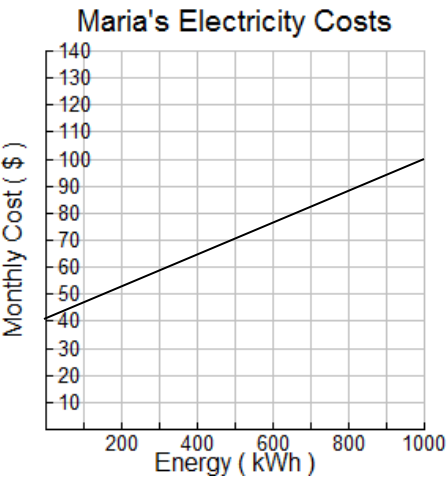


1. Electrical energy is sold in units kilowatt-hours (kWh). Maria operates a horse-boarding stable. The graph shows the monthly cost for the electricity consumed to operate the stable.



a) *Describe* the relationship between monthly cost and energy consumed.

K2

b) Calculate the rate of change and the equation for the electricity costs (*do not forget to add units for the rate of change.*)

A2

A3

c) Use the equation to find *the cost* in dollars *of 200 kWh* consumed.

K1

d) *By how much* does the cost increase from 300 kWh to 400 kWh?

K1

e) How does *the cost* change each time if the consumption goes up by 100 kWh?

K1

f) Is the *rate of change* of cost with respect to gas consumption *increasing, decreasing, or constant*?

Justify your answer.

A2

2. The table shows distance and time data for a free- fall ride at an amusement park.

<i>Time (s)</i>	<i>Distance (m)</i>
0.0	0.0
0.2	0.2
0.4	0.8
0.6	1.8
0.8	3.2
1.0	5.0
1.2	7.2
1.4	9.8
1.6	12.8
1.8	16.2
2.0	20.0
2.2	24.2
2.4	28.8
2.6	33.6

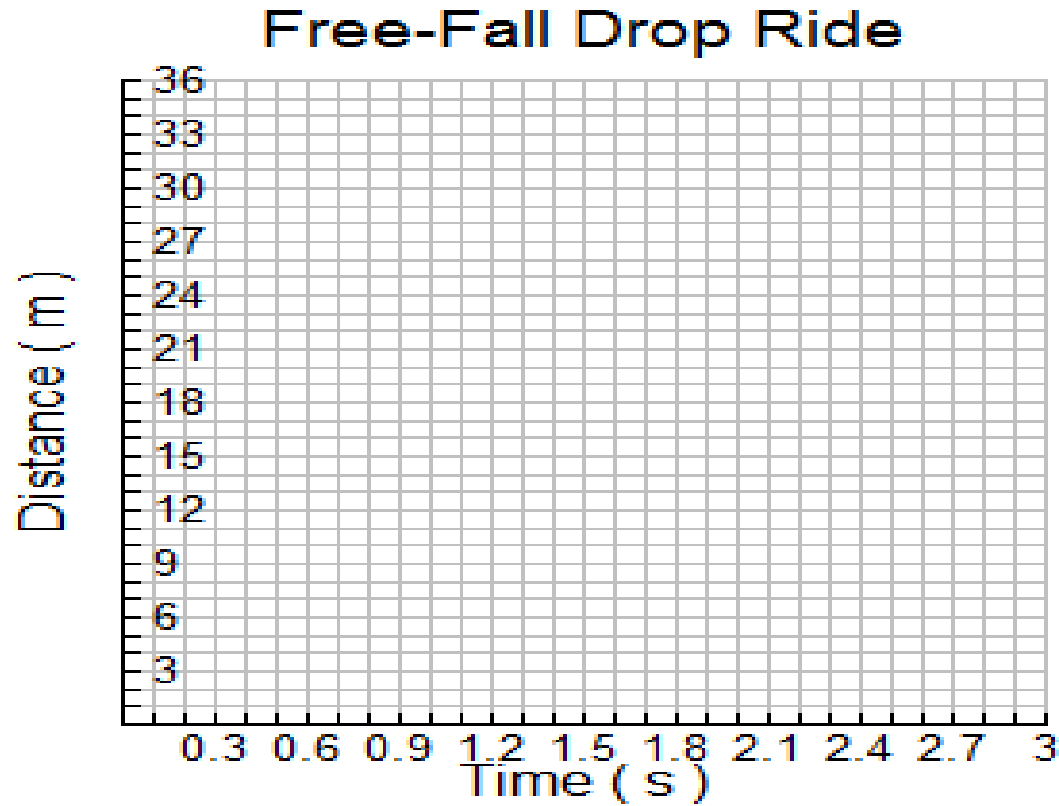
a) Does the time column show *equal time intervals* and by how much?

K2

b) Calculate the first and second differences for the table of values above.

A7

c) Graph the data from the table of values and draw the line of best fit or curve of best fit.



K9

d) Is this relationship linear or non- linear? Explain your answer.

K2

e) Does the rate of change of distance with respect to the time appear to be constant, increasing, or decreasing? Justify your answer.

K2

f) What is appropriate unit for this rate of change?

K1

3. The volume V of a cone with height h and radius r is given by the formula $V = \frac{1}{3}\pi r^2 h$.

a) Which variable, r or h , should you set constant to produce a linear relationship?

T1

b) Which variable, r or h , should you set constant to produce a quadratic relationship?

T1

c) Calculate the volume of the cone when $r = 4$.

T3

d) Calculate the volume of the cone when $h = 6$.

T3

4. Which models represent exponential relations? Justify your answer.

a)

t	0	1	2	3
A	35	25	15	5

b)

d	0	1	2	3
P	51.2	64	80	100

A4

5. Write beside which type of relation each equation represents (linear, quadratic, or exponential.)

a) $y = 5x + 2$

b) $y = 5(2)^x$

c) $y = 5x^2$

d) $y = x^2 + x + 6$

e) $y = 1.8x$

f) $y = -2x - 7$

K3

6. Two colonies of bacteria each start with 200 bacteria.

- The population of **Colony A** doubles every hour.
- The population of **Colony B** triples every hour.

These equations represent the population, P bacteria, of the two colonies after t hours.

Colony A: $P = 200 (2)^t$

Colony B: $P = 200 (3)^t$

a) Calculate the population of bacteria for each colony after 4 hours.

T4

7. A population grows by given percent per year. By what factor is each year's population multiplied?

a) 7%

b) 15%

T2