

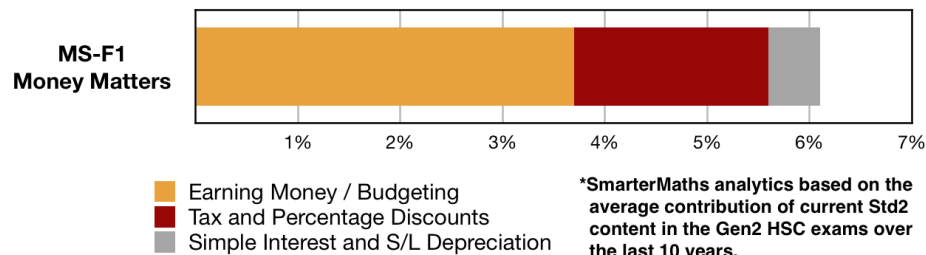
STD 1: Financial Maths (Std 1), F1 Money Matters (Y11)
Simple Interest and S/L Depreciation (Std 1)



Teacher: Kirtana Hariharan

Exam Equivalent Time: 45 minutes (based on HSC allocation of 1.5 minutes approx. per mark)

General 2 Exam Contribution History
F1 - Money Matters



IMPORTANT FEATURES AND TIPS FROM 2UG EXAM HISTORY

- *MS-F1 Money Matters* has contributed a solid 6.1% to Gen2 past papers over the past decade (note past allocations are no guarantee of future contributions).
- We have split this area into 3 subtopics: *Earning money and budgeting (3.7%)*, *Tax and Percentage Discounts (1.9%)* and *Simple Interest and Straight Line Depreciation (0.5%)*.
- This analysis looks at the smallest sub-topic, *Simple Interest and Straight Line Depreciation (0.5%)*.

ANALYSIS - What to Expect and Common pitfalls

- *Simple Interest and Straight Line Depreciation (0.5%)* are minor contributors - "gateway" content for Y12 topics compound interest and declining balance depreciation.
- Flat-rate (simple) interest loans are regarded as outside the current syllabus and all past HSC questions in this area have been removed.
- *Depreciation* is regularly tested by comparing straight line and declining balance methodologies. These questions, due to the requirement of Y12 content, are covered in the *MS-F3* topic area.

Questions

1. Financial Maths, STD2 F1 SM-Bank 03 MC

\$6000 is invested in an account that earns simple interest at the rate of 3.5% per annum.

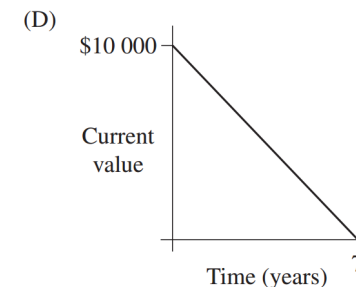
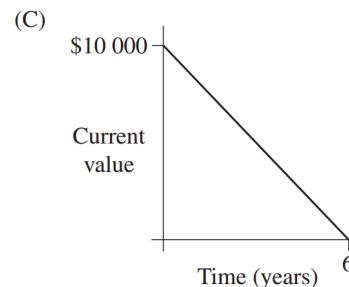
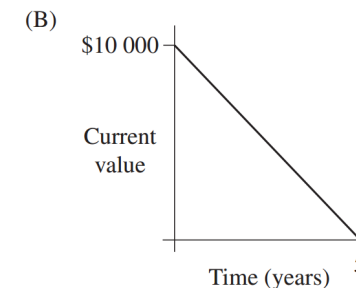
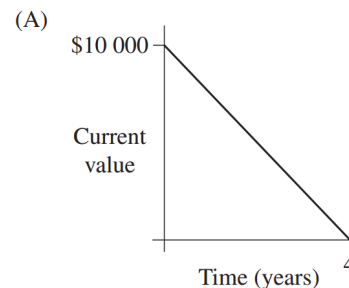
The total interest earned in the first four years is

- A. \$70
- B. \$84
- C. \$210
- D. \$840

2. FS Driving, 2UG 2010 HSC 11 MC

⚡ RAP Data - Bottom 10%: School result (86%) was 2% above state average (84%)

Which of the following graphs shows the lowest rate of depreciation over the given time period?



3. Financial Maths, 2UG 2010 HSC 5 MC

Minjy invests \$2000 for 1 year and 5 months. The simple interest is calculated at a rate of 6% per annum.

What is the total value of the investment at the end of this period?

- (A) \$2170
 - (B) \$2180
 - (C) \$3003
 - (D) \$3700
-

4. Financial Maths, 2UG 2013 HSC 13 MC

Polly borrowed \$11 000. She repaid the loan in full at the end of two years with a lump sum of \$12 000.

What annual simple interest rate was she charged?

- (A) 4.17%
 - (B) 4.55%
 - (C) 8.33%
 - (D) 9.09%
-

5. Financial Maths, 2UG 2013 HSC 9 MC

Lynne invests \$1000 for a term of 15 months. Simple interest is paid on the investment at a rate of 3.75% per annum.

How much will Lynne's investment be worth at the end of the term?

- (A) \$1046.88
 - (B) \$1047.09
 - (C) \$1296.88
 - (D) \$1468.75
-

6. Financial Maths, STD2 F1 SM-Bank 01 MC

Rae paid \$40 000 for new office equipment at the start of the 2013 financial year.

At the start of each following financial year, she used flat rate depreciation to revalue her equipment.

At the start of the 2016 financial year she revalued her equipment at \$22 000.

The annual flat rate of depreciation she used, as a percentage of the purchase price, was

- (A) 11.25%
 - (B) 15%
 - (C) 17.5%
 - (D) 35%
-


7. FS Driving, 2UG 2017 HSC 11 MC

A new car was bought for \$19 900 and one year later its value had depreciated to \$16 300.

What is the approximate depreciation, expressed as a percentage of the purchase price?

- A. 18%
 - B. 22%
 - C. 78%
 - D. 82%
-

8. Financial Maths, 2UG 2009 HSC 20 MC

 *RAP Data - Bottom 11%: School result (36%) was 2% above state average (34%)*

Lou bought a plasma TV which was priced at \$3499. He paid \$1000 deposit and got a loan for the balance that was paid off by 24 monthly instalments of \$135.36.

What simple interest rate per annum, to the nearest percent, was charged on his loan?

- (A) 11%
 - (B) 15%
 - (C) 30%
 - (D) 46%
-

9. Financial Maths, 2UG 2005 HSC 25a

Reece is preparing his annual budget for 2006.

His expected income is:

- \$90 every week as a swimming coach
- Interest earned from an investment of \$5000 at a rate of 4% per annum.

His planned expenses are:

- \$30 every week on transport
- \$12 every week on lunches
- \$48 every month on entertainment.

Reece will save his remaining income. He uses the spreadsheet below for his budget.

	A	B	C	D	E	F	G	H
1	REECE'S ANNUAL BUDGET FOR 2006							
2								
3	INCOME				EXPENSES			
4								
5	Wages			\$4,680		Transport		\$(Y)
6	Interest on investment			\$(X)		Lunches		\$624
7						Entertainment		\$(Z)
8								
9								

(i) Determine the values of **X**, **Y** and **Z**. (Assume there are exactly 52 weeks in a year.) (3 marks)

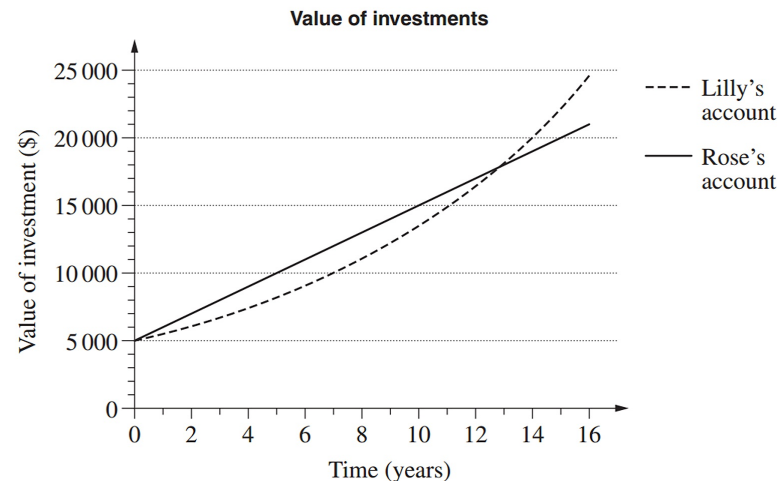
(ii) At the beginning of 2006, Reece starts saving.

Will Reece have saved enough money during 2006 for a deposit of \$2100 on a car if he keeps to his budget? Justify your answer with suitable calculations. (2 marks)

10. Financial Maths, 2UG 2007 HSC 23a

Lilly and Rose each have money to invest and choose different investment accounts.

The graph shows the values of their investments over time.



- (i) How much was Rose's original investment? (1 mark)
- (ii) At the end of 6 years, which investment will be worth the most and by how much? (2 marks)
- (iii) Lilly's investment will reach a value of \$20 000 first.

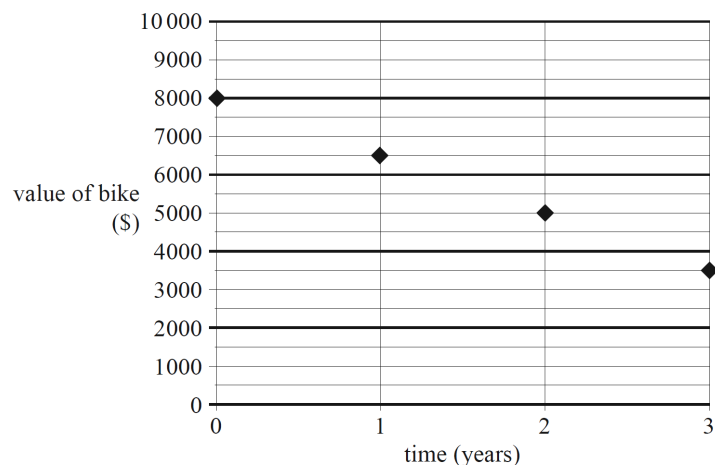
How much longer will it take Rose's investment to reach a value of \$20 000? (1 mark)

11. Financial Maths, STD2 F1 SM-Bank 02

Hugo is a professional bike rider.

The value of his bike will be depreciated over time using the flat rate method of depreciation.

The graph below shows his bike's initial purchase price and its value at the end of each year for a period of three years.



- (i) What was the initial purchase price of the bike? *(1 mark)*
- (ii) Use calculations to show that the bike depreciates in value by \$1500 each year. *(1 mark)*
- (iii) Assume that the bike's value continues to depreciate by \$1500 each year. Determine its value five years after it was purchased. *(1 mark)*

12. Financial Maths, STD2 F1 SM-Bank 03

A company purchased a machine for \$60 000.

For taxation purposes the machine is depreciated over time using the straight line depreciation method.

The machine is depreciated at a flat rate of 10% of the purchase price each year.

- (i) By how many dollars will the machine depreciate annually? *(1 mark)*
- (ii) Calculate the value of the machine after three years. *(1 mark)*
- (iii) After how many years will the machine be \$12 000 in value? *(1 mark)*

13. Financial Maths, STD2 F1 SM-Bank 05

Khan paid \$900 for a printer.

This price includes 10% GST (goods and services tax).

- (i) Determine the price of the printer before GST was added.
Write your answer correct to the nearest cent. *(2 marks)*
- (ii) Khan is able to depreciate the full \$900 purchase price of his printer for taxation purposes.
Under flat rate depreciation the printer will be valued at \$300 after five years.

Calculate the annual depreciation in dollars. *(1 mark)*

14. Financial Maths, STD2 F1 SM-Bank 06

Michelle intends to keep a car purchased for \$17 000 for 15 years. At the end of this time its value will be \$3500.

- (i) By what amount, in dollars, would the car's value depreciate annually if Michelle used the flat rate method of depreciation? *(1 mark)*
- (ii) Determine the annual flat rate of depreciation correct to one decimal place. *(1 mark)*

15. Financial Maths, STD2 F1 SM-Bank 02

George makes a single deposit of \$9000 into an account that pays simple interest.

After 4 years, George's account has a balance of \$10 350.

What simple interest rate did George receive on his investment? *(2 marks)*

Worked Solutions

1. Financial Maths, STD2 F1 SM-Bank 03 MC

$$P = 6000, r = 3.5\%, n = 4$$

$$I = Prn$$

$$= 6000 \times \frac{3.5}{100} \times 4$$

$$= 840$$

$$\Rightarrow D$$

2. FS Driving, 2UG 2010 HSC 11 MC

The lowest rate of depreciation will occur when an item retains value for the longest time.

$$\Rightarrow D$$

3. Financial Maths, 2UG 2010 HSC 5 MC

$$\text{Interest} = Prn$$

$$= 2000 \times 6\% \times \frac{17}{12}$$

$$= 170$$

$$\begin{aligned} \therefore \text{Value of Investment} &= 2000 + 170 \\ &= 2170 \end{aligned}$$

$$\Rightarrow A$$

4. Financial Maths, 2UG 2013 HSC 13 MC

$$\text{Total interest paid} = 12000 - 11000 = 1000$$

$$\text{Using } I = Prn$$

$$1000 = 11000 \times r \times 2$$

$$r = \frac{1000}{22000}$$

$$= 4.55\%$$

$$\Rightarrow B$$

5. Financial Maths, 2UG 2013 HSC 9 MC

$$I = Prn = 1000 \times \frac{3.75}{100} \times \frac{15}{12} = \$46.88$$

$$\therefore \text{Investment is worth } 1000 + 46.88 = \$1046.88$$

$$\Rightarrow A$$

6. Financial Maths, STD2 F1 SM-Bank 01 MC

Depreciation over 3 years

$$= 40\,000 - 22\,000$$

$$= \$18\,000$$

◆ Mean mark 50%.

$$\therefore \text{Annual depreciation} = \frac{18\,000}{3} = \$6000$$

$$\therefore \text{Depreciation rate} = \frac{6000}{40\,000} = 0.15 = 15\%$$

$$\Rightarrow B$$

7. FS Driving, 2UG 2017 HSC 11 MC

$$\text{Net Depreciation} = 19\,900 - 16\,300$$

$$= \$3600$$

$$\therefore \% \text{ Depreciation} = \frac{3600}{19\,900} \times 100$$

$$= 18.09\% \dots$$

$$\Rightarrow A$$

8. Financial Maths, 2UG 2009 HSC 20 MC

$$\begin{aligned}\text{Loan} &= \text{Price} - \text{deposit} \\ &= 3499 - 1000 \\ &= 2499\end{aligned}$$

$$\begin{aligned}\text{Total repaid} &= 24 \times 135.36 \\ &= 3248.64\end{aligned}$$

$$\begin{aligned}\therefore \text{Interest paid} &= 3248.64 - 2499 \\ &= 749.64\end{aligned}$$

$$\text{Simple Interest} = Prn$$

$$749.64 = 2499 \times r \times 2$$

$$\therefore r = \frac{749.64}{2 \times 2499}$$

$$= 0.1499\dots$$

$$= 15\% \text{ (nearest \%)}$$

$\Rightarrow B$

◆◆ Mean mark 34%

COMMENT: A multi-step question targeting higher bands that can be a time-trap for many students.

9. Financial Maths, 2UG 2005 HSC 25a

(i) $\text{Interest on Investment} = X$

$$\begin{aligned}X &= 5000 \times 4\% \\ &= \$200\end{aligned}$$

$$\text{Transport} = Y$$

$$\begin{aligned}Y &= 52 \times 30 \\ &= \$1560\end{aligned}$$

$$\text{Entertainment} = Z$$

$$\begin{aligned}Z &= 48 \times 12 \\ &= \$576\end{aligned}$$

(ii) $\text{Total Income} = 4680 + 200$

$$= \$4880$$

$$\text{Total Expenses} = 1560 + 624 + 576$$

$$= \$2760$$

$$\text{Savings} = 4880 - 2760$$

$$= \$2120$$

\therefore Reece will have saved enough for a \$2100 deposit.

10. Financial Maths, 2UG 2007 HSC 23a

(i) \$5000 (y -intercept)

(ii) After 6 years,

$$\text{Lilly's investment} = \$9000$$

$$\text{Rose's investment} = \$11\,000$$

\therefore Rose's is worth \$2000 more.

(iii) It takes Lilly 14 years to reach \$20 000 and it takes Rose 1 year longer (15 years) to reach the same value.

11. Financial Maths, STD2 F1 SM-Bank 02

(i) \$8000

(ii) Value after 1 year = \$6500 (from graph)

$$\begin{aligned}\therefore \text{Annual depreciation} &= 8000 - 6500 \\ &= \$1500\end{aligned}$$

(iii) After 5 years:

$$\begin{aligned}S &= V_0 - Dn \\ &= 8000 - 5 \times 1500 \\ &= \$500\end{aligned}$$

12. Financial Maths, STD2 F1 SM-Bank 03

$$\begin{aligned}\text{(i) Annual depreciation} &= 10\% \times 60\,000 \\ &= \$6000\end{aligned}$$

(ii) After 3 years,

$$\begin{aligned}\text{Value} &= V_0 - Dn \\ &= 60\,000 - (3 \times 6000) \\ &= \$42\,000\end{aligned}$$

(iii) Find n when value = \$12 000

$$\begin{aligned}12\,000 &= 60\,000 - 6000 \times n \\ 6000n &= 48\,000 \\ \therefore n &= \frac{48\,000}{6000} \\ &= 8 \text{ years}\end{aligned}$$

13. Financial Maths, STD2 F1 SM-Bank 05

(i) Let $\$P$ = price ex-GST

$$\begin{aligned}\therefore P + 10\% \times P &= 900 \\ 1.1P &= 900 \\ P &= \frac{900}{1.1} \\ &= 818.181\dots \\ &= \$818.18 \text{ nearest cent}\end{aligned}$$

COMMENT: Reverse GST questions regularly cause problems for many students.

(ii) Annual depreciation

$$\begin{aligned}&= \frac{(900 - 300)}{5} \\ &= \$120\end{aligned}$$

14. Financial Maths, STD2 F1 SM-Bank 06

$$\begin{aligned} \text{(i) Depreciation} &= \frac{17\,000 - 3\,500}{15} \\ &= \$13\,500 \end{aligned}$$

$$\begin{aligned} \therefore \text{Annual depreciation} &= \frac{13\,500}{15} \\ &= \$900 \end{aligned}$$

$$\begin{aligned} \text{(ii) } \therefore \text{Flat rate of depreciation} &= \frac{900}{17\,000} \times 100\% \\ &= 5.29\dots \\ &= 5.3\% \text{ (1 d.p.)} \end{aligned}$$

15. Financial Maths, STD2 F1 SM-Bank 02

$$\begin{aligned} \text{Interest earned} &= 10\,350 - 9\,000 \\ &= \$1\,350 \end{aligned}$$

Using $I = Prn$,

$$1350 = 9000 \times r \times 4$$

$$\begin{aligned} \therefore r &= \frac{1350}{4 \times 9000} \\ &= 0.0375 \\ &= 3.75\% \end{aligned}$$