Name: KEY

Date: _____

Chapter 4 Group Problem Solving

Graphing linear relations can be very helpful for analyzing 'real world' problems and making predictions.

Often, a regular coordinate plane is not used for two reasons:

i) In real world problems, negative values are often not needed, so (0, 0) can be in the bottom left corner of the graph.

ii) The graph may not necessarily increase by 1s. You may even want to set the graph up so that the ***x*** axis changes by a different amount than the ***y*** axis. This is one of the challenges in the following problems – to decide the scaling of each axis in your graph in order to use up most of the graphing space.

For the following problems, read all directions and questions carefully, and answer each fully.

1) An amusement park charges an admission fee of $10, plus $2 per ride.

a) Choose variables to represent the number of rides that are taken and the total cost.

LET r = # of rides taken, LET C = cost

b) Which variable is the independent variable, and therefore on the *x* axis?

r is independent, b/c Cost depends on r

c) Make a table of values for zero rides up to 10 rides. →

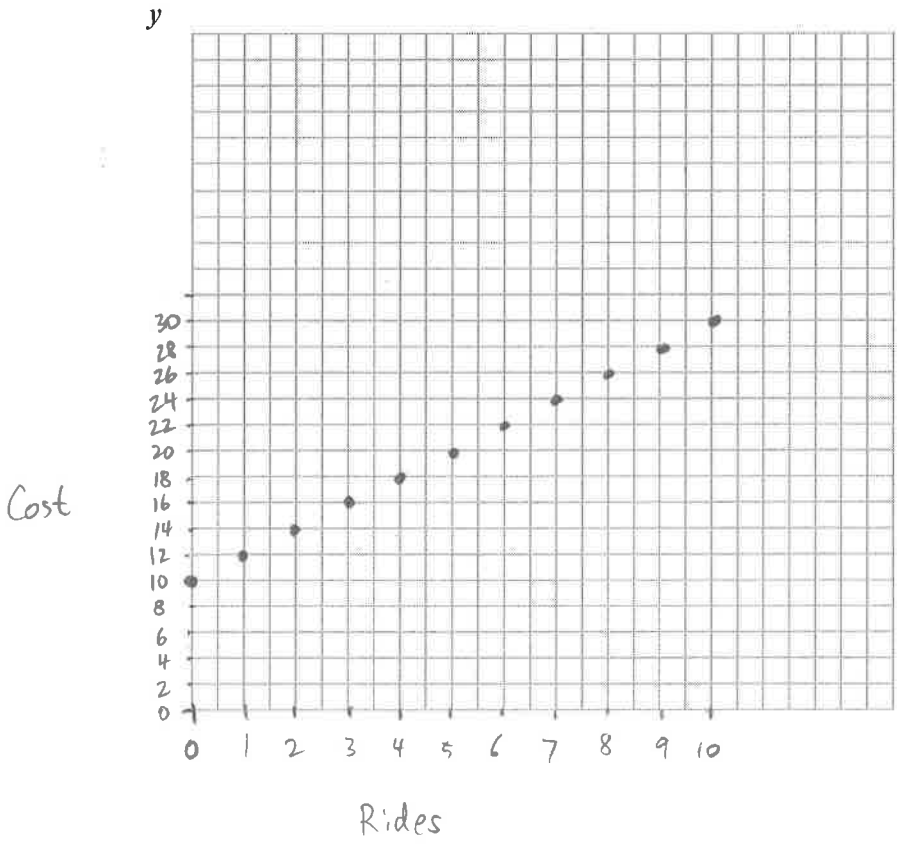
r	C
0	10
1	12
2	14
3	16
4	18
5	20
6	22
7	24
8	26
9	28
10	30

d) Write an equation that relates the total cost to the number of rides.

$C = 2r + 10$

e) Decide your ***x*** and ***y*** scales and graph the equation so that most of the grid is used for the graph. Label each axis.

f) Should you join the points? Why or why not? No because you cannot go on half of a ride so data is discrete



g) What is the total cost for 17 rides? Use your equation.

$C = 2r + 10$

$C = 2(17) + 10$

$C = 34 + 10$

$C = \$44$

h) How many rides can be taken for a total of $52? Use your equation.

$C = 2r + 10$

$52 = 2r + 10$

$-10 \quad -10$

$\frac{42}{2} = \frac{2r}{2}$

$21 = r$

2) A small plane is at a height of 1800m when it starts descending to land (we'll call this point in time 0 minutes). The plane's height decreases at an average rate of 150m per minute.

a) Choose variables to represent the time in minutes and the height in metres since the plane began its descent.

Let t = time (min) Let h = height (m)

b) Determine which is the independent variable (*x* axis).

time

c) Construct a table of values until the plane is on the ground (0m) →

t	h
0	1800
1	1650
2	1500
3	1350
4	1200
5	1050
6	900
7	750
8	600
9	450
10	300
11	150
12	0

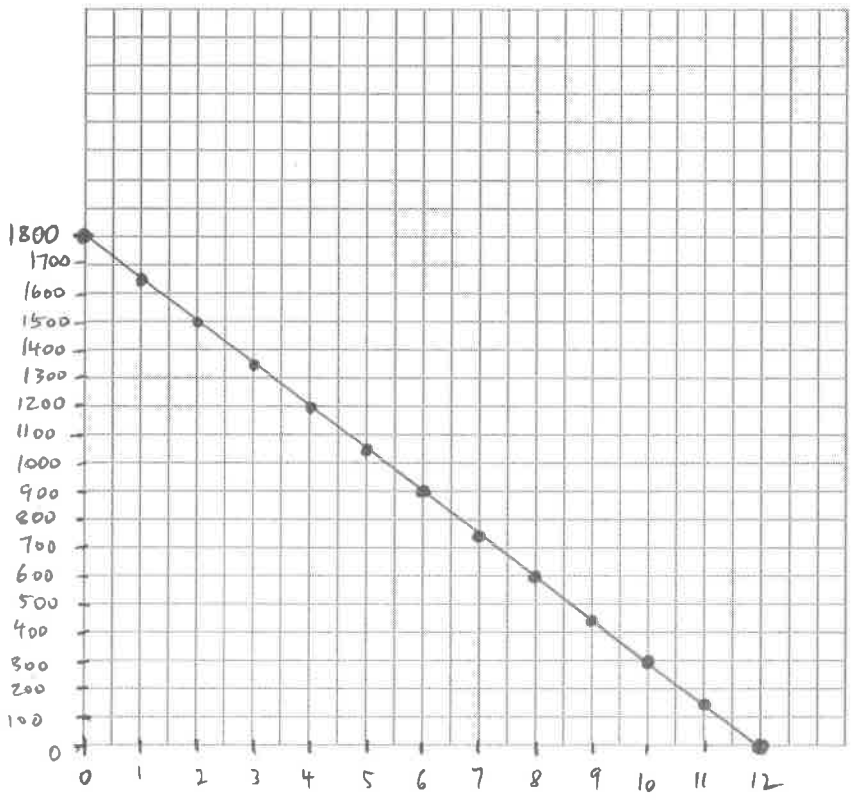
d) Write an equation that relates the height to the time.

$h = -150t + 1800$

e) Decide your ***x*** and ***y*** scales and graph the equation so that most of the grid is used for the graph. Label each axis.

f) Should you join the points? Why or why not?

Yes, as the data is continuous. You can measure the height of the plane any time.



e) What is the height of the plane 6.5 minutes after it began its descent? Use your equation to solve.

$h = -150(6.5) + 1800$

$h = -975 + 1800$

$h = 825\text{m}$

f) When is the plane 100m above the ground? Use your equation to solve.

$h = -150t + 1800$

$100 = -150t + 1800$

$-1800 \quad -1800$

$-1700 = -150t$

$\frac{-1700}{-150} = \frac{-150t}{-150}$

$11.\overline{3} = t$

$t = 11\frac{1}{3}$ mins

$t = 11$ min, 20 sec

3a) As a group, formulate a real-life linear situation. Describe below:

b) Decide on two variables for your situation:

c) Build a table for your situation with at least 6 entries ⟶

d) Build an equation for the relation.

e) Decide your ***x*** and ***y*** scales and graph the equation so that most of the grid is used for the graph. Label each axis.

f) Should you join the points? Why or why not?