Problem #1

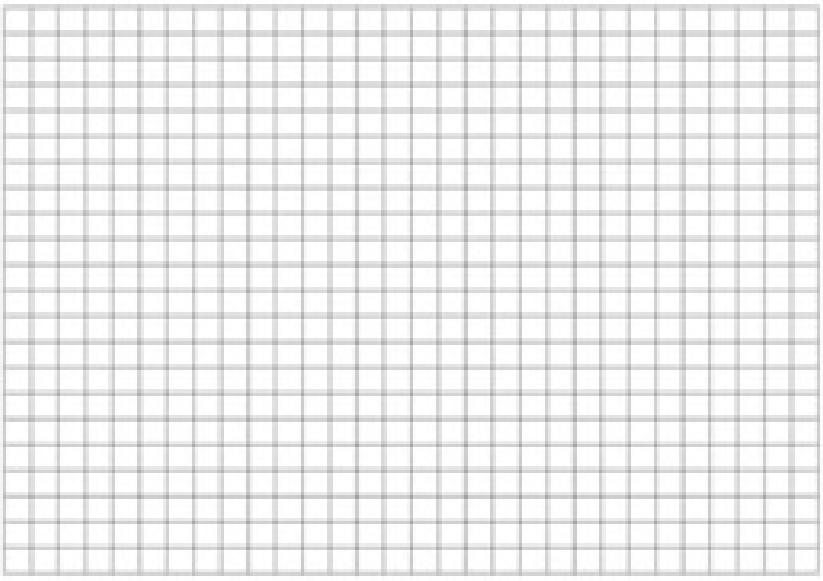
The Area of a rectangle is given by the relation $A = -4x^2 + 34x - 70$.

a) Determine expressions for the possible dimensions

b) Determine for what dimensions the area will be maximum.

c) Calculate the maximum area.

d) Sketch the graph of the area vs. x.



Problem #2

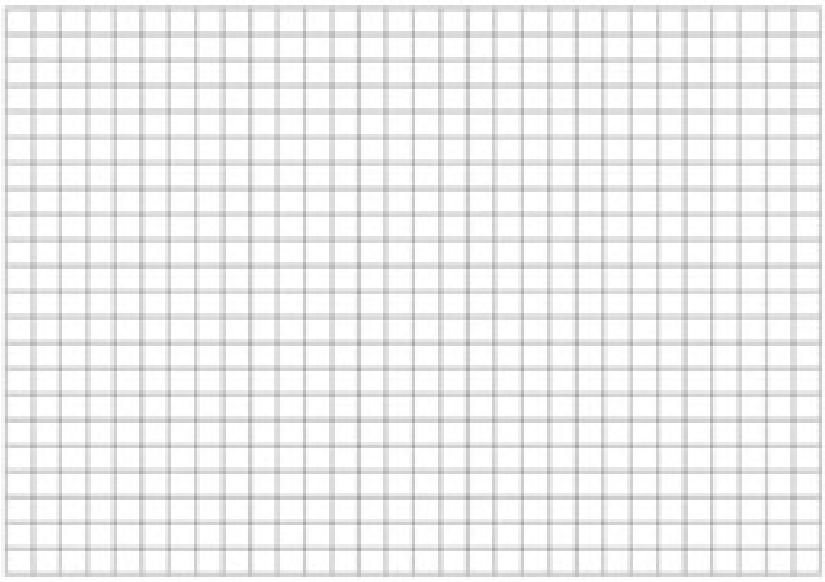
Erica and Asif sell newly designed digital watches. The profit on the watches can be determined by the relation $P = -2n^2 + 120n - 1000$, where n is the number of watches sold and P is the profit in dollars.

a) What are the break-even points for Erica and Asif?

b) How many watches they need to sell to maximize the profit?

c) Calculate the maximum profit.

d) Represent the problem with a graph.



Problem #3

Jason jumped off of a cliff into the ocean in Acapulco while vacationing with some friends. His height as a function of time could be modeled by the relation:

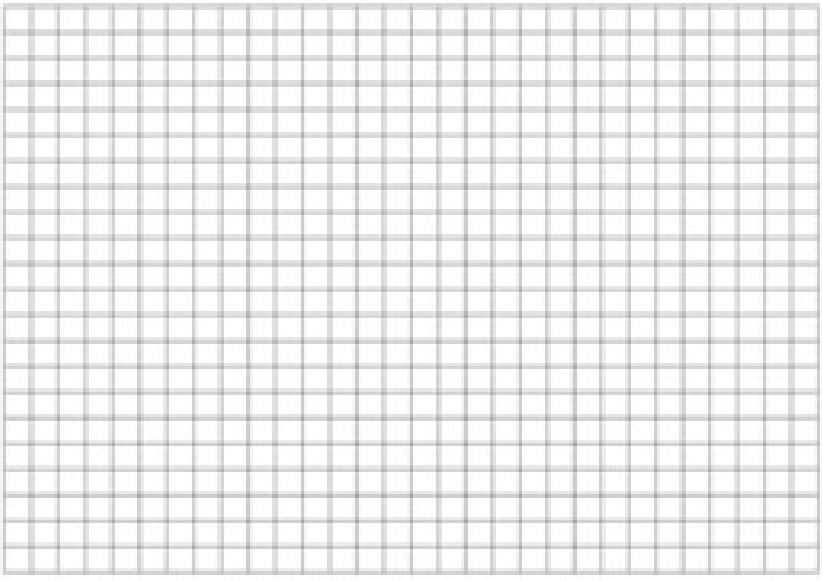
$h = -16t^2 + 16t + 480$, where t is the time in seconds and h is the height in feet.

a. How long did it take for Jason to reach his maximum height?

b. What was the highest point that Jason reached?

c. Jason hit the water after how many seconds?

d. Represent the problem with a graph.



Problem # 4

The height of a flare fired from the deck of a ship in distress can be modeled by

$h = -16t^2 + 104t + 56$,

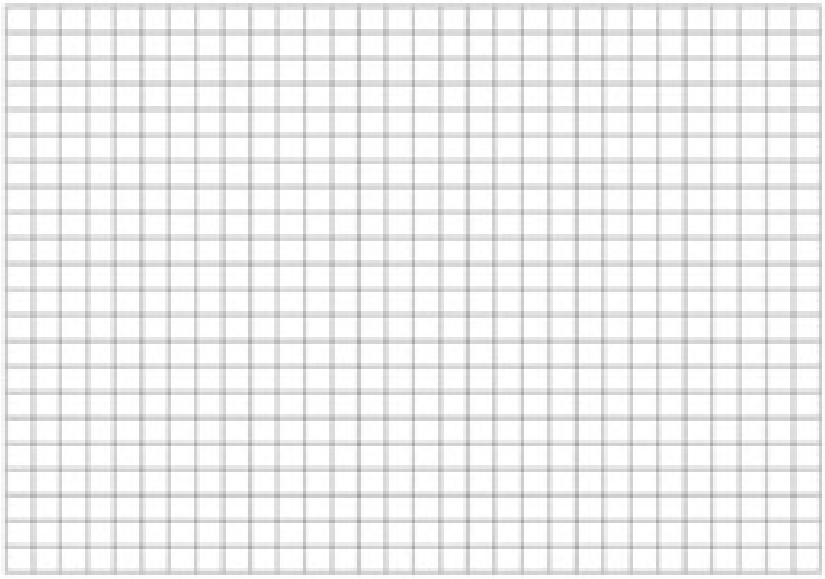
where h is the height of the flare above water and t is the time in seconds.

a. Find the time it takes the flare to hit the water.

b. What was the highest point that flare reached?

c. When did the flare reach the highest point?

d. Represent the problem with a graph.



Problem #5

During a game of golf, Kayley hits her ball out of a sand trap. The height of the golf ball is modeled by the equation

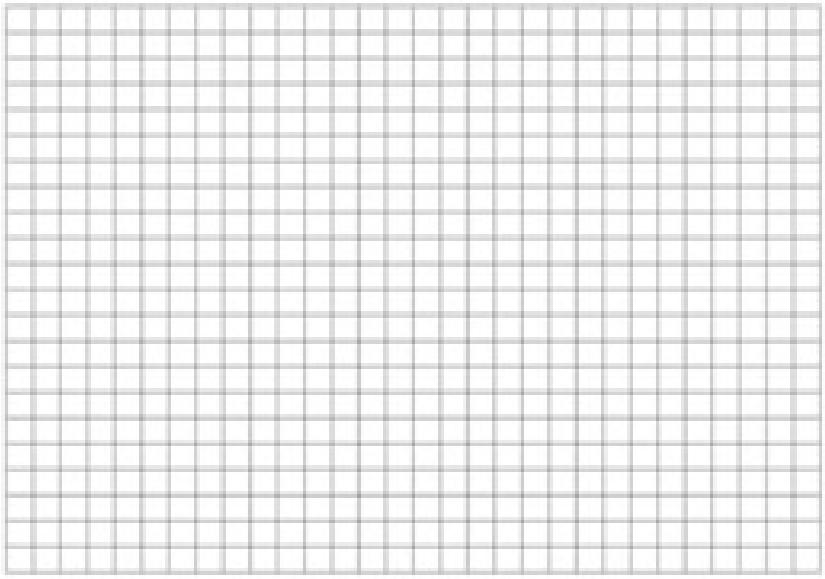
$h = -16t^2 + 20t - 4$, where h is the height in feet and t is the time in seconds since the ball was hit.

a. Find how long it takes Kayley's golf ball to hit the ground.

b. At what time the ball reached the maximum height?

c. What is the maximum height of the golf ball?

d. Represent the problem with a graph.



Problem #6

A rocket carrying fireworks is launched from a hill 80 feet above a lake. The rocket will fall into lake after exploding at its maximum height. The rocket's height above the surface of the lake is given by
$h = -16t^2 + 64t + 80$.

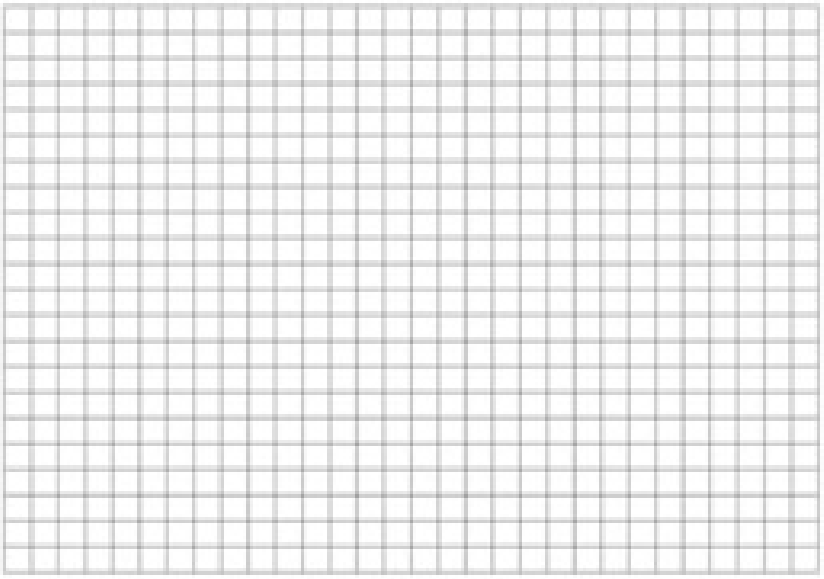
a. What is the height of the rocket after 1.5 second?

b. After how many seconds after it is launched will the rocket hit the lake?

c. What is the maximum height reached by the rocket?

d. How long will it take for the rocket to reach the maximum height?

e. Represent the problem with a graph.



Problem #7

A ball is thrown straight up, from 3 m above the ground, with a velocity of 14 m/s.
The height of the ball can be modeled by the equation:

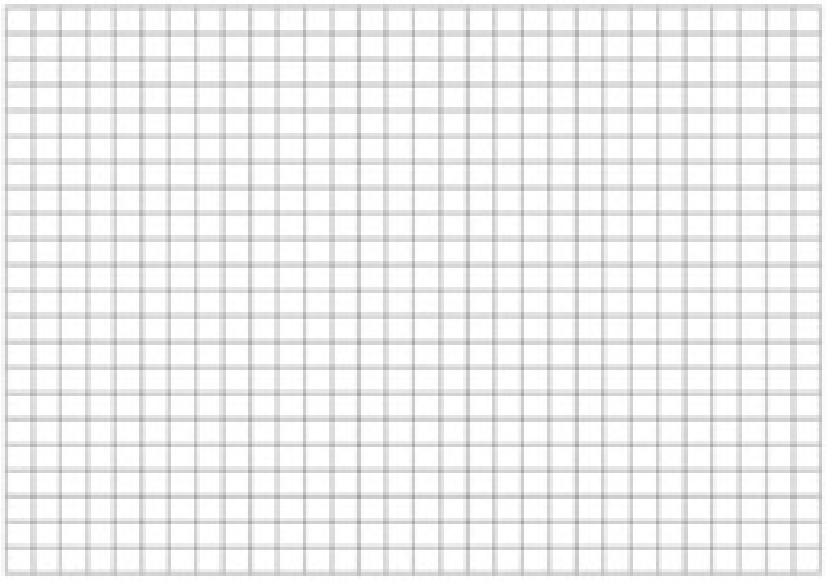
$h = -5t^2 + 14t + 3$

a. When does he ball hit the ground?

b. What is the maximum height reached by the ball?

c. How long will it take for the ball to reach the maximum height?

e. Represent the problem with a graph.



Problem #8

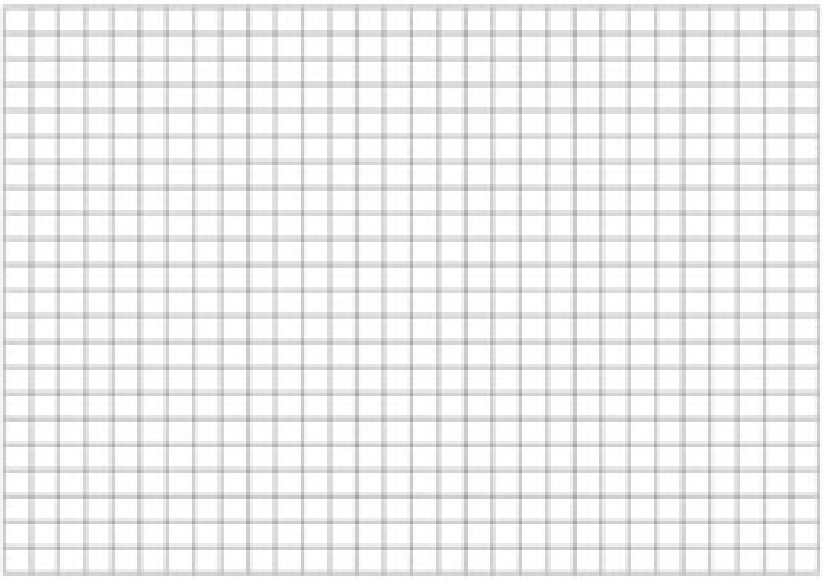
The user manual for Arlean's model rocket says that the equation $h = -5t^2 + 40t$ models the approximate height of the rocket after t seconds.

a. When the rocket hit the ground?

b. What is the maximum height of the rocket?

c. When will Arleen's rocket reach a height of 60 m?

d. Represent the problem with a graph.



Problem # 9

A graphic art company creates posters with areas that are given by the equation

$A = 2x^2 + 11x + 12$

a. Write expressions for possible dimensions of posters.

b. Write expressions for the dimensions of a poster whose width is doubled and whose length is increased by 2. Write the new area as a simplified polynomial.

c. Write expression for possible dimensions of a poster whose area is given by $18x^2 + 99x + 108$.

d. Create a graph for the expression in c)