Station # 1: The Baseball Player

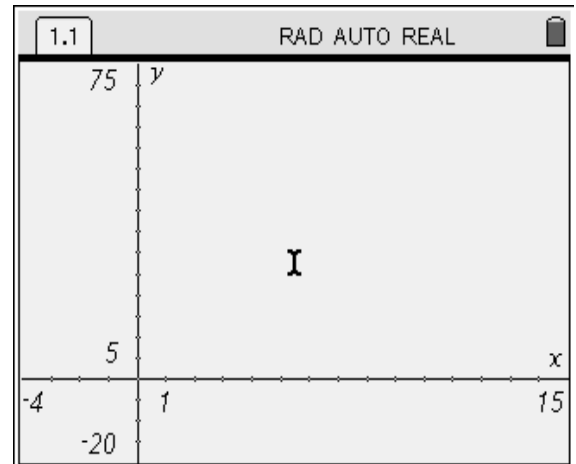The height of a baseball after it is hit
can be modeled by the function
$y = -4.9x^2 + 35x + 1$
In this equation x is the time, in seconds, since the ball
was hit and y is the height, in metres, of the ball
 above the ground.

a) Graph the equation on your TI-Nspire
using the window settings shown on the grid
provided.
Sketch your graph on the grid provided.

b) Trace your graph to find the following
ordered pairs: y-intercept, x-intercept, vertex.
Record the ordered pairs on your sketch.
Draw a dotted line on your sketch to represent
the axis of symmetry.

1.1	RAD AUTO REAL

75 y

5

-4   1   15

-20

c) Is your vertex a maximum or minimum point?   _____

d) What is the maximum height of the ball?   _____

e) What is the height of the ball when it is hit?   _____

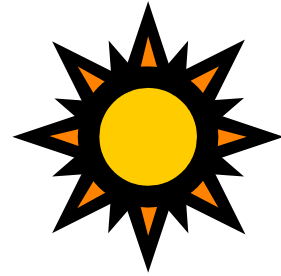f) How long does it take for the ball to hit the ground?   _____

You will need to trace to find other ordered pairs to answer the following
questions:

g) What is the height of the ball 2 seconds
after it is hit?   _____

h) Over what time interval is the height of the ball
greater than 30 metres?   _____

Station # 2: The UV Index

The UV index was created to measure the strength
of the sun's rays. The scale goes from 0 to 12 where
the higher the value, the faster unexposed skin burns.
The UV index on a hot day during the summer
in Ontario can be modeled by the function
$y = -0.16x^2 + 4.192x - 19.2576$.
In this equation, x is the time of day (24 hour clock)
and y is the UV index.

a) Graph the equation on your TI-Nspire
using the window settings shown on the
grid provided.
Sketch your graph on the grid provided.
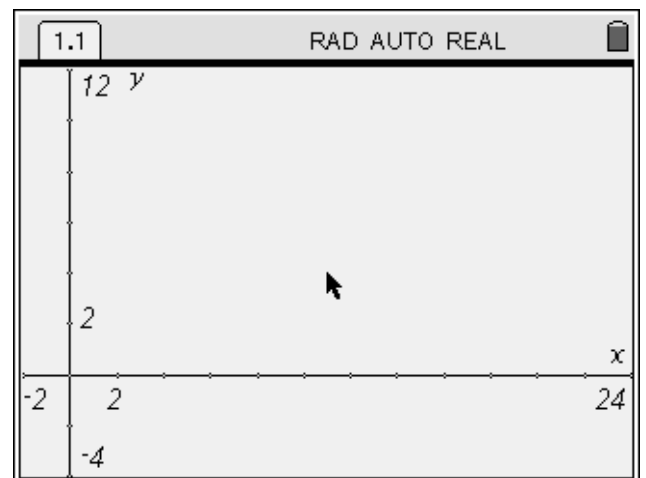
b) Trace your graph to find the following
ordered pairs: x-intercepts, vertex.
Record the ordered pairs on your sketch.
Draw a dotted line on your sketch to
represent the axis of symmetry.

1.1	RAD AUTO REAL

c) What is the maximum value of the UV index?   _____

d) At what time does the maximum occur?   _____

e) What are the x-intercepts of the function?   _____
What do they represent in this context?   _____

You will need to trace to find other ordered pairs to answer the following
questions:

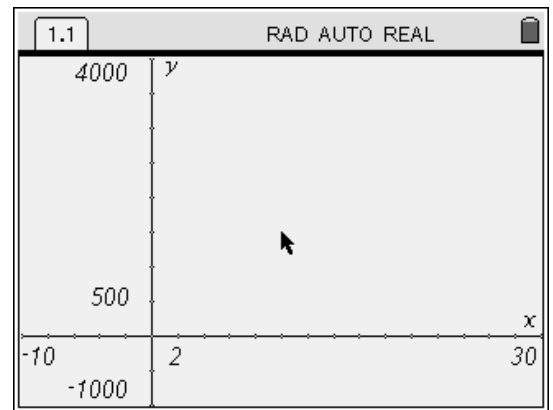f) What is the UV index at noon? (12:00)   _____

g) When the UV index is greater than 7, it is considered to be high and
exposed skin can burn in 15 minutes or less. For how long is the UV index
high on this day?   _____

Station # 3: Skydiving

A skydiver jumps from a plane at an altitude
of 3100 metres. Her height above the ground during
free fall is given by the equation $y = -4.9x^2 + 3100$.
In this equation, x is the time in seconds
since she leaves the plane and y is the height
above the ground in metres.

a) Graph the equation on your TI-Nspire
using the window settings shown on the grid
provided.
Sketch your graph on the grid provided.

b) Trace your graph to find the following
ordered pairs: y-intercept, x-intercept(s),
vertex.
Record the ordered pairs on your sketch.

1.1	RAD AUTO REAL

```
4000  y




 500
                              x
-10        2              30
 -1000
```

c) In this example the vertex and the y-intercept are the same point. What
does the y-value of this point represent in this context? _____

d) If her parachute didn't open, how long would it be until the skydiver
reaches the ground?   _____

You will need to trace to find other ordered pairs to answer the following
questions:

e) What is her height above the ground 5 seconds
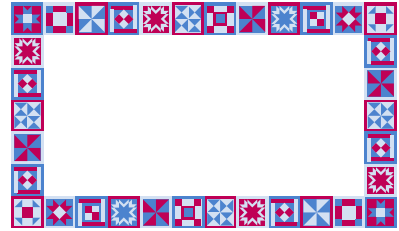after she leaves the plane?   _____

f) If the skydiver plans to open her parachute at an
altitude of 2000 metres, how many seconds of free fall
will she have?   _____

Station # 4: Area of a Rectangle

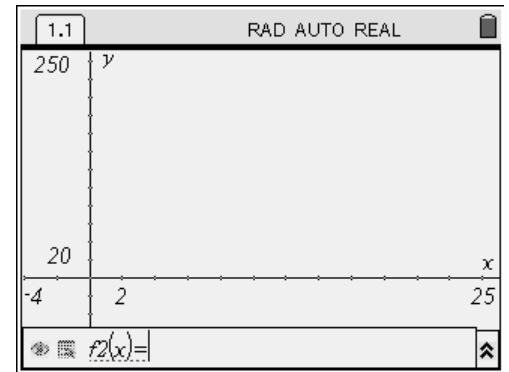A rectangular enclosure has an area in square metres given by the equation $y = -2x^2 + 36x$.
In this equation, x is the width of the rectangle in metres, and y is the area of the rectangle.

a) Graph the equation on your TI-Nspire using the window settings shown on the grid provided.
Sketch your graph on the grid provided.

b) Trace your graph to find the following ordered pairs: y-intercept, x-intercepts, vertex.
Record the ordered pairs on your sketch.
Draw a dotted line on your sketch to represent the axis of symmetry.

1.1	RAD AUTO REAL	

250 y

20

-4   2   x   25

$f2(x)=$

c) One of the x-intercepts is the same as the y-intercept.
What does this point represent in this context?   _____

d) What is the maximum area of the rectangle?   _____

e) What is the width of the rectangle that would produce this maximum area?   _____

You will need to trace to find other ordered pairs to answer the following questions:

f) Find the area when the width is 4.   _____

g) Find the width that would produce an area of 90 square metres.   _____