**NZQA**

**Approved**

Achievement standard: 91026 Version 3

Standard title: Apply numeric reasoning in solving problems

Level: 1

Credits: 4

Resource title: ‘To market to market’

Resource reference: Mathematics and Statistics VP-1.1 v2

Vocational pathway: Primary Industries

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| Date version published | February 2015 Version 2To support internal assessment from 2015 |
| Quality assurance status | These materials have been quality assured by NZQA. NZQA Approved number A-A-02-2015-91026-02-7262 |
| Authenticity of evidence | Assessors/educators must manage authenticity for any assessment from a public source, because learners may have access to the assessment schedule or exemplar material.Using this assessment resource without modification may mean that learners’ work is not authentic. Assessors/ educators may need to change figures, measurements or data sources or set a different context or topic to be investigated or a different text to read or perform. |

Vocational Pathway Assessment Resource

Achievement standard: 91026

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Learner instructions

# Introduction

This assessment activity requires you to apply numeric reasoning in solving problems.

You are going to be assessed on how effectively you apply numeric reasoning, using extended abstract thinking, to find the net profit for a farmer after selling fattened stock at a sale. You will work independently to complete this activity.

The following instructions provide you with a way to structure your work so you can demonstrate what you have learnt and achieve success in this standard.

Assessor/educator note: It is expected that the assessor/educator will read the learner instructions and modify them if necessary to suit their learners.

# Task

Pete’s farming operation involves buying store stock, improving their weight and condition and on-selling them. The income that Pete receives is affected by the costs of feeding and caring for the stock as they grow.

Use the following information to find the total income (net profit) for Pete after the stock has been sold in the annual sale:

* Pete buys some stock at the sales spending $32 per ewe lamb and $212 per bull calf.
* Over the next 12 months five ewe hoggets and three bull calves die.
* Pete runs his stock ratios at 2.5 bulls per hectare, and five ewes per hectare.

Animals need food, for example, grass and dry-matter feed, and water. The pasture needs fertiliser. Pete pays $26 per hectare for the water and will need to buy a four month supply of dry-matter feed.

He can buy the fertiliser and feed from two different farm stores:

* Farm Help – Fertiliser at $191 per hectare and feed at $283 per month with a 12% discount on the total spent if both are purchased at the same time.
* Cattle Store – Fertiliser at $182 per hectare and feed at $292 per month. If both are purchased at the same Pete can get the feed for the GST exclusive cost.

Other costs are drench, which is $563 in total, and vet fees, which are $365 in total.

At the end of 12 months Pete has 125 ewes and 22 bulls for sale. Current prices indicate that he is likely to get $65 per ewe and $525 per bull.

In the solution to this problem you should:

* show calculations, as appropriate, that you have used in the solution to the problem
* use mathematical statements
* explain what you are calculating at each stage of the solution.

The quality of your discussion and reasoning, and how well you link this to the context, will determine the overall grade.

# Resources

None.

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Assessor/Educator guidelines

# Introduction

The following guidelines are supplied to enable assessors/educators to carry out valid and consistent assessment using this internal assessment resource.

As with all assessment resources, education providers will need to follow their own quality control processes. Assessors/educators must manage authenticity for any assessment from a public source, because learners may have access to the assessment schedule or exemplar material. Using this assessment resource without modification may mean that learners' work is not authentic. The assessor/educator may need to change figures, measurements or data sources or set a different context or topic. Assessors/educators need to consider the local context in which learning is taking place and its relevance for learners.

Assessors/educators need to be very familiar with the outcome being assessed by the achievement standard. The achievement criteria and the explanatory notes contain information, definitions, and requirements that are crucial when interpreting the standard and assessing learners against it.

# Context/setting

This activity requires learners to use extended abstract thinking to perform operations with fractions, decimals, percentages, and rates.

The context for this assessment is that of a farmer who has purchased young stock, raised them for a year and is then selling them. Learners are required to determine the likely net profit made. Learners will need to be familiar with the technical phrases and terms used in this resource.

# Conditions

Learners need to work independently to complete this activity. Confirm the time frame with your learners.

# Resource requirements

Learners should have access to appropriate technology.

# Additional information

Ensure learners are familiar with any context specific vocabulary used in this resource.

## Other possible contexts for this vocational pathway

Horticulture, where learners purchase seed/seedlings, grow a crop and determine profit when it is sold, by considering factors, such as water, fertiliser, pest and weed protection, etc.

# Assessment schedule: Mathematics and Statistics 91026 – ‘To market to market’

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| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The learner applies numeric reasoning in solving problems by:* selecting and using a range of methods in solving problems

Selection includes at least three different numeric methods that are correctly used in solving problemsFor example:Percentages are used to calculate the GST exclusive cost of the Cattle Store fertiliser.Ratios are used to determine the number of hectares.Percentages are used to calculate the cost of the Farm Help fertiliser.* demonstrating knowledge of number concepts and terms
* communicating solutions which usually require only one or two steps.

*The examples above are indicative of the evidence that is required.* | The learner applies numeric reasoning, using relational thinking, in solving problems by involving one or more of:* selecting and carrying out a logical sequence of steps
* connecting different concepts and representations
* demonstrating an understanding of concepts
* forming and using a model

and also relating findings to the context, or communicating thinking using appropriate mathematical statementsFor example:Different costs have been linked to get a net income figure for the stock Pete purchased at the beginning of a 12 month period. Calculations include:* linking individual costs and constraints to get total costs involved in buying and raising stock for 12 months
* linking income from sale of stock to total costs to determine the net income.

*The examples above are indicative of the evidence that is required.* | The learner applies numeric reasoning, using extended abstract thinking, in solving problems by involving one or more of:* devising a strategy to investigate or solve a problem
* identifying relevant concepts in context
* developing a chain of logical reasoning, or proof
* forming a generalisation

and also using correct mathematical statements, or communicating mathematical insightFor example:The learner calculated Pete’s net income and identified and discussed the impact of various aspects such as:* the number of stock that died
* variations in costs of such things as the fertiliser, vet bills
* purchase and sale prices.

*The examples above are indicative of the evidence that is required.* |

Final grades will be decided using professional judgement based on an examination of the evidence provided against the criteria in the Achievement Standard. Judgements should be holistic, rather than based on a checklist approach.