6.6 Solving Problems Using Quadratic Models

Ex. 1
The student council are busy planning the Semi-formal to raise money. They have to pay a set fee to the musicians, plus an additional fee to the school board for each person attending the concert. The relation $P = -n^2 + 580n - 48000$ models the profit, $P$, in dollars, for the dance, where $n$ is the number of tickets sold.

How can you determine the number of tickets that must be sold to break even and to maximize the profit?
Ex. 2
Ryan B. was practicing his 10 m platform dive. Because of gravity, the relation between his height, \( h \), in metres, and the time, \( t \), in seconds, after he dives is quadratic. If Ryan reached a maximum height of 11.225 m after 0.5 s, how long was above the water after he dove?
Ex. 3
Statisticians use various models to make predictions about population growth. Ontario’s population (in 100 000s) can be modelled by the relation \( P = 0.007x^2 + 0.196x + 21.5 \), where \( x \) is the number of years since 1900.

a) Using this model, what was Ontario’s population in 1925?

b) When will Ontario’s population reach 15 million?
Lila is creating dog runs for her dog kennel. She can afford 30 m of chain-link fence to surround four dog runs. The runs will be attached to a wall, as shown in the diagram. To achieve the maximum area, what dimensions should Lila use for each run and for the combined enclosure?

1. Need an expression for Area in standard form.

\[ l = 30 - 5w \]
\[ = 30 - 5(3) \]
\[ = 15 \]

2. Convert to Vertex Form. Solve for the dimensions of each enclosure.

Assigned Work:

pp. 357 - 359 #2, 3, 6, 8, 10, 11,

Test Ch. 6 Monday
PT Ch. 5 & 6 Tuesday