THT.

THT WORKSHEETS

ATAR Mathematics

Learning Pack

Functions, Financial Modelling & Mathematical Reasoning

Student Name: _____

Date: _____

Recommended Time: 60 minutes

Why This Learning Pack Matters

Senior mathematics is about more than applying formulas. Students are expected to analyse situations, interpret mathematical models and justify conclusions. This Learning Pack develops those skills through questions that reflect the style and reasoning expected in senior secondary mathematics.

Learning Outcomes

By completing this Learning Pack, students will:

- interpret linear and quadratic relationships
- solve financial and algebraic problems
- analyse graphs and data
- apply mathematics to real-world scenarios
- communicate mathematical reasoning clearly

Instructions

- Answer every question.
- Show all working.
- Use appropriate mathematical notation.

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- Round answers where necessary.
- Justify your conclusions whenever requested.

Question 1

Solve for **x**.

$4x - 9 = 27$

Question 2

A function is defined by

f(x) = 3x + 5

Find:

a) f(4)

b) f(−2)

Question 3

The cost of hiring equipment is given by

C = 150 + 25h

where **h** is the number of hours.

a) What does the number **150** represent?

b) Calculate the cost of hiring the equipment for **8 hours**.

Question 4

A savings account earns **5.2% compound interest per annum**, compounded annually.

An investment of **$18,000** is left for **5 years**.

Calculate the final balance.

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Question 5

The graph of a line passes through the points

(2, 7)

and

(8, 19)

Find:

a) the gradient

b) the equation of the line.

Question 6

A business sells **120 products** each week.

Each product sells for **$35**.

Weekly fixed costs are **$1,450**.

Variable costs are **$18 per product**.

Calculate the weekly profit.

Question 7

The quadratic expression

$x^2 - 11x + 24$

Factorise completely.

Hence solve

$x^2 - 11x + 24 = 0$

Question 8

The graph below shows the relationship between advertising expenditure and weekly sales.

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Advertising ($)	Weekly Sales ($)
500	4050
700	4760
900	5510
1100	6180

Describe the relationship.

Suggest one reason why this pattern may not continue indefinitely.

Question 9

A loan of **$12,000** is repaid using **simple interest** at **6% per annum** over **4 years**.

Calculate:

a) the total interest

b) the total amount repaid.

Question 10

A company's monthly profit is modelled by

$P(x) = 450x - 12{,}000$

where **x** is the number of products sold.

What is the minimum whole number of products the company must sell to make a profit?

Question 11

A student says:

> "If two lines have different gradients, they must intersect."

Is the student's statement always true?

Explain your reasoning.

Question 12

A family is choosing between two internet plans.

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Plan A

$78 per month

Unlimited data

Plan B

$55 per month

Plus $4 for every 10 GB used

The family uses **90 GB** each month.

Which plan is cheaper?

Show your calculations.

Question 13

The table shows the number of students achieving each grade.

Grade	Students
A	18
B	26
C	31
D	15

What percentage of students achieved **Grade B or higher**?

Give your answer correct to one decimal place.

Question 14

A linear function has gradient -3 and passes through

$(4, 5)$.

Find its equation.

Question 15

A company offers two payment options.

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Option A

5% discount for immediate payment.

Option B

Pay the full amount over 12 months with **3% simple interest**.

The original invoice is **$8,400**.

Determine which option is financially better.

Support your recommendation with calculations.

Reflection

Before reading the solutions...

One concept I applied confidently was:

One question that required the most reasoning was:

One topic I would like to revise is:

End of Learning Pack

Please check your answers before reading the **Learn With the Solutions** booklet.