

6 How many atoms of thorium-234 decayed during the:

- a first 24 days? (1)
- b first 96 days? (1)
- c last 96 days? (1)
- d last 24 days? (1)

On the very first day, the activity of the same sample was measured at a range of distances from the source and the following results were obtained.

| Distance from source (m) | Activity (Bq) |
|--------------------------|---------------|
| 0.10 | 1900 |
| 0.15 | 844 |
| 0.20 | 475 |
| 0.25 | 304 |
| 0.30 | 211 |
| 0.35 | 155 |
| 0.40 | 119 |
| 0.45 | 94 |
| 0.50 | 76 |

Missing horizontal lines

7 Plot a graph of activity versus distance from the source. (3)

8 You are required to construct a graph that will allow you to prove that the activity *varies inversely* with the square of the distance from the source. In doing this:

- a What variables and units would you put on the *Y* and *X* axes of a graph to confirm a relationship such as activity $\propto \frac{1}{d^2}$? (2)
 - b If this relationship was confirmed, what shape would the graph take? (1)
 - c Manipulate your data and construct the graph that will allow you to prove that the activity varies inversely with the square of the distance from the source. (3)
- 9 From a quick internet search, find out if there are any health concerns related to thorium and why some people have taken great interest in using thorium. (2)