

Year 8 Term 1 Math Homework

Student Name: _____	Grade: _____
Date: _____	Score: _____

Table of contents

10 Year 8 Term 1 Week 10 Homework	1
10.1 Data Representation	1
10.1.1 Step Graphs	1
10.1.2 Travel Graphs	3
10.2 Angles & Geometric	5
10.2.1 Parallel Lines	5
10.2.2 Angle Sum of a Triangle	7
10.2.3 Isosceles and Equilateral Triangles	8
10.3 Factorials	10
10.4 Fractions	11
10.5 Math challenge	12

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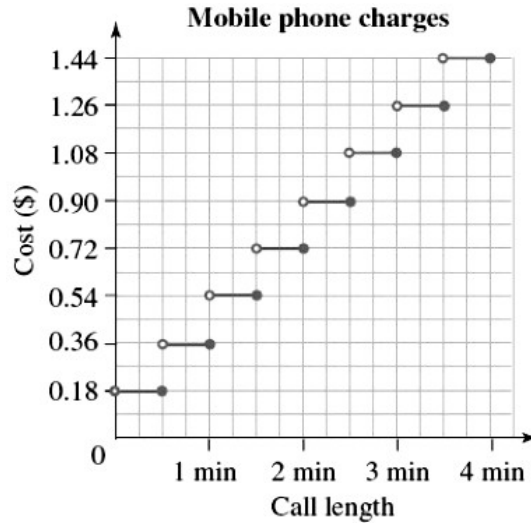
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10 Year 8 Term 1 Week 10 Homework

10.1 Data Representation

10.1.1 Step Graphs

Exercise 10.1.1 A telephone company charges mobile phone calls at the rates shown below:



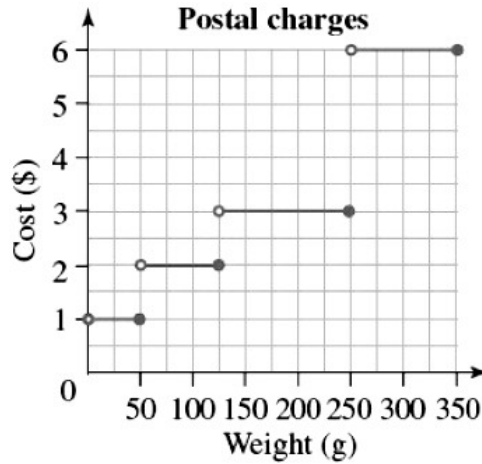
1. How much will a 3 min 10 seconds call cost?

2. David spoke on his mobile phone for 3 min and 40 seconds. How much longer could he have talked without any extra charge?

3. What is the longest conversation a caller can have for 90 cents?

4. Linda's mobile phone dropped out after 1 min 15 sec. She called back and spoke for another 2 min and 10 sec. How much extra has the call cost because of the dropout?

Exercise 10.1.2 The graph shows the postal charge for letters mailed from within Australia to anywhere in the Asia-Pacific region.



1. Find the cost of sending a letter weighing 100g.

2. Find the cost of mailing a letter that weighs 125 g.

3. What is the heaviest letter than can be mailed for \$3?

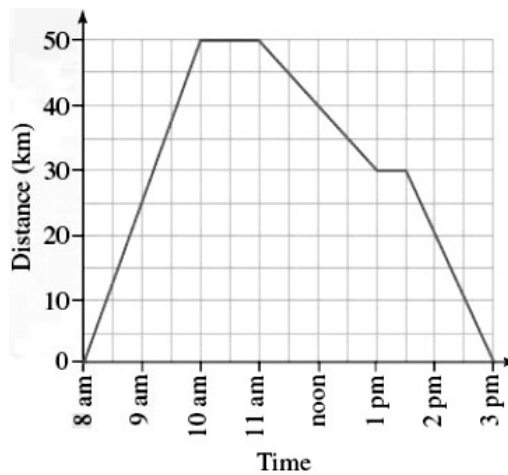
4. How much more does it cost to mail 3 letters each weighing 325 g than to mail 5 letters each weighing 60 g and 7 letters each weighing 25 g?

10.1.2 Travel Graphs

A travel graph is a type of line graph. It is used to represent a journey and compares the distance travelled with the time taken.

- The slope of the line indicates the speed at which the object is moving.
- The steeper the line, the faster the speed. The flatter the line, the slower the speed.
- A horizontal line indicates that the object is stationary.

Exercise 10.1.3 This travel graph shows the distance from home of a cyclist during daily training routine.



1. At what time was she 25 km away from home?

2. How far did she cycle before taking her first rest?

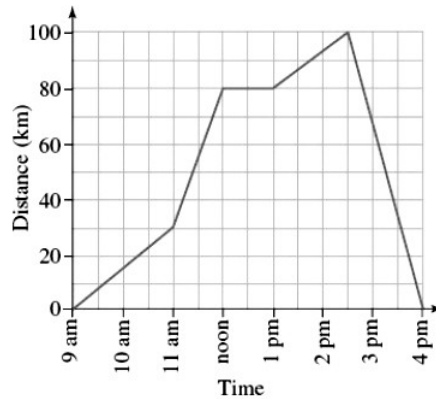
3. Between what time was she resting?

4. For how long did she cycle altogether, not including rests?

Important formulae:

$Speed = \frac{distance}{time}$	$Distance = Speed \times time$	$Time = \frac{distance}{speed}$
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Exercise 10.1.4 The graph shows the distance of a man from his office at various times during the day.



1. How far did he travel in the first 3 hours?

2. Did his speed increase or decrease at 11 am?

3. When did he stop for lunch?

4. What is the furthest distance he travelled from his office?

5. At what time did he travel back to his office?

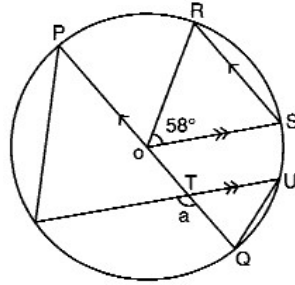
6. How long did the return trip take?

10.2 Angles & Geometric

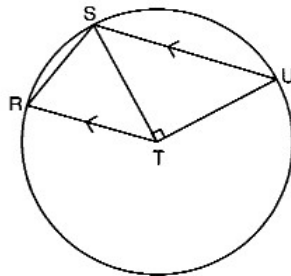
10.2.1 Parallel Lines

Exercise 10.2.1

1. The diagram shown below is not drawn to scale, $PQ \parallel RS$ and $OS \parallel TU$. Find $\angle a$.



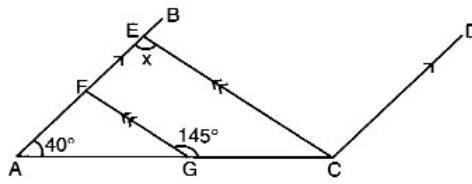
2. In the figure shown below, $RT \parallel SU$ and T is the centre of the circle.



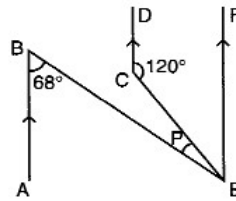
(a) Name one other angle in the figure which is equal to $\angle UST$.

(b) Find the value of $\angle SRT$.

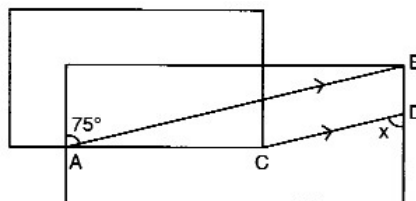
3. In the diagram shown below, $AB \parallel CD$ and $FG \parallel EC$. AGC is a straight line. Find $\angle x$.



4. The figure below is not drawn to scale. $AB \parallel CD \parallel EF$. Find $\angle P$.

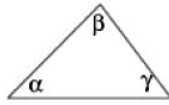


5. The figure shown below consists of 2 rectangles and $AB \parallel CD$. Find $\angle x$.



10.2.2 Angle Sum of a Triangle

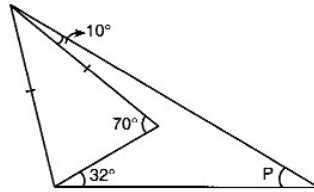
The angle sum of a triangle is 180° .



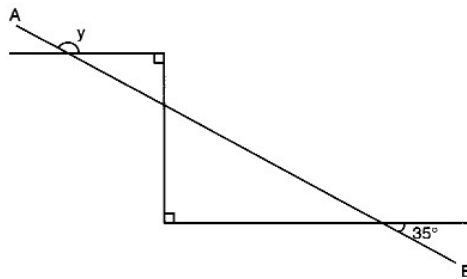
That is, $\alpha + \beta + \gamma = 180^\circ$.

Exercise 10.2.2

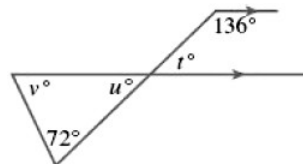
1. Find the $\angle p$ in the figure shown below: _____



2. In the diagram shown below, line AB is a straight line, find $\angle y$. _____



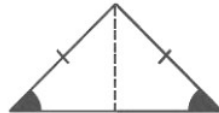
3. Find the value of the pronumerals in the figure shown below, giving reasons.



10.2.3 Isosceles and Equilateral Triangles

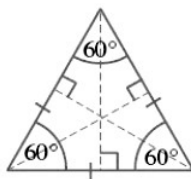
An isosceles triangle has the following properties:

- 2 sides equal in length.
- 2 angles equal in size.
- 1 axis of symmetry.



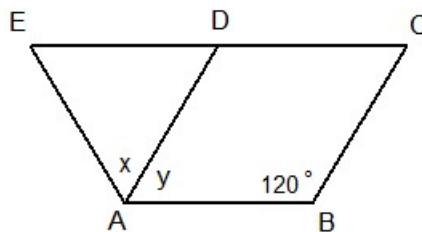
An equilateral triangle has the following properties:

- 3 sides equal in length.
- 3 angles measure 60° .
- 3 axes of symmetry.



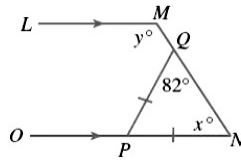
Exercise 10.2.3

1. The figure is made up of a rhombus and an equilateral triangle. Find the value of $\angle x + \angle y$.

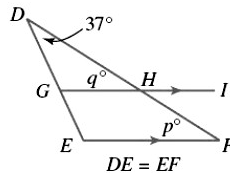


2. Find the value of the pronumerals in each of the following diagrams, giving reasons.

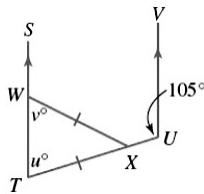
(a) $\angle x =$ _____, $\angle y =$ _____



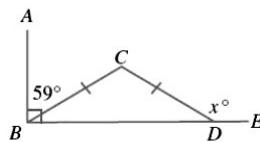
(b) $\angle p =$ _____, $\angle q =$ _____



(c) $\angle u =$ _____, $\angle v =$ _____



(d) $\angle x =$ _____



10.3 Factorials

Definition: The factorial $n!$ is defined for a positive integer n as:

$$n! \equiv n \times (n-1) \times (n-2) \dots \times 2 \times 1 \quad \text{and} \quad 0! = 1$$

$$n! = n \times (n-1)! \quad \text{or} \quad n! = n \times (n-1) \times (n-2)!$$

Example 10.3.1

1. Find the value of $\frac{7!}{4! \times 3!}$

Solution: $\frac{7!}{4! \times 3!} = \frac{7 \times 6 \times 5 \times 4!}{4! \times 3 \times 2} = 35$

2. $\frac{10!+7!}{8!}$

Solution: $\frac{10!+7!}{8!} = \frac{10 \times 9 \times 8 \times 7! + 7!}{8 \times 7!} = \frac{(10 \times 9 \times 8 + 1) \times 7!}{8 \times 7!} = 90\frac{1}{8}$

3. Simplify $\frac{(n+2)!}{(n-1)!}$ where $n \geq 1$.

Solution: $\frac{(n+2)!}{(n-1)!} = \frac{(n+2) \times (n+1) \times n \times (n-1)!}{(n-1)!} = (n+2) \times (n+1) \times n = n^3 + 3n^2 + 2n$

Exercise 10.3.1

1. Evaluate $\frac{17!}{14!3!}$

2. $\frac{100!+98!}{97!}$

3. Simplify $\frac{(n+2)!}{(n-2)!}$ where $n \geq 2$.

10.4 Fractions**Exercise 10.4.1**

1. If a , b and c are positive integers such that $a + \frac{1}{b+\frac{1}{c}} = \frac{37}{16}$, find the sum of a , b and c .

2. If $\frac{1}{x} + \frac{1}{y} = 10$ and $x + y = 2$, what is the value of xy ?

3. If the fraction $\frac{1}{4}$ is tripled by adding the same number to both the numerator and denominator, find the number.

4. Simplify the following fractions:

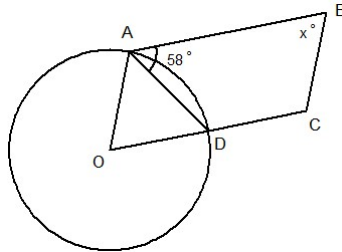
(a) $\frac{\frac{3}{8} - \frac{7}{16}}{\frac{1}{4} + \frac{5}{8}}$.

(b) $2 + \frac{2}{2+\frac{1}{3}}$.

10.5 Math challenge

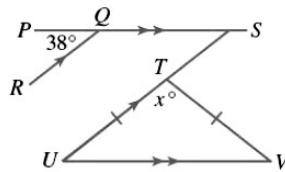
Exercise 10.5.1

1. In the figure shown below not drawn to scale, $OABC$ is a parallelogram and O is the centre of the circle. Find $\angle x$.

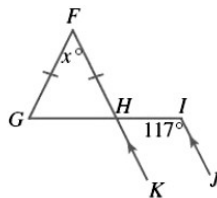


2. Find the value of x in each of these figures, giving reasons.

(a) $\angle x =$ _____

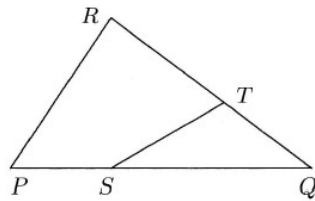


(b) $\angle x =$ _____

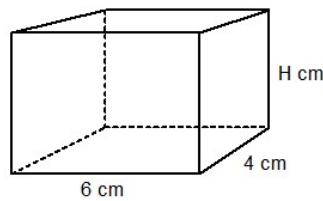


Exercise 10.5.2

1. In the triangle PQR , $\angle PST = 158^\circ$, $ST = TQ$ and $PQ = RQ$. Find the size of the $\angle PRQ$.



2. A rectangular prism has a surface area of 208 cm^2 . If two sides of the prism are 4 cm and 6 cm , find the third side of the prism.



3. Find the value of the pronumeral in the diagram shown below:

