**Nana Fe**

**Mathematics and statistics AS 1.1 Credits: 4**

| **Achievement** | **Achievement with Merit** | **Achievement with Excellence** |
| --- | --- | --- |
| * Apply numeric reasoning in solving problems.
 | * Apply numeric reasoning, using relational thinking, in solving problems.
 | * Apply numeric reasoning, using extended abstract thinking, in solving problems.
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Student instructions sheet

**Nana Fe**

Nana Fe lives in Australia and is buying the following items from the NZ online store Baby’s R US for her new mokopuna.

**Fe wants to buy**

(Prices given include NZ GST)

|  |  |  |  |
| --- | --- | --- | --- |
| Car seat | $539.95 | Cot | $519.95 |
| Changing table | $319.95 | 6 piece bedding set | $239.95 |
| Baby monitor | $89.99 | Cot mobile (All Blacks) | $99.95 |
| 3 hooded towels | $38.97 | bottle starter set | $41.99 |
|  |  |  |  |
|  |  |

Baby’s R US is having an “**Online you choose the discount**” sale.

These are the 8 offers below:

* *25% OFF any one item which costs up to a maximum of $20*
* *OFF any one item which costs up to a maximum of $500*
* *Reduced by 0.2 of the price any one item which costs up to a maximum of $50*
* *12.5% OFF any one item which costs up to a maximum of $500*
* *0.15 of the price off any one item which costs up to a maximum of $100*
* *Pay 92% of any one item which costs up to a maximum of $1000*
* *Pay 85% of any one item which costs up to a maximum of $100*
* *Pay ths of the cost of any one item which costs up to a maximum of $1000*
* **You may choose as many offers as you want but you may only choose one per item and each offer can only be used once (ie 3 items needs 3 different offers)**
* A New Zealand dollar is worth 0.793 Australian Dollars ( for this assessment)

Nana Fe has **three** options

1. She can choose to pay for all the items using the online discount choices.
2. She can choose to send the money to her daughter who can then use her loyalty card and receive th discount off all the items.
3. Get her sister who works for Baby’s R Us in New Zealand to use her staff discount which gives GST off all items.

**Task**

Work out what the best option is for Fe **and** what it will cost her in Australian Dollars.

Justify your answers

Discuss any assumptions you have made.

In the solution of this problem you should:

* Show all relevant workings
* The quality of your discussion and reasoning and how well you link this to the context will determine the overall grade.

Assessment Schedule: AS1.1 New Parents

|  |  |  |
| --- | --- | --- |
| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| To “Achieve” students will be required to apply numeric reasoning in solving problems.Students select and use a range of methods in solving problems. This demonstrates knowledge of number concepts and terms. Students communicate solutions which typically require one or two steps.At **least three different types of numeric methods** need to be used in solving problems.*Examples:** Calculating a percentage of a quantity

*See attached solution sheet** Calculating a fraction of a quantity

*See attached solution sheet** Converting using exchange rates from

$NZ to $ AUS * Percentage decrease
* GST exclusive price

*See attached solution sheet*The interpretation of this question is ‘open’. Students do not need to calculate all three options for Achieve but must demonstrate three methodsand there must be some evidence of comparing the different purchase options i.e. answering the problem. | To achieve with “Merit” students will be required to apply numeric reasoning with relational thinking in solving problems. This involves one or more of: Selecting and carrying out a logical sequence of steps, connecting different concepts and representations, demonstrating understanding of concepts, forming and using a model **and** either relating findings to the context or communicating thinking using appropriate mathematical statements.Student identifies an option for FE **and** explains why it is the best. Student must have comparisonTotal Cost rounded appropriatelyOption 1 $1682.86 (NZ) Option 2 $1680.62 (NZ)Option 3 $ 1644.09 (NZ)The student needs to arrive at a correct total for one option. Emphasis is on the sequence of logical communication of thinking using mathematical statements. One options total cost must be correct either in NZD or AUSD.Student must demonstrate logical working with reasons and description for each calculation | To achieve with “Excellence” students will be required to apply numeric reasoning with extended abstract thinking in solving problems. This involves one or more ofDevising a strategy to investigate or solve a problem, identifying relevant concepts in context,developing a chain of logical reasoning, forming a generalisation and either using correct mathematical statements or communicating mathematical insight. * The communication of the solution must include correct rounding.
* Student must correctly calculate at least two totals in Australian Dollars
* Identify with justification the best option.

Extended abstract thinking will be evident in the solution by the identification and discussion of aspects such asVariation in the exchange rateEasiest option for FeNote: If students have derived the solution, but not communicated their ideas clearly or shown mathematical insight, the maximum grade they can achieve is “Merit*”.* |

Final grades will be decided using professional judgement based on **a holistic examination of the evidence provided** against the criteria in the Achievement Standard.

Solutions to calculations

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Cost | Vouchers | Vouchers rounded |
| Car seat | 539.95 | 479.9556 | 479.96 |
| Cot | 519.95 | 478..354 | 478.35 |
| Changing table | 319.95 | 279.9563 | 279.96 |
| 6 piece bedding set | 239.95 | 209.9563 | 209.96 |
| Baby monitor | 89.99 | 76.4915 | 76.49 |
| Cot mobile (all blacks) | 99.95 | 84.9575 | 84.96 |
| 3 hooded towels | 38.97 | 38.97 | 38.97 |
| bottle starter set | 41.99 | 33.592 | 33.59 |
| Voucher | 1890.7 | 1682.2332 | 1682.24 |
|  |  |  |  |
| Daughter | 1890.7 | 1680.622 |  |
|  |  |  |  |
| Sister | 1890.7 | 1644.087 |  |
|  |  |  |  |
| Conversions | NZD | AUSD |  |
| Voucher | 1682.24 | 1334.02 |  |
| Daughter | 1680.622 | 1332.733 |  |
| Sister | 1644.087 | 1303.761 |  |

Excellence Solution

|  |  |  |
| --- | --- | --- |
| Strategy | * Find the cost of the items using each of the alternative
* Convert the totals into Australian Dollars
* Compare the costs of each alternative
* Decide which option is the best taking into factors including costs.
 |  |
| Calculations  | Using vouchers* Cot $519.95 x 0.92 = $478.35
* Bedding $239.95 x 7/8 = $209.96
* Car seat $539.95 x 8/9 = $479.96
* Table $319.95 x 87.5% = $279.96
* Mobile $99.95 x 0.85 = $84.96
* Bottle set $41.99 x 0.8 = $33.59
* Monitor $ 89.99 x 0.85 = $76.49
* Towels $38.97 ( no valid voucher)
* Total $1682.24 (NZ)
* Total $ 1334.02(AUS)

**NB Bedding & change table methods are interchangeable to give the same answers, as are baby monitor and cot mobile**Daughter buys Total of all eight items $1890.7 x 8/9 =  Total cost $1680.62 (NZ) Total cost $1332.73AUSSisters buys goodsTotal of all eight items $1890.7 / 1.15GST free = $1644.09 (NZ)GST free = $1303.76 (AUS) | A (% of)A (fraction - decr)A (fraction of)A (% decr)A (decimal decr)A (decimal decr)A (% of)A (conversion)A (fraction)A (conversion)A (% GST excl)A (conversion) |
| Solutions | Option 1 $1682.24 $1334.02Option 2 $1680.62 $1332.73Option 3 $1644.09 $1303.76 | MMM |
| Comparison | Comparing option one and option two no real difference in cost.On line ordering does not show any postage, packaging or carriage fees which may need to be added.Fe may not want her daughter or sister to know how much she is spending.I would recommend Nana Fe uses option 1 because it allows her privacy.Comparing all three optionsI would recommend option 3, it is the cheapest option though only by just over $30, Fe’s daughter does not need to know how much her mother has spent and her sister may not charge her for the postage.Any fluctuations in the exchange rate will not affect the results | E |