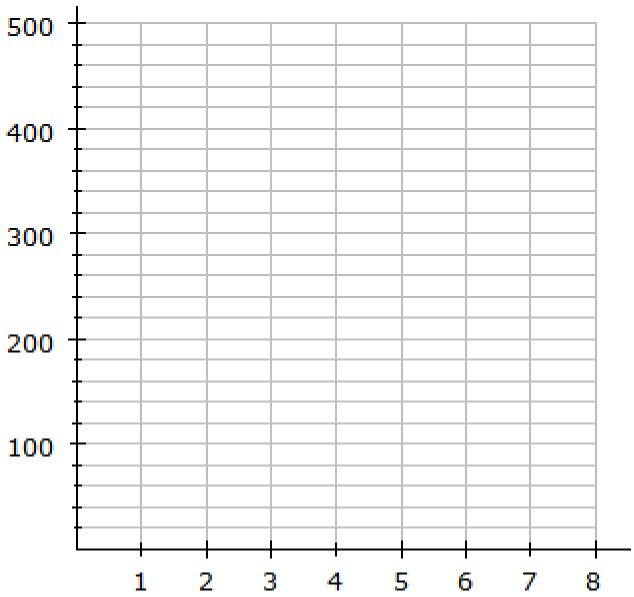
Y11 Context Graphs Practice #2

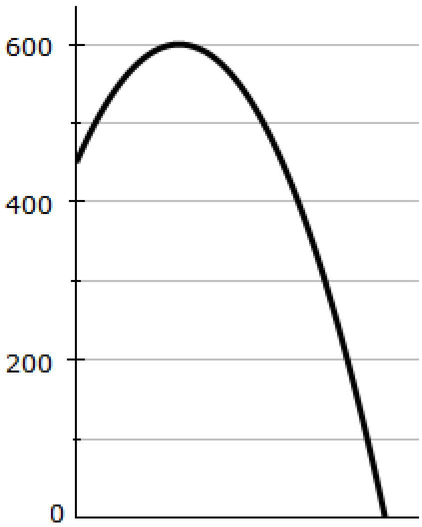
1. Bentley and family have a 400 km drive, and expect to average 80 km per hour.

a Sketch a relationship between distance and time if they travel at exactly 80 km/hr.

b Write an equation for that line.

c If they spend X hours stopped for a break in the middle, write a new equation for the line representing the **second** part of their trip.





2. Ebola is has spread in a country before authorities start a quarantine and treatment campaign to stop it. The number of cases can be modelled with a parabola.

There are 450 cases at the start, and two months later the disease peaks at 600 cases.

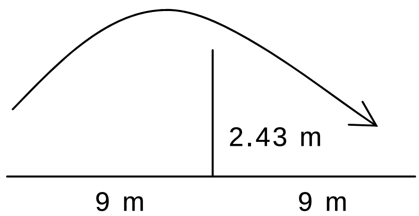
a Write an equation to give the number of cases of Ebola, E, relative to time, t.

b Use your equation to show when the disease will be stopped.

3. The height of a served volleyball is given by

$$h = \frac{(8 - x)(x + 13)}{30}$$

where
h is height above the ground, in metres, and
x is the distance from the net, in metres



a A volleyball court is 9 metres long either side of the net.

Will the ball land inside the court?

b Will the ball go over the 2.43 m high net?

c What is the maximum height the ball reaches?

Answers: Y11 Context Graphs Practice #2

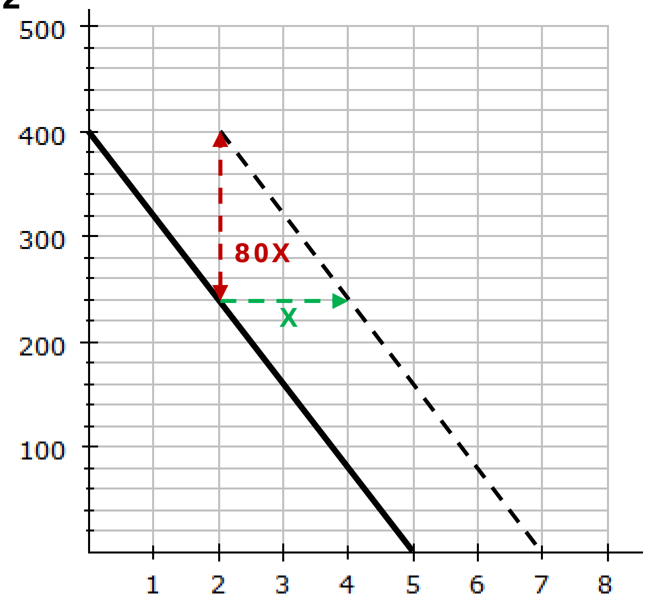
1.

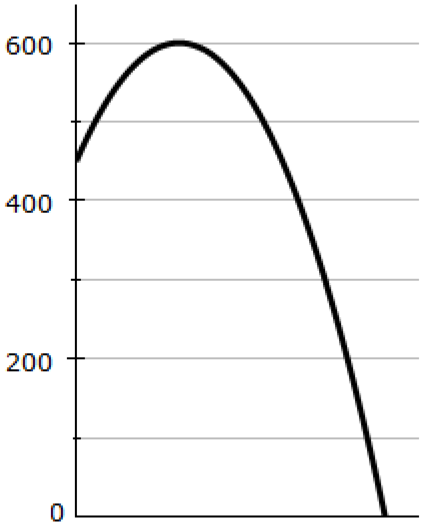
a The solid line shown (must stop at axes).

b **d = –80 t + 400**, or equivalent.

c Each hour spent stopped loses 80 km, so pushes the initial starting point 80 X higher. The gradient stays the same.

d = –80 t + 400 + 80 X





2. Intecept method, uses symmetry to know that (0, 450) means (4, 450) is also a point. Use these as if intercepts, then raise the line by 450

$$\boldsymbol{E = -37.5\, x\, (x - 4) + 450}$$

Turning point method, uses turning point at (2, 600) and fits the point (0, 450) to give the multiplier

$$\boldsymbol{E = 600 - 37.5\, (x - 2)^2}$$

b Solving $0 = -37.5\, x\, (x - 4) + 450$

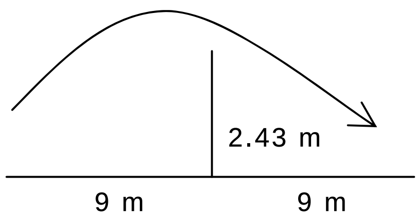
$0 = -37.5\, x^2 + 150x + 450$

$0 = x^2 - 4x - 12$ (all divided by –37.5)

$0 = (x + 2)(x - 6)$

gives $x = -2$ or 6. So **after 6 months**.

3. $h = \dfrac{(8 - x)(x + 13)}{30}$



a x intercepts are $x = 8$ and –13. The –13 is the server's side.

So it lands **inside at 8 m** from the net.

b Putting in $x = 0$, gives $h = \dfrac{(8 - 0)(0 + 13)}{30}$ = **3.47 m**

So it goes over a 2.43 m net easily.

c Maximum halfway between intercepts of –13 and 8 is at $x = -2.5$

$h = \dfrac{(8 - -2.5)(-2.5 + 13)}{30}$ = **3.675 m** is the maximum height