Math 11 · *Quadratic Functions*

A girl threw a ball off the roof of her school. Its height above the ground, in metres, is expressed as a function of time, in seconds.

$h = -4.9t^2 + 11.76t + 10.944$

(a) Determine the maximum height of the ball.
(b) For how many seconds did the ball travel up?
(c) For how many seconds did the ball travel before it hit the ground?
(d) At what time was the exactly 12 m high?

Y= $Y_1 = -4.9x^2 + 11.76x + 10.944$ (for x, use X,T,θ,n)

GRAPH
If you can't see the parabola, change the WINDOW
Xmin = -10 (no reason to change)
Xmax = 10 (no reason to change)
Ymin = -10 (no reason to change)
Ymax = 20 (we have to see a little higher)
ZOOM 6 goes back to standard window
GRAPH

Find the vertex (in this case a maximum point)
2nd CALC 4 maximum
use right and left keys to move the cursor a little bit left of the vertex ENTER
now go a little bit to the right ENTER ENTER
maximum (1.2, 18)

(a) 18 metres
(b) 1.2 seconds

Find the x-intercept
2nd CALC 2 zero
use right and left keys to move the cursor a little bit left of the x-intercept ENTER
now go a little bit to the right ENTER ENTER
zero x=3.12

(c) 3.12 seconds

Graph a second equation and find the point(s) of intersection
Y= $Y_2 = 12$
GRAPH
2nd CALC 5 intersect
(in this case, there are two points of intersection so you will have to the following instructions for each one)
use the right and left keys to get as close as you can to the point of intersection ENTER ENTER ENTER
the first: Intersection (0.09, 12)
the second: Intersection (2.31, 12)

(d) 0.09 seconds and 2.31 seconds