**Stage 1 Essential Mathematics**

**Assessment Type 1: Skills and Applications Tasks**

**Assignment: Calculations, Time and Ratio**

**Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

This assignment has six sections.

Section 1: Basic Number Operations

Section 2: Rounding and Estimating

Section 3: Decimals

Section 4: Time and Timetables

Section 5: Unit Pricing

Section 6: Ratio

Complete each section when you have completed the class work provided to you by your teacher and you are ready to show your understanding.

You must provide clear evidence of all calculations.

Take careful note of when you are allowed to use a calculator and when you are not.

Return the booklet to your teacher as you complete each section.

**Section 1**

**No calculator**

**Basic Number Operations**

Complete the following. Show all of your working out.

|  |  |  |
| --- | --- | --- |
|  |  | 3. |
|  |  | 6.  2 3 5  X 4 |
| 7.  4 5 2  X 8 | 3 5 8  X 1 2 | 4 5 6  X 4 3 |
| 635 5 | 2 376 3 |  |
|  |  | You have completed Section 1 of the assignment. Return your assignment booklet to your teacher. |

**Section 2**

**Rounding, Estimating and Checking with a Calculator**

1. Round the following numbers to their leading digit (e.g. 32 30, and 479 500)

41

57

92

1.8

411

209

867

59.3

2038

5811

1607

743.1

21

8350

522

6.78

1. Complete the following:
2. Use rounding to the leading digit to **estimate** the following (the first one is started for you)

1. Use your calculator to find the **exact** answers to all of the equations above in number 3.
2. Compare your answers to question 3 with your answers to question 4. Write a brief explanation of how accurate your estimations in question 3 were compared to the exact answers in question 4.
3. Give one example of when it might be **useful** to **round** numbers to **estimate** a calculation.

You have completed Section 2 of the assignment. Return your assignment booklet to your teacher.

**Section 3**

**No calculator**

**Operations with Decimals**

1. Decimal value: Consider the numbers below.

smallest number

rectangle

Underline the biggest number and draw a around the

**73.2 7.09 320.7 0.72 0.093 9.003 2003.1 93 4.86931**

1. Rounding decimals:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Round to the nearest whole number** | | **Round to one decimal place** | | **Round to two decimal places** | |
| 3.8 |  | 7.13 |  | 27.973 |  |
| 92.1 |  | 81.92 |  | 3.0457 |  |
| 693.62 |  | 674.021 |  | 11.218 |  |
| 803.09 |  | 43.2961 |  | 100.039 |  |
| 73.5092 |  | 5.98 |  | 0.2418 |  |

1. Show that you can add, subtract, multiply and divide decimal numbers:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

1. Problem solving using decimals (without a calculator)

**Small pack: $5.87** **Large pack: $8.90**

**Small notes**

**Large notes**

1. Calculate, showing all working, exactly how much it would cost to buy:

|  |  |
| --- | --- |
| 3 small packs | A small pack and 2 large packs |
| 8 large packs |

1. How many packs could you buy with $60? Give 3 different combinations and show all calculations to prove that you have enough money for each combination **and** how much change you would have left.

|  |  |  |
| --- | --- | --- |
|  |  | You have completed Section 3 of the assignment. Return your assignment booklet to your teacher. |

**Section 4**

**Time and Timetables**

1. Complete the table below to demonstrate conversion of units in time.

|  |  |  |
| --- | --- | --- |
| **Analogue** | **Digital (am then pm)** | **24 hour clock** |
| [Image result for images analog clock](http://www.google.com.au/imgres?imgurl=http://www.masterclock.com/images/clkntd30-ss/clkntd30-black-front.jpg&imgrefurl=http://www.masterclock.com/products/clkntd30.php&h=200&w=204&tbnid=C3QwK7BCn60VsM:&zoom=1&docid=Ki6XhwFwXavgcM&ei=iJlVVerTEZOB8gWerYCoCw&tbm=isch&ved=0CCkQMygNMA0) | am |  |
| pm |  |
| [Image result for images analog clock](http://www.google.com.au/imgres?imgurl=http://www.oxfordmathcenter.com/applets/clockface.png&imgrefurl=http://www.oxfordmathcenter.com/drupal7/node/125&h=250&w=250&tbnid=sKepGWOq5FCfRM:&zoom=1&docid=U9PKV75KZohARM&ei=iJlVVerTEZOB8gWerYCoCw&tbm=isch&ved=0CD0QMygXMBc) | am | 02:00 hours |
| pm | 14:00 hours |
| [Image result for images analog clock](http://www.google.com.au/imgres?imgurl=http://www.oxfordmathcenter.com/applets/clockface.png&imgrefurl=http://www.oxfordmathcenter.com/drupal7/node/125&h=250&w=250&tbnid=sKepGWOq5FCfRM:&zoom=1&docid=U9PKV75KZohARM&ei=iJlVVerTEZOB8gWerYCoCw&tbm=isch&ved=0CD0QMygXMBc) | 10 past 6 in the morning |  |
| 6:10pm |  |
| [Image result for images analog clock](http://www.google.com.au/imgres?imgurl=http://www.oxfordmathcenter.com/applets/clockface.png&imgrefurl=http://www.oxfordmathcenter.com/drupal7/node/125&h=250&w=250&tbnid=sKepGWOq5FCfRM:&zoom=1&docid=U9PKV75KZohARM&ei=iJlVVerTEZOB8gWerYCoCw&tbm=isch&ved=0CD0QMygXMBc) | am | 05:30 hours |
| pm | 17:30 hours |
| [Image result for images analog clock](http://www.google.com.au/imgres?imgurl=http://www.oxfordmathcenter.com/applets/clockface.png&imgrefurl=http://www.oxfordmathcenter.com/drupal7/node/125&h=250&w=250&tbnid=sKepGWOq5FCfRM:&zoom=1&docid=U9PKV75KZohARM&ei=iJlVVerTEZOB8gWerYCoCw&tbm=isch&ved=0CD0QMygXMBc) | Quarter to 9 in the morning |  |
| Quarter to 9 at night |  |
| [http://images.monstermarketplace.com/cost-effective-electronics-supplier/9a13e-standard-wireless-analog-clock-12-hour-display-with-chrome-bezel-400x400.jpg](http://www.google.com.au/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0CAcQjRw&url=http://pixshark.com/analog-clock-cartoon.htm&ei=HppVVbHYKtbq8AXxyIPQAQ&bvm=bv.93564037,d.dGc&psig=AFQjCNFdEM0WxNMkOLBuQ69OoCu8GGG8YQ&ust=1431759624547298) | am |  |
| pm |  |
| [https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcSuAX-hfkUFJyTk1UiPuZEC71yMxShcOGhALDzlBb7F52qN19n2uA](http://www.google.com.au/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0CAcQjRw&url=http://imgsoup.com/1/3d-analog-clock/&ei=zppVVazMHI388QXq8oHADQ&bvm=bv.93564037,d.dGc&psig=AFQjCNFdEM0WxNMkOLBuQ69OoCu8GGG8YQ&ust=1431759624547298) | am |  |
| pm |  |

1. Consider the following bus timetable.

All buses do a circuit of the city starting and finishing at the City Terminal:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| City Terminal (departure) | 9.05 | 10.15 | 11.30 | 14.00 | 15.20 |
| Royal Adelaide Hospital | 9.14 | 10.24 |  | 14.09 |  |
| Botanical Gardens |  | 10.29 | 11.44 |  |  |
| North Adelaide | 9.28 | 10.38 | 11.53 | 14.23 | 15.43 |
| Robe Terrace | 9.40 |  | 12.05 | 14.35 | 15.55 |
| Port Road | 9.49 | 10.59 | 12.14 |  | 16.04 |
| City Terminal (arrival) | 10.03 | 11.13 | 12.28 | 14.58 | 16.18 |

Assume there is only one bus and one driver on this route.

1. What time would you need to be at the city terminal if you need to be in North Adelaide by 12.00 noon?
2. How many times each day does the bus stop at the Botanical Gardens?
3. How long does the bus wait at the City terminal each time?
4. What time does the bus driver take his lunch break?
5. Mary want to catch the earliest bus at the City terminal. She wants to visit her friend at the Royal Adelaide hospital and she wants to have at least an hour shopping in North Adelaide. Plan her journey for her.
6. Mary sleeps in and misses the 9.05. Is she still able to visit her friend in hospital and do her shopping in North Adelaide? Explain her trip.

You have completed Section 4 of the assignment. Return your assignment booklet to your teacher.

**Section 5**

**Calculator allowed**

**Unit Pricing**

1. Batteries come in many different size packs.
2. Calculate how much, in cents, it is for a single battery (the unit price) in each of the following packs:

|  |  |  |  |
| --- | --- | --- | --- |
| Twin Pack (2)  $1.99 | Pack of 4  $3.50 | Dozen (12)  $8.99 | Bulk Pack of 100  $65 |
|  |  |  |  |

1. The Bulk Pack offers the best value for money. Explain why.
2. Even though the Bulk Pack offers the best value for money, give two examples when it might be more reasonable to choose to buy a smaller pack instead.
3. Flour comes in various different size bags.
4. Find the unit price (price per kg) for each of the packs of flour below:

|  |  |  |  |
| --- | --- | --- | --- |
| 1kg  $2.50 | 500gm  $1.45 | 3kg  $7.80 | 250gm  $1.20 |
|  |  |  |  |

1. Which bag offers the best value for money?
2. Phone companies all charge different rates for texts, calls and data use.
3. Determine the charges for three different students for three different phone companies:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Bob**  110 texts  85 minutes on calls  0 data use | **Kaylah**  314 texts  5 minutes on calls  500 MB of data | **Chris**  50 texts  12 minutes on calls  2 GB of data |
| **TEXTA Phone Company**  $30  includes 500 free texts  Extra texts cost 15c each  Calls cost 35c per minute  Data costs 15c per MB |  |  |  |
| **YABBA Phone Company**  $30  includes 80 min free calls  Extra calls are 20c per minute  Texts cost 10c each  Data costs $5 per 500 MB |  |  |  |
| **GAMER Phone Company**  $30  Includes 2GB of data  Extra data costs $5 per 500 MB  Texts cost 18c each  Calls cost 40c per minute |  |  |  |

1. Which company should each student choose?
2. Bob starts using facebook on his new phone. He decides he now also wants 500MB of data. Which company should he choose now? Show how much his new choice will cost him.

You have completed Section 5 of the assignment. Return your assignment booklet to your teacher.

**Section 6**

**Ratio**

1. Find the following ratios in simplest form

 What is the ratio ofto  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 What is the ratio ofto \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 What I the ratio of+to  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



1. One measure of Lemonade syrup is made using the juice of 3 lemons and 1 tablespoon of sugar.
2. Express the syrup recipe as a ratio of lemons to tablespoons of sugar
3. If I have 24 lemons and I want to make them all into syrup, how many tablespoons of sugar will I need?
4. If I only have 3 tablespoons of sugar, how many lemons can I use?
5. Mary has 10 lemons and 5 tablespoons of sugar. After she makes the lemonade syrup, how many tablespoons of sugar will she have left?

To make the lemonade you add 2 cups of water to 1 measure of syrup

1. Express the recipe for lemonade as a ratio of water to syrup
2. Express the recipe for lemonade as a ratio of water to lemons to sugar.

You have completed Section 6 of the assignment. Return your assignment booklet to your teacher.

Note to Teachers about Assignment: Calculations, Time and Ratio

Topic 1 in the Essential Mathematics subject covers a wide range of fundamental numeracy skills.

For this reason, this skills and applications task for Essential Mathematics is quite long.

The content will be assessed in 6 separate sections:

* Basic number operations without technology
* Using rounding techniques to estimate arithmetic calculations
* Calculations using decimal numbers without technology
* Time conversions and calculation of lapsed time
* Use of unit price to make comparisons between products
* Ratio

The content in *Section 1: Basic number operations*, provides the opportunity for students to demonstrate their mathematical process skills without extracting information from written problems, and without using a calculator. This allows the teacher to determine what level of mathematical skill the student has, separate from their ability to access written problems in context. Throughout the remaining sections more wording is introduced to enable students to engage in increasing depth with contextual problems.

Students **are not required** to complete all sections in one sitting, but rather can complete each section as they learn the required skills. In this way, teachers can collect evidence of student learning and understanding as it occurs.

The Assessment Design Criteria assessed in this task are:

Concepts and Techniques

The specific features are as follows:

CT1 Knowledge and understanding of mathematical information and concepts

CT2 Application of mathematical skills and techniques to find solutions to practical problems in context

CT3 Gathering, representation, and interpretation of data in context

CT4 Use of electronic technology to find solutions to practical problems.

Reasoning and Communication

The specific features are as follows:

RC1 Interpretation of mathematical results

RC2 Use of mathematical reasoning to draw conclusions and consider the appropriateness of solutions

RC3 Use of appropriate mathematical notation, representations, and terminology

RC4 Communication of mathematical ideas and information.

Performance Standards Stage 1 Essential Mathematics

|  |  |  |
| --- | --- | --- |
|  | Concepts and Techniques | Reasoning and Communication |
| **A** | Knowledge and understanding of mathematical information and concepts in familiar and unfamiliar contexts.  Highly effective application of mathematical skills and techniques to find efficient and accurate solutions to routine and complex problems in a variety of contexts.  Gathering, representation, and interpretation of a range of data in familiar and unfamiliar contexts.  Appropriate and effective use of electronic technology to find accurate solutions to routine and complex problems. | Accurate interpretation of mathematical results in familiar and unfamiliar contexts.  Highly effective use of mathematical reasoning to draw conclusions and consider the appropriateness of solutions to routine and complex problems.  Proficient and accurate use of appropriate mathematical notation, representations, and terminology.  Clear and effective communication of mathematical ideas and information to develop logical and concise arguments. |
| **B** | Knowledge and understanding of mathematical information and concepts in familiar and some unfamiliar contexts.  Effective application of mathematical skills and techniques to find mostly accurate solutions to routine and some complex problems in a variety of contexts.  Gathering, representation, and interpretation of data in familiar and some unfamiliar contexts.  Mostly appropriate and effective use of electronic technology to find mostly accurate solutions to routine and some complex problems. | Mostly accurate interpretation of mathematical results in familiar and some unfamiliar contexts.  Effective use of mathematical reasoning to draw conclusions and consider the appropriateness of solutions to routine and some complex problems.  Mostly accurate use of appropriate mathematical notation, representations, and terminology.  Clear and appropriate communication of mathematical ideas and information to develop some logical arguments. |
| **C** | Knowledge and understanding of simple mathematical information and concepts in familiar contexts.  Application of some mathematical skills and techniques to find solutions to routine problems in familiar contexts.  Gathering, representation, and interpretation of data in familiar contexts.  Generally appropriate and some effective use of electronic technology to find solutions to routine problems. | Generally accurate interpretation of mathematical results in familiar contexts.  Appropriate use of mathematical reasoning to draw conclusions and consider the appropriateness of solutions to routine problems.  Generally appropriate use of familiar mathematical notation, representations, and terminology.  Appropriate communication of mathematical ideas and information. |
| **D** | Basic knowledge and some understanding of simple mathematical information and concepts in some familiar contexts.  Application of basic mathematical skills and techniques find partial solutions to routine problems in some contexts.  Some gathering, representation, and basic interpretation of simple data in familiar contexts.  Some appropriate use of electronic technology to find solutions to routine problems. | Some interpretation of mathematical results in some familiar contexts.  Attempted use of mathematical reasoning to consider the appropriateness of solutions to routine problems.  Some use of familiar mathematical notation, representations, and terminology.  Attempted communication of simple mathematical ideas and information. |
| **E** | Limited knowledge or understanding of mathematical information or concepts.  Attempted application of basic mathematical skills or techniques, with limited accuracy in solving routine problems.  Some gathering and attempted representation of simple data in a familiar context.  Attempted use of electronic technology in to find a solution to a routine problem. | Limited interpretation of mathematical results.  Limited awareness of the use of mathematical reasoning in solving a problem.  Limited use of mathematical notation, representations, or terminology.  Attempted communication of an aspect of mathematical information. |