Linear patterns, rules and graphs

Name:____

On page 4 of this handout you will find a number of real-world applications of linear patterns. For each of the patterns you need to make a table, find the common difference, identify the rule and plot a graph.

For example, consider this (imaginary) plumber's ad:

Fasta Plumba

Servicing Innaloo and Upper Swan. Cheapest rates in Australia: $38 per hour[a], including GST.

[a] A callout fee of $27 applies to all jobs

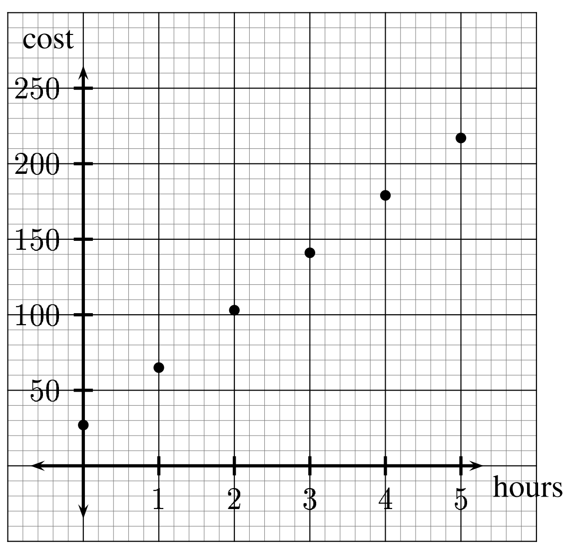
First you might fill in the table:

Hours	Cost
0	$27
1	$65
2	$103
3	$141
4	$179
5	$217

You can identify the common difference as $38.

Then plot the graph:

Cost of Fasta Plumba



Then you might finish it by writing the rule as an algebraic sentence. We work out the cost by multiplying the number of hours by $38 and then adding $27, so the rule is

$$c = 38h + 27$$

(where c is the cost and h is the number of hours).

1 The Rottnest Plan

Look at the cost from 1 January 2003 of a “Bungalow, four-bed”.

The rule is $c =$ ____________________
(use w for the number of weeks and c for the cost)

Weeks	Cost
0	
1	
2	
3	
4	
5	

Common difference = _______________

2 Footyprints

Read the article “Footyprints don’t add up” from *Inside Cover*. For different numbers of teams, how many rounds are required for each team to play every other team twice?

The rule is $g =$ ____________________
(use t for the number of teams and g for the number of games)

Teams	Games
1	0
2	
3	
4	
5	
10	
15	
16	
20	

Common difference = _______________

3 Hurry to score a winning deal

Look at the Vodafone ad. What would it cost, including the initial cost of the phone, for a number of months on the plan (assuming there are no other call costs)?

The rule is ______________________________

Months	Cost
0	
1	
2	
3	
4	
5	
6	
12	
24	

Common difference = ____________________

4 How it measures up

Look at the the fuel tank capacity and litres/100km for the Porsche 911 Targa. If we start with a full tank, how much fuel is left after 100km of city driving? After 200km?

The rule is ____

Distance	Fuel remaining
0	
100km	
200km	
300km	
400km	
500km	

Common difference = ______________________________

Can you read from your graph how far you expect to be able to drive on a full tank before you run out?

How would the rule change if we used the litres/100km figure for highway driving? Try plotting this rule on the same graph as the one you used for city driving.

Joining the dots

Sometimes it makes sense to join the dots on your graph, and sometimes it doesn't. For example, if our "Fasta Plumba" is happy to work out his bill to the nearest minute, then we could join our dots with a straight line. But if he always rounds his charges up to the next full hour, it doesn't make sense to join the dots. **It only makes sense to join the dots if the in-between values make sense.**

Look back over the graphs you've drawn and join the dots where it makes sense to do so.

THE ROTTNEST PLAN

WHAT YOU WILL PAY TO STAY

(Peak season charges per week)

	Current	From January 1
Bungalow, four-bed	$262.90	$285
Unit, four-bed	$486.20	$650
Villa, six-bed, not refurbished	$694.10	$805
Villa, eight-bed, refurbished with view	$850.30	$1145
Cottage, four-bed, restored	$828.30	$965
Cottage, four-bed, refurbished	$941.60	$1060
Cottage, eight-bed, restored	$1058.20	$1325

GRAPHIC: Toby Wilkinson

Footyprints don't add up

LINDSAY of Dianella says there are very good reasons why footy players shouldn't be allowed to write newspaper articles, as former Carlton great Stephen Silvagni illustrated in the Financial Review on Monday.

Writing about the push for a longer AFL season, "Sos" stated: "In an ideal world, the 16 teams would meet each other twice. But the league would never extend the home-and-away season to 32 games on top of the finals series . . ."

32 games from 16 teams?

Surely that should be 30 games, Lindsay points out.

Quite right, Lindsay.

How it measures up

Porsche 911 Targa

Comment	Carrera shape still presses the buttons, with bonus glass roof in Targa trim meaning only slight performance penalty. Less than lavish cabin cannot detract from engaging drive. **New rivals ...** from Maserati and Mercedes arrive soon, but it will take a lot to knock the 911 off its pedestal.
Price	$211,600
Warranty	2 years/unlimited km
Engine	3.6-litre flat six-cylinder
Power/Torque	235kW/370Nm
Transmission	Rear-drive, five-speed tiptronic auto (six-speed manual $8000 less)
Seats/Weight	Two plus two/1470kg
Fuel tank/type	64 litres/premium unleaded
Litres/100km	16.9 city, 8.1 highway
0-100km/h	5.7 seconds
Turning circle	10.6m
Airbags/ABS	Four/Yes
Ratings	Value: ★★★ 1/2 Performance: ★★★★★ Overall: ★★★★ 1/2

"hurry to score a winning deal"

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