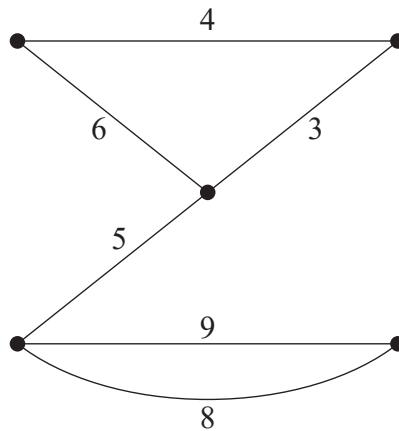


QUESTION 4

A network graph is shown.



The network graph could be described as

- (A) connected and weighted.
- (B) directed and connected. ← no arrow heads (not directed)
- (C) simple and connected. ← weights included ∴ not simple
- (D) weighted and simple. ← can't be weighted and simple

QUESTION 5

Identify the number of faces for a planar graph that has 5 edges and 3 vertices.

- (A) 8
 - (B) 6
 - (C) 4
 - (D) 2
- $$v + f - e = 2$$

$$\therefore 3 + f - 5 = 2$$

$$\therefore f = 2 + 5 - 3$$

$$= 4$$

QUESTION 6

A ball is dropped from a height of 25.6 m. After each bounce, the ball rebounds to 75% of its previous height.

Which option shows the ball's height after the third bounce?

- (A) 8.1 m
- (B) 10.8 m
- (C) 14.4 m
- (D) 19.2 m

Doing repeated calcs using 'Ans'

- Enter initial height and press EXE (or OK)
- Enter 'x 0.75' and EXE. The 'Ans' will appear
- ← height after one bounce
- Press EXE again
- ← height after two bounces
- Press EXE again
- 3 of 6
- ← height after third bounce.

Using the Table app:

- Press Function (F(x))
- Define f(x)
- ← use the α key

f(x) = 25.6 x 0.75^x

← this is the function for height after x bounces

- Press Tools (T)
- Open Table Range (no change needed)
- Arrow down and ok

x	f(x)	g(x)
1	19.2	
2	14.4	
3	10.8	
4	8.1	

← look for height (f(x)) when bounce (x) = 3

* Table method better for large x *

QUESTION 6 (6 marks)

Fiore (F) and Goran (G) each hike for n hours along a track that joins a car park and a lookout. They both start their hike at 10 am, but from opposite ends of the track.

- Fiore's distance (km) from the car park, F_n , is modelled by $F_n = 2n$
- Goran's distance (km) from the car park, G_n , is modelled by $G_n = 12 - 3(n - 1)$

When Fiore and Goran meet on the track, they both take a 30-minute break. They then hike together to the car park, arriving at 4 pm.

Determine their hiking speed (km/h) from when Fiore and Goran finish their break to when they arrive at the car park.

TABLE App

n	0	1	2	3					
F_n	0	2	4	6					
G_n	15	12	9	6					

- Tools ☺☺☺
Define $f(x)/g(x)$

	Define $f(x)$
	Define $g(x)$

- Enter $f(x)$
(use \oplus key)

	$f(x) = 2x$
--	-------------

- Repeat for $g(x)$

	$g(x) = 12 - 3(x - 1)$
--	------------------------

\therefore meet when $n = 3$, at 1 pm

they are 6 km from the carpark

- Tools ☺☺☺
Table Range

Set as 0-5

Table Range	
Start:	0
End:	5
Step:	1

\therefore Between 1:30 & 4:00 they hike 6 km.

- Arrow down and Execute.

x	$f(x)$	$g(x)$
0	0	15
1	2	12
2	4	9
3	6	6

\therefore Their speed is $\frac{6}{2.5} = 2.4$ km/h

	$\frac{6}{2.5}$
	2.4

QUESTION 7 (6 marks)

Two businesses, B₁ and B₂, report their annual profit (\$) at the end of each year.

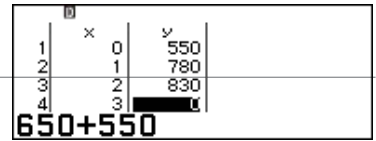
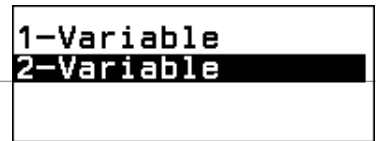
	Annual profit (\$)		Sum
	B ₁	B ₂	
2022	300 000	250 000	550 000
2023	500 000	280 000	780 000
2024	400 000	430 000	830 000
2025	650 000	550 000	1200 000

At the end of 2025, the two businesses merged into one company, C, and appointed a new director. The director used the B₁ and B₂ data up until that time to predict that C's annual profit reported at the end of 2040 would be more than \$4 million.

Evaluate the reasonableness of the director's prediction.

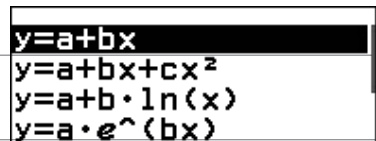
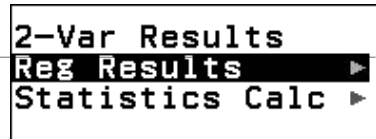
Statistics app

If x is years since 2022
 and y is combined profit in \$1000s
 then a regression model for y is
 $y = 540 + 200x$

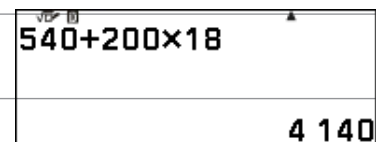
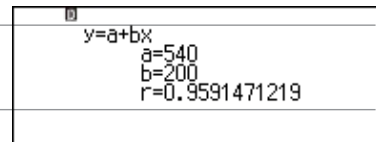


can sum within the Stats app.

Using this model, at the end of 2040, $x = 18$ and
 $y = 540 + 200 \times 18 = 4140$



\therefore The model predicts that C's annual profit is \$4140 000 which is more than \$4 million
 \therefore the prediction is reasonable.



Do not write outside this box.