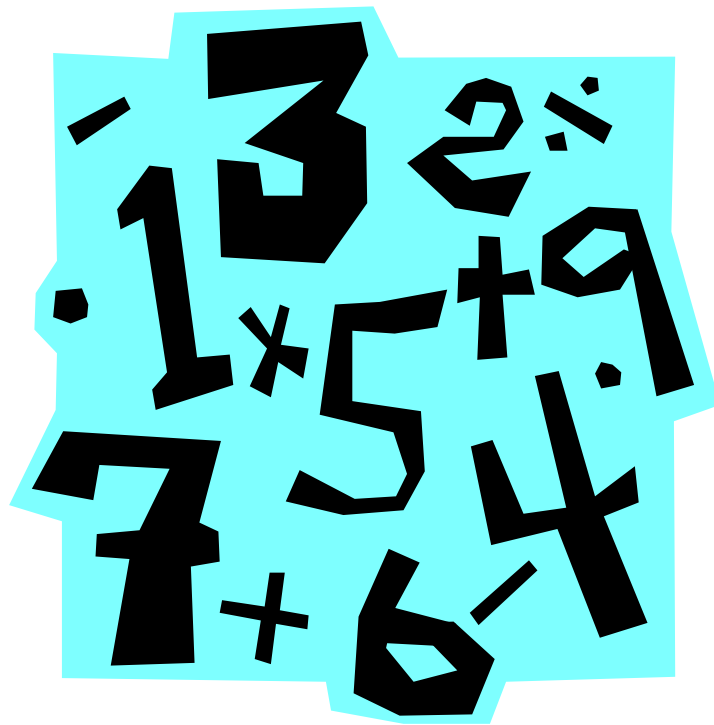


Part A

Fundamental Level

(Up to the end of Math 025)



Whole Numbers

*Do not use a calculator in this section***Exercises***Answers on page A 33***Add**

1.
$$\begin{array}{r} 16 \\ + 24 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 183 \\ + 275 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 6230 \\ + 2148 \\ \hline \end{array}$$

Subtract

4.
$$\begin{array}{r} 54 \\ - 23 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 423 \\ - 187 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 5000 \\ - 1421 \\ \hline \end{array}$$

Multiply

7.
$$\begin{array}{r} 42 \\ \times 12 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 18 \\ \times 20 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 316 \\ \times 104 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 8231 \\ \times 132 \\ \hline \end{array}$$

Divide

11. $8 \overline{)584}$

12. $9 \overline{)774}$

13. $52 \overline{)4836}$

14. $3960 \div 8$

15. $7218 \div 9$

16. $3612 \div 42$

17. Jim drives at an average speed of 75 km per hour. How long will it take him to drive 450 km at this speed?
18. Mary earned \$212 one week, \$302 the next week, and \$178 the third week. What were her total earnings?
19. How many 2 kg boxes can be filled from 178 kg of sugar?

Fractions

*Do not use a calculator in this section***Review**

A fraction is a number which consists of two parts, a **numerator** (top) over a **denominator** (bottom).

Example: $\frac{2}{3}$ $\frac{\text{numerator}}{\text{denominator}}$

Fractions must always be reduced to their lowest terms in final answers. Lowest terms means the lowest numerator and denominator. Fractions are reduced to their lowest terms by removing factors common to both the numerator and the denominator.

Example: $\frac{12}{16}$ Both the 12 and the 16 can be divided by 4.

So $\frac{12}{16} = \frac{3}{4}$ (lowest terms)

If the numerator is larger than the denominator, then the number is an **improper** fraction.

Example: $\frac{6}{5}$

Improper fractions can be expressed as a **mixed number** part whole number, part fraction.

Example: $\frac{6}{5}$ (improper fraction) = $1\frac{1}{5}$ (mixed number)

Mixed numbers can be expressed as **improper fractions**.

Example: $4\frac{2}{3}$ (mixed number) = $\frac{14}{3}$ (improper fraction)

Exercises*Answers on page A 33***Simplify the following fractions (reduce to lowest terms)**

20. $\frac{9}{12}$

21. $\frac{8}{12}$

22. $\frac{6}{8}$

23. $\frac{15}{30}$

24. $\frac{20}{25}$

25. $\frac{14}{21}$

26. $\frac{8}{16}$

27. $\frac{24}{36}$

28. $\frac{66}{99}$

29. $\frac{18}{30}$

Change the following to mixed numbers

30. $\frac{7}{5}$

31. $\frac{18}{11}$

32. $\frac{70}{61}$

33. $\frac{12}{5}$

34. $\frac{100}{99}$

35. $\frac{25}{2}$

Change the following to improper fractions

36. $2\frac{1}{5}$

37. $6\frac{3}{8}$

38. $8\frac{2}{3}$

39. $11\frac{1}{5}$

40. $9\frac{4}{5}$

41. $4\frac{3}{4}$

Simplify the following fractions (reduce to lowest terms)

42. $\frac{28}{40}$

43. $\frac{80}{10}$

44. $2\frac{12}{18}$

45. $5\frac{27}{54}$

46. $\frac{25}{15}$

47. $\frac{90}{12}$

Adding or Subtracting with Fractions

In order to add or subtract, fractions must have a common denominator. This is not required for multiplication or division of fractions.

Examples of Adding

With the same denominator—*note that you just add the numerators*

$$\frac{1}{4} + \frac{2}{4} = \frac{3}{4} \quad \text{or} \quad \begin{array}{r} \frac{1}{4} \\ + \frac{2}{4} \\ \hline \frac{3}{4} \end{array}$$

With different denominators—*note that you just add the numerators*

$$\frac{2}{4} + \frac{5}{8} = \frac{4}{8} + \frac{5}{8} = \frac{9}{8} = 1\frac{1}{8} \quad \text{or} \quad \begin{array}{r} \frac{2}{4} = \frac{4}{8} \\ + \frac{5}{8} = \frac{5}{8} \\ \hline \frac{9}{8} = 1\frac{1}{8} \end{array}$$

Note that $\frac{2}{4}$ was changed to $\frac{4}{8}$ before the fractions could be added, by multiplying the numerator and denominator by the same number—in this case it was 2.

With mixed numbers where denominators had to be changed

$$2\frac{1}{2} + 3\frac{4}{5} = 2\frac{5}{10} + 3\frac{8}{10} = 5\frac{13}{10} = 6\frac{3}{10} \quad \text{or} \quad \begin{array}{r} 2\frac{1}{2} = 2\frac{5}{10} \\ + 3\frac{4}{5} = 3\frac{8}{10} \\ \hline 5\frac{13}{10} = 6\frac{3}{10} \end{array}$$

Examples of Subtracting

With the same denominator—*note that you just subtract the numerators*

$$\frac{4}{5} - \frac{1}{5} = \frac{3}{5} \qquad \text{or} \qquad \begin{array}{r} \frac{4}{5} \\ - \frac{1}{5} \\ \hline \frac{3}{5} \end{array}$$

With different denominators—*note that you just subtract the numerators*

$$\frac{7}{8} - \frac{3}{4} = \frac{7}{8} - \frac{6}{8} = \frac{1}{8} \qquad \text{or} \qquad \begin{array}{r} \frac{7}{8} = \frac{7}{8} \\ - \frac{3}{4} = \frac{6}{8} \\ \hline \frac{1}{8} \end{array}$$

With mixed numbers where the denominators had to be changed

$$2\frac{2}{3} - 1\frac{1}{4} = 2\frac{8}{12} - 1\frac{3}{12} = 1\frac{5}{12} \qquad \text{or} \qquad \begin{array}{r} 2\frac{2}{3} = 2\frac{8}{12} \\ - 1\frac{1}{4} = 1\frac{3}{12} \\ \hline 1\frac{5}{12} \end{array}$$

With borrowing—*note that you must **borrow** from the whole number.*

For example, in the fraction $8\frac{2}{4}$, 8 becomes $7\frac{4}{4}$ then we add $\frac{2}{4}$ to make $7\frac{6}{4}$

$$8\frac{1}{2} - 2\frac{3}{4} = 8\frac{2}{4} - 2\frac{3}{4} = 7\frac{6}{4} - 2\frac{3}{4} = 5\frac{3}{4} \qquad \text{or} \qquad \begin{array}{r} 8\frac{1}{2} = 8\frac{2}{4} = 7\frac{6}{4} \\ - 2\frac{3}{4} = 2\frac{3}{4} = 2\frac{3}{4} \\ \hline 5\frac{3}{4} \end{array}$$

Multiplying or Dividing with Fractions

Fractions do not have to have a common denominator for multiplication or division.

Examples of Multiplying

$$\frac{2}{3} \times \frac{4}{5} = \frac{8}{15}$$

When multiplying mixed numbers you must change the fractions to improper fractions

$$1\frac{1}{2} \times 2\frac{3}{4} = \frac{3}{2} \times \frac{11}{4} = \frac{33}{8} = 4\frac{1}{8}$$

Note that when multiplying, numbers can sometimes be cancelled or reduced first. This keeps the numbers small and manageable.

$$\frac{4^2}{5_1} \times \frac{10^2}{2_1} = \frac{2 \times 2}{1 \times 1} = \frac{4}{1} = 4$$

Examples of Dividing

Note that when dividing fractions, invert the second fraction (or term) and then multiply.

$$\frac{4}{7} \div \frac{2}{3} = \frac{4}{7} \times \frac{3}{2} = \frac{12}{14} = \frac{6}{7}$$

When dividing mixed numbers, change mixed numbers to improper fractions before inverting the second fraction (or term) and then multiply

$$4\frac{3}{5} \div 2\frac{1}{2} = \frac{23}{5} \div \frac{5}{2} = \frac{23}{5} \times \frac{2}{5} = \frac{46}{25} = 1\frac{21}{25}$$

Exercises*Answers on page A 33-34***Add the following**

48. $\frac{1}{5} + \frac{2}{5}$

49. $\frac{4}{5} + \frac{3}{5}$

50. $\frac{2}{3} + \frac{1}{9}$

51. $\frac{1}{2} + \frac{3}{8}$

52. $3\frac{1}{2} + 4\frac{1}{4}$

53. $9\frac{2}{3} + 3\frac{1}{6}$

Subtract the following

54. $\frac{9}{12} - \frac{1}{8}$

55. $9\frac{2}{3} - 6\frac{1}{6}$

56. $4\frac{1}{2} - 1\frac{1}{4}$

57. $\frac{3}{4} - \frac{5}{8}$

58. $6\frac{1}{3} - 2\frac{2}{3}$

59. $16\frac{2}{3} - 5\frac{3}{4}$

Multiply the following

60. $\frac{2}{3} \times \frac{3}{4}$

61. $\frac{5}{3} \times \frac{9}{15}$

62. $2\frac{4}{5} \times 3\frac{4}{7}$

63. $2\frac{5}{12} \times 6$

Divide the following

64. $\frac{3}{5} \div \frac{9}{15}$

65. $\frac{3}{7} \div \frac{12}{5}$

66. $\frac{27}{30} \div 8\frac{1}{3}$

67. $4\frac{2}{3} \div 3\frac{1}{2}$

Problems involving fractions

68. Tom usually takes $\frac{3}{4}$ of an hour to drive to work. One day, due to flooding of the road, it took him $1\frac{1}{2}$ hours longer. How long did the journey take him that day?

69. Mary and John want to save \$7,000 for a down payment on a house. So far they have saved $\frac{4}{5}$ of what they need. How much have they saved?

70. A recipe calls for $\frac{2}{3}$ kg of sugar. How many times can Bill use the recipe before he uses 6 kg of sugar?

Decimals

Review of the Decimal System

The decimal system is another way of expressing a part of a whole number. Decimals can be written as decimal fractions with denominators of 10 or 100 or 1,000 etc. In a decimal the number of decimal places refers to how many zeros will be in the denominator of the equivalent decimal fraction.

The **first** decimal place refers to **tenths** $2.3 = 2\frac{3}{10}$

The **second** decimal place refers to **hundredths** $2.31 = 2\frac{31}{100}$

The **third** decimal place refers to **thousandths** $2.319 = 2\frac{319}{1000}$

Note that the number 2.319 is read as “two and three hundred nineteen thousandths” or “two point three one nine”.

Similarly six decimal places would be a decimal fraction with a denominator of 1,000,000 (millionths). The most common usage of decimals is in our monetary system where 100 cents (2 decimal places) make up one dollar.

For example, \$2.41 is really two dollars and forty-one hundredths ($\frac{41}{100}$) of a dollar.

Examples

Change 2.30 to a fraction. $2.30 = 2\frac{30}{100} = 2\frac{3}{10}$

Note that 2.30 is the same as 2.3. In fact, $2.3 = 2.300 = 2.3000$, etc.

Change 0.791 to a fraction $0.791 = \frac{791}{1000}$

Note that $0.791 = .791$. The zero in front of the decimal place is not needed but usually written with numbers of less than 1 to draw attention to the decimal point.

Change 0.003 to a fraction $0.003 = \frac{3}{1000}$

*Notice that the zeros **after** the decimal point and **before** the number are important.*

Simplify 0.0024000 $0.0024000 = 0.0024$

Notice that the zeros at the end (to the right) are not needed.

Operations with Decimals

Addition or Subtraction

Place numbers so that the decimal points line up vertically.

Examples

$21.43 + 8.1 + 120.235$ is written as

$$\begin{array}{r} 21.43 \\ 8.1 \\ \underline{120.235} \\ 149.765 \end{array}$$

$234.06 - 128.7$ is written as

$$\begin{array}{r} 234.06 \\ -128.7 \\ \hline 105.36 \end{array}$$

Multiplication

Ignore the decimals and multiply the numbers. Then count the decimal places in *both* numbers. That is the number of decimal places in your answer.

Example: 2.12×4.2 is written as

$$\begin{array}{r}
 2.12 \quad (2 \text{ places}) \\
 \times 4.2 \quad (1 \text{ place}) \\
 \hline
 424 \\
 8480 \\
 \hline
 8.904 \quad (3 \text{ places})
 \end{array}$$

Division

The divisor must be a whole number or converted to a whole number.

Divisor is a whole number: $232.2 \div 12$ is written as $12 \overline{)232.2}$

$$\begin{array}{r}
 19.35 \\
 12 \overline{)232.20} \\
 \underline{12} \\
 112 \\
 \underline{108} \\
 42 \\
 \underline{36} \\
 60 \\
 \underline{60} \\
 0
 \end{array}$$

Add a zero to continue dividing

Divisor not a whole number: $51 \div 0.003$ is written as $0.003 \overline{)51.000}$

$$\begin{array}{r}
 17000 \\
 3 \overline{)51000} \\
 \underline{3} \\
 21 \\
 \underline{21} \\
 0
 \end{array}$$

*Move the decimal point 3 places to the right on **both** numbers.*

Exercises*Answers on page A 34***Add (remember to line up the decimal points)**

$$\begin{array}{r} 18.4 \\ 71. \quad 13.7 \\ \underline{16.3} \end{array}$$

$$\begin{array}{r} 21.45 \\ 72. \quad 8.2 \\ \underline{9.214} \end{array}$$

$$\begin{array}{r} 145.8 \\ 73. \quad 27.21 \\ \underline{16.4} \end{array}$$

74. $18.2 + 137.81 + 23.45 =$

75. $128.75 + 13 + 200.8 + 175.26 =$

Subtract (remember to line up the decimal points)

$$\begin{array}{r} 76. \quad 15.85 \\ \underline{-12.37} \end{array}$$

$$\begin{array}{r} 77. \quad 814.14 \\ \underline{-25.85} \end{array}$$

$$\begin{array}{r} 78. \quad 2000 \\ \underline{-1428.7} \end{array}$$

79. $250.8 - 12.74 =$

80. $3500 - 497.18 =$

Multiply *(remember to count the decimal points and move from the end of the number to the left)*

81. $41.2 \times 5 =$

82. 394.12×2.1

83. $512.1 \times 16.02 =$

84. $81.75 \times 3.2 =$

Divide *(remember the divisor must be a whole number, so move the decimal in both numbers)*

85. $24.8 \div 8 =$

86. $16.2 \div 0.02$

87. $18.8 \div 0.8 =$

88. $129.03 \div 2.3 =$

Problems involving Decimals

89. The average life expectancy for men is 68.1 years and for women is 75.4 years. by how many years do women outlive men on average?
90. Mark drives 12 miles to work. One mile equals 1.6 kilometres. Find the distance Mark drives to work in kilometres.

Percentage

Do not use a calculator in this section

Review

A percentage is another way of expressing a number, in this case as a fraction whose denominator is 100.

For example, 28% means $\frac{28}{100}$

A percent means a part of 100. If you get 95% on a test, your mark was 95 out of 100.

Fractions, decimals and percentages can be interchanged.

Changing Percentage to Fractions

Change a percentage to a fraction by simply dividing the percentage number by 100.

$$93\% = \frac{93}{100}$$

Put the % number over 100 and reduce if necessary.

$$50\% = \frac{50}{100} = \frac{1}{2}$$

$$24\% = \frac{24}{100} = \frac{6}{25}$$

If a decimal appears in the fraction, multiply the fraction by 10 or 100 or 1000, etc. to produce an equivalent fraction without decimals.

$$26.3\% = \frac{26.3 \times 10}{100 \times 10} = \frac{263}{1000}$$

$$5.55\% = \frac{5.55 \times 100}{100 \times 100} = \frac{555}{10000} = \frac{111}{2000}$$

Changing Percentage to Decimals

Change a percentage to a decimal by simply dividing the percentage number by 100—which is the same as moving the decimal point 2 places to the *left*.

$$50\% = .50 \text{ or } 0.5$$

$$9.23\% = 0.0923$$

$$4\% = 0.04$$

$$148\% = 1.48$$

Changing Fractions to Percent

If you get 17 out of 20 for a test, it is convenient to change this mark to a percentage.

This means changing $\frac{17}{20}$ to an equivalent fraction with 100 as the denominator.

That is, $\frac{17}{20} = \frac{?}{100}$

To change fractions to % simply multiply the fraction by 100%

$$\frac{17}{20} = \frac{17}{20} \times 100\% = \frac{1700}{20} = 85\%$$

$$\frac{1}{2} = \frac{1}{2} \times 100\% = \frac{100}{2} = 50\%$$

$$\frac{2}{3} = \frac{2}{3} \times 100\% = \frac{200}{3} = 66.6\% \text{ or } 66\frac{2}{3}\%$$

$$\frac{19}{40} = \frac{19}{40} \times 100\% = \frac{1900}{40} = 47.5\% \text{ or } 47\frac{1}{2}\%$$

The mathematical wording for changing the fraction $\frac{17}{20}$ to a percent would normally be:

17 is what % of 20?

or

what % is 17 of 20?

More examples:

19 is what % of 75?

$$\frac{19}{75} = \frac{19}{75} \times 100\% = 25\frac{1}{3}\%$$

What % is 7 of 5?

$$\frac{7}{5} = \frac{7}{5} \times 100\% = 140\%$$

Changing Decimals to Percents

To change decimals to percents, simply multiply by 100%, which is the same as moving the decimal point two places to the *right*.

$$0.29 = .29 \times 100\% = 29\%$$

$$0.156 = .156 \times 100\% = 15.6\%$$

$$1.3 = 1.3 \times 100\% = 130\%$$

Exercises

Answers on page A 34

Complete the table

	Percentage	Fraction	Decimal
91.	10%		
92.		$\frac{1}{4}$	
93.			0.45
94.	0.25%		
95.	120%		
96.			0.14
97.		$\frac{7}{9}$	
98.	$5\frac{1}{2}\%$		
99.			2.5

Review

There are three things that we can do with percents. Using the relationship,

$$50\% = \frac{20 \text{ (part)}}{40 \text{ (total)}}, \text{ as an example,} \quad \frac{\%}{100} = \frac{\text{part}}{\text{whole}} \text{ or } \frac{\text{is}}{\text{of}}$$

we can summarize working with percents as follows:

Finding the Percentage

$$\text{What \% of 40 is 20?} \quad \frac{n}{100} = \frac{20}{40} \quad n = 50\%$$

or

$$\text{What \% is 20 of 40?} \quad \frac{n}{100} = \frac{20}{40} \quad n = 50\%$$

Finding the part

$$50\% \text{ of 40 is what number?} \quad \frac{50}{100} = \frac{n}{40} \quad n = 20$$

Finding the total

$$50\% \text{ of what number is 20?} \quad \frac{50}{100} = \frac{20}{n} \quad n = 40$$

or

$$20 \text{ is } 50\% \text{ of what number?} \quad \frac{50}{100} = \frac{20}{n} \quad n = 40$$

Exercises*Answers on page A 35***Find the Percentage**

100. What % is 72 of 18?
101. 16 is what % of 80?
102. What % of 30 is 18.5?

Find the Part

103. 40% of 18 is what number?
104. What number is 16.5% of 30.2?
105. 65% of 15 is what?

Find the Total

106. 40% of what number is 12?
107. 18 is 55% of what number?
108. 120 is 150% of what number?

Answer the following

109. What % of 25 is 5?
110. 70% of 15 is what number?
111. 85 is 20% of what number?
112. 90 is what % of 55?
113. 30% of what number is 80?
114. What number is 42% of 50?

Problems involving Percents

115. Betty bought a \$18.24 compact disk. If the provincial sales tax was 7%, how much did she pay for the disk?
116. The regular price for a watch on sale for \$52 was \$70. What is the percent savings?

Cutoff for Applied Business Technology

Review of Proportion

A proportion is formed when two ratios are equal.

$\frac{2}{3} = \frac{8}{12}$ is a proportion because they are equal

Missing quantities in a proportion can be calculated using cross multiplication.

$$\frac{n}{12} = \frac{3}{18} \qquad \frac{n}{12} \begin{array}{c} \swarrow \searrow \\ \nwarrow \swarrow \end{array} \frac{3}{18}$$

$$18 \times n = 3 \times 12$$

Cross multiply

$$n = \frac{36}{18}$$

$$n = 2$$

Exercises

Answers on page A 35

Find the missing quantity in each

120. $\frac{n}{10} = \frac{8}{15}$ $n =$

121. $\frac{2}{3} = \frac{8}{n}$ $n =$

122. $\frac{6}{n} = \frac{24}{18}$ $n =$

123. To get a specific shade of orange paint you need to mix 3 parts yellow paint to 2 parts red. How many litres of yellow would have to be mixed with 5.5 litres of red?

The Metric System

Do not use a calculator in this section

Review of Metric

Chart of Metric Prefixes and Place Value

	← Larger Units			Base Unit	Smaller Units →		
Metric Prefixes	kilo k	hecto h	deca da	m (metre) g (gram) L (litre)	deci d	centi c	milli m
Place Value Decimal	1 000	100	10	1	0.1	0.01	0.001
Place Value Fraction	1 000	100	10		1/10	1/100	1/1 000

The metric prefixes may be used with any base unit—metres (m), grams (g), and litres (L). i.e. hectometre, hectogram, hectolitre.

Converting within the Metric System using the Chart

Example

A cigar weighs 12 grams (g). Convert this amount to milligrams (mg).

1. If there is no decimal point in the known amount, place a “.” after the amount.
12 g = 12. g
2. Locate the prefix of the known amount. If no prefix is given, find the base unit (gram in the example) in the centre of the chart.
3. Find the prefix that you are changing to (**milligram** in this example). It is to the right of gram. Count the number of bars (|) between gram and milli. **You cross three bars to move three places to the right.**
4. Move the decimal point the same number of places in the same direction as you moved on the chart. Add zeros as needed.

12. g = 12 0 0 0. mg. The cigar is 12 000 mg.

On the chart, every time you cross over a bar (|), the factor is 10.

If you cross a bar going from the left to the right (larger to smaller), multiply by 10. Crossing 3 bars is the same as multiplying by 1 000 ($10 \times 10 \times 10$).

If you cross a bar going from the right to the left (smaller to larger), divide by 10. Crossing 3 bars is the same as dividing by 1 000 ($10 \times 10 \times 10$).

Common Metric Units

<u>Unit</u>	<u>Symbol</u>	<u>What is Measured</u>
metre	m	length
litre	L	capacity (volume)
gram	g	mass (weight)
second	s	time
degree Celcius	°C	temperature

Exercises*Answers on page A 36***Complete the following metric conversions**

124. 42 cm to metres _____
125. 2.86 m to centimetres _____
126. 33 kg to centigrams _____
127. 8 L to millilitres _____
128. 78 mm to centimetres _____

Write the metric prefix for

129. ten _____
130. one thousandth _____
131. one hundredth _____

Measure the line segment below

132. to the nearest centimetre _____
133. to the nearest millimetre _____

Complete these conversions

134. 2 metres to centimetres

135. 2 metres to millimetres

136. 400 mm to metres

137. 2386 m to kilometres

138. 5.4 cm to mm

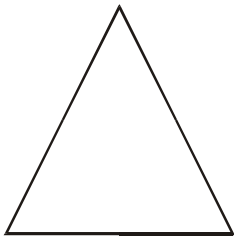
139. 0.6 km to m

140. 3.21 m to cm

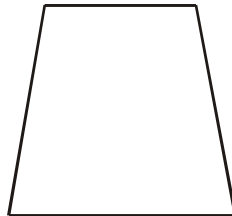
Geometry

*Do not use a calculator in this section***Review**

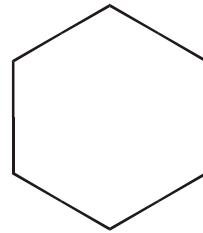
A **polygon** is a closed geometric figure with at least three sides, in which each side is a straight line segment. You should be familiar with the polygons below. They are named according to the number of sides and interior angles that they have.



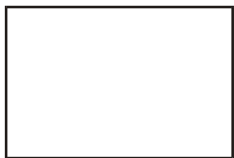
Triangle (3)



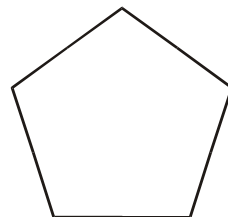
Quadrilateral (4)



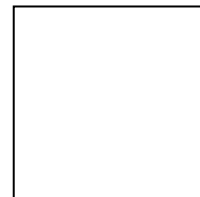
Hexagon (6)



Rectangle (4)



Pentagon (5)



Square (4 equal)

Finding the Perimeter of a Polygon

P stands for **perimeter**, the sum of the lengths of the sides.

l stands for length

w stands for width

s stands for side

Rectangle

$$P = 2l + 2w$$

($2 \times$ the length plus $2 \times$ the width) **or**

$$P = s + s + s + s$$

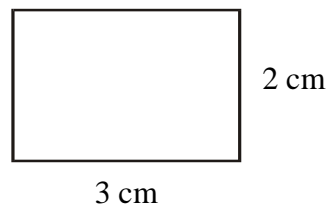
(side plus side plus side plus side)

The perimeter of the rectangle shown is

$$P = 2 \times 2 + 2 \times 3 = 10 \text{ cm}$$

or

$$P = 3 + 3 + 2 + 2 = 10 \text{ cm}$$

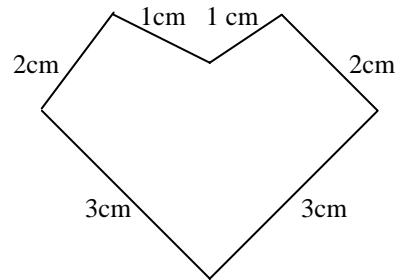


Square $P = 2l + 2w$ ($2 \times$ the length plus $2 \times$ the width) **or**
 $P = 4s$ ($4 \times$ one side)

Triangle $P = s + s + s$ (side plus side plus side)

Polygon $P = s + s + s + s \dots$ (side plus side plus side plus side... depending on the number of sides of the polygon)

The perimeter of the polygon shown is
 $P = 1 + 2 + 3 + 3 + 2 + 1 = 12$ cm



The units for perimeter are just cm or m or whatever units were added together.

Finding the Area of a Rectangle

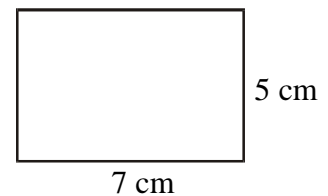
A stands for **area**, the *space* that something takes up. It is always expressed in **square** units—eg. m^2 , cm^2 , km^2

l stands for length

w stands for width

Rectangle $A = lw$ (*length* \times *the width*)

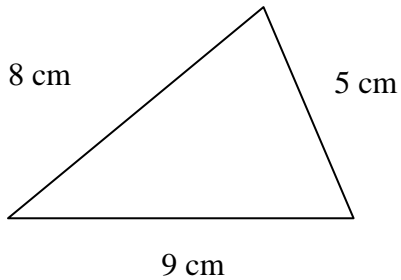
The area of the rectangle shown is
 $A = 5 \times 7 = 35$ cm^2



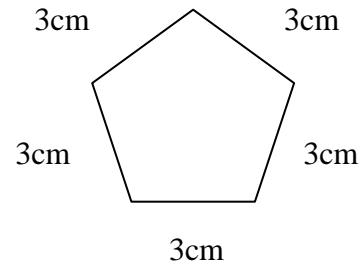
The units for area are cm^2 or m^2 or whatever units were multiplied.

Exercises*Answers on page A 36***Find the perimeter of the following**

141.



142.

**Problems involving Perimeter and Area**

143. You have decided to plant a garden 10 metres long by 3 metres wide. In order to know how much fertilizer to buy, you have to figure out the area of your garden or how many square metres (m^2) it is. If one bag of fertilizer covers 5 square metres (m^2), then how many bags of fertilizer will you need for your garden?
144. The deer have become a problem now that your garden is flourishing and you have decided to put up a fence. How many metres of fencing will you need to surround your garden?

Graphs

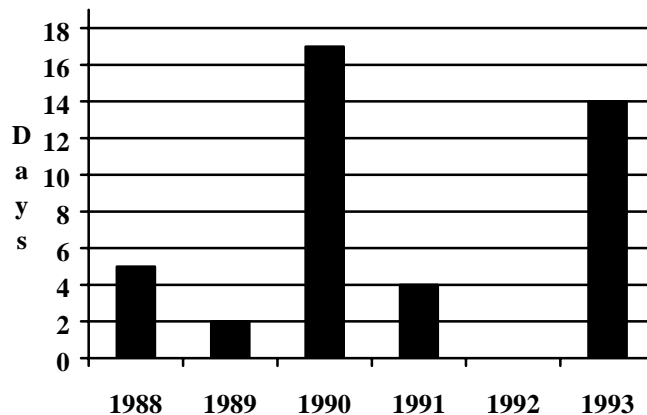
Do not use a calculator in this section

A graph is a way of presenting facts visually. There are many different kinds of graphs. Bar graphs, line graphs, circle (or pie) graphs are most common. Complete the following exercise on graphing.

Exercises*Answers on page A 36*

Use the following graph to answer 145 – 147.

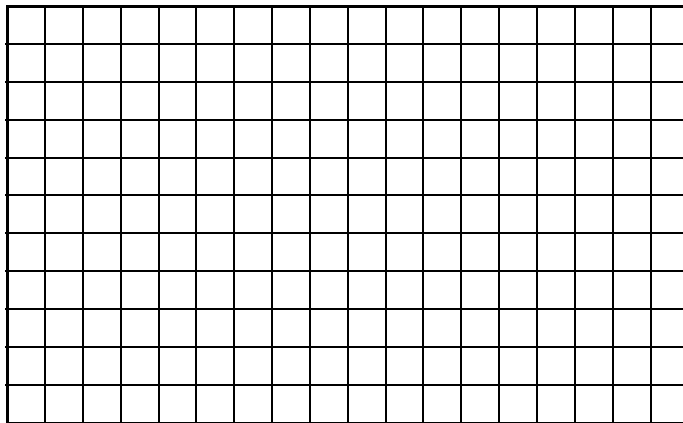
Production Days Lost Due to Strikes



145. Which year showed the least loss of production days due to labour actions?
146. In which years were more than 5 production days lost as the result of labour action?
147. What is the average number of production days lost per year during the period 1988-1993?

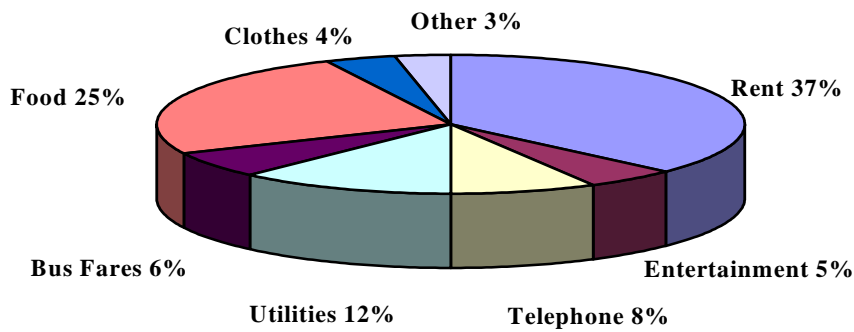
148. Draw a line graph to show this set of data.

Season	Catch
1990	150 thousand kilograms
1991	140 thousand kilograms
1992	90 thousand kilograms
1993	125 thousand kilograms



149. What percentage of this budget is food and rent?

Monthly Budget



Answers**Whole Numbers**

- | | | | |
|-------------|---------------|--------------|--------|
| 1. 40 | 2. 458 | 3. 8378 | 4. 31 |
| 5. 236 | 6. 3579 | 7. 504 | 8. 360 |
| 9. 32,864 | 10. 1,086,492 | 11. 73 | 12. 86 |
| 13. 93 | 14. 495 | 15. 802 | 16. 86 |
| 17. 6 hours | 18. 692 | 19. 89 boxes | |

Fractions

- | | | | |
|---------------------|---------------------|---------------------|-----------------------|
| 20. $\frac{3}{4}$ | 21. $\frac{2}{3}$ | 22. $\frac{3}{4}$ | 23. $\frac{1}{2}$ |
| 24. $\frac{4}{5}$ | 25. $\frac{2}{3}$ | 26. $\frac{1}{2}$ | 27. $\frac{2}{3}$ |
| 28. $\frac{2}{3}$ | 29. $\frac{3}{5}$ | 30. $1\frac{2}{5}$ | 31. $1\frac{7}{11}$ |
| 32. $1\frac{9}{61}$ | 33. $2\frac{2}{5}$ | 34. $1\frac{1}{99}$ | 35. $12\frac{1}{2}$ |
| 36. $\frac{11}{5}$ | 37. $\frac{51}{8}$ | 38. $\frac{26}{3}$ | 39. $\frac{56}{5}$ |
| 40. $\frac{49}{5}$ | 41. $\frac{19}{4}$ | 42. $\frac{7}{10}$ | 43. 8 |
| 44. $2\frac{2}{3}$ | 45. $5\frac{1}{2}$ | 46. $1\frac{2}{3}$ | 47. $7\frac{1}{2}$ |
| 48. $\frac{3}{5}$ | 49. $1\frac{2}{5}$ | 50. $\frac{7}{9}$ | 51. $\frac{7}{8}$ |
| 52. $7\frac{3}{4}$ | 53. $12\frac{5}{6}$ | 54. $\frac{5}{8}$ | 55. $3\frac{1}{2}$ |
| 56. $3\frac{1}{4}$ | 57. $\frac{1}{8}$ | 58. $3\frac{2}{3}$ | 59. $10\frac{11}{12}$ |

60. $\frac{1}{2}$

61. 1

62. 10

63. $14\frac{1}{2}$

64. 1

65. $\frac{5}{28}$

66. $\frac{27}{250}$

67. $1\frac{1}{3}$

68. $2\frac{1}{4}$ hrs

69. \$5600

70. 9 times

Decimals

71. 48.4

72. 38.864

73. 189.41

74. 179.46

75. 517.81

76. 3.48

77. 788.29

78. 571.3

79. 238.06

80. 3002.82

81. 206

82. 827.652

83. 8203.842

84. 261.6

85. 3.1

86. 810

87. 23.5

88. 56.1

89. 7.3 years

90. 19.2 km

Percentage

91.	10%	$\frac{1}{10}$	0.1
92.	25%	$\frac{1}{4}$	0.25
93.	45%	$\frac{9}{20}$	0.45
94.	0.25%	$\frac{25}{10000}$.0025
95.	120%	$1\frac{1}{5}$	1.2
96.	14%	$\frac{7}{50}$	0.14
97.	$77\frac{7}{9}\%$	$\frac{7}{9}$	$0.7\bar{7}$
98.	$5\frac{1}{2}\%$	$\frac{11}{200}$	0.055
99.	250%	$2\frac{1}{2}$	2.5

100. 400%

101. 20%

102. $61\frac{2}{3}\%$ or $61.\bar{6}\%$

103. 7.2

104. 4.983

105. 9.75

106. 30

107. 32.72 or $32\frac{8}{11}$

108. 80

109. 20%

110. 10.5

111. 425

112. 163.63% or $163\frac{7}{11}\%$

113. $266\frac{2}{3}$ or $266.\bar{6}$

114. 21

115. \$19.52

116. 25.71%

Ratio and Proportion

117. 40 plants:3 rows

or $\frac{40 \text{ plants}}{3 \text{ rows}}$

118. 1 centimetre:50 kilometres

or $\frac{1 \text{ centimetre}}{50 \text{ kilometres}}$

119. 1 cup flour:1 cup sugar

or 1:1 or $\frac{1}{1}$

120. $5\frac{1}{3}$ or $5.\bar{3}$ 121. 12

122. $4\frac{1}{2}$ or 4.5 123. 8.25 litres

Metric

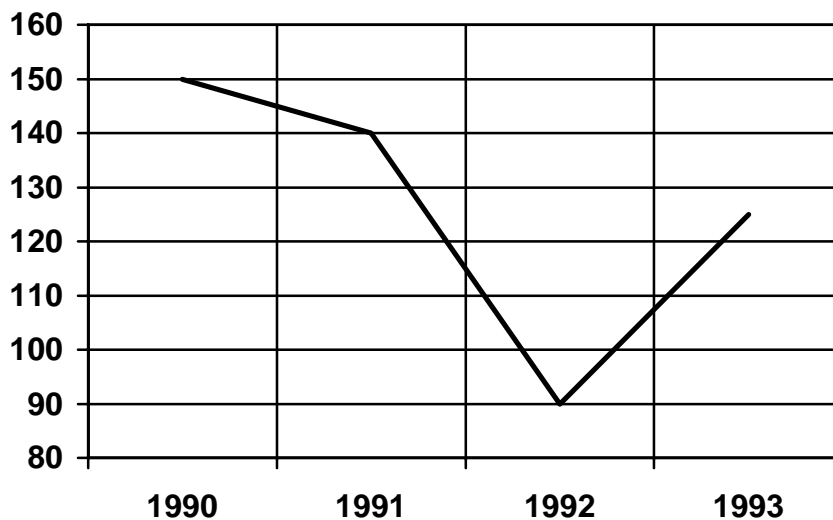
124. 0.42 m 125. 286 cm 126. 3 300 000 cg 127. 8 000 mL
128. 7.8 cm 129. deca 130. milli 131. centi
132. 9 cm 133. 92 mm (± 1) 134. 200 cm 135. 2000 mm
136. 0.4 m 137. 2.386 km 138. 54 mm 139. 600 m
140. 321 cm

Fundamental Geometry

141. 22 cm 142. 15 cm 143. 30 m^2 6 bags 144. 26 m

Graphs

145. 1992 146. 1990, 1993 147. 7

148. Gillnet Catch of Sockeye Salmon

149. 62%