3.5 Application: Vertex Form

Ex. 1   A video tracking device recorded the height, h, in metres, of a baseball after it was hit. The data collected can be modelled by the relation: $h = -5(t-2)^2 + 21$, where t is the time in seconds after the ball was hit.
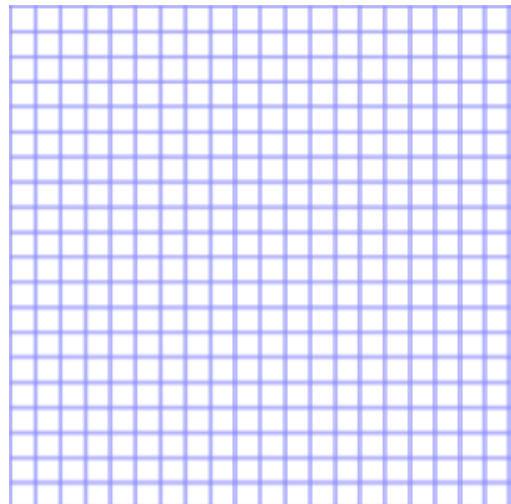
a) Sketch the relation.

b) What was the maximum height of the ball?
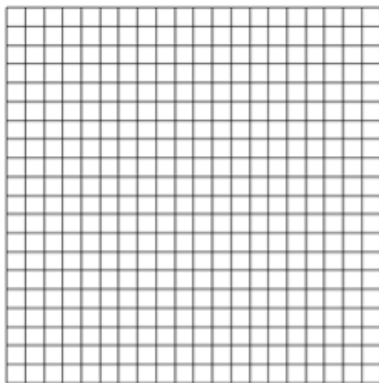
c) When did the maximum height occur?

d) How high was the ball after 1 s?
Determine another time when the ball was this height.

e) From what height was the ball hit?

Ex. 2 Sketch each parabola, then determine its equation.
Algebraically determine the value of 'a'.

a)   The parabola is 18 metres wide and reaches a maximum
height of 10 metres.

Is there only one possible answer to this question?
What would be the same?
What could be different?

b)   The parabola starts at the highest point of 30 m. It
drops to zero 9 metres to the right of the highest point.
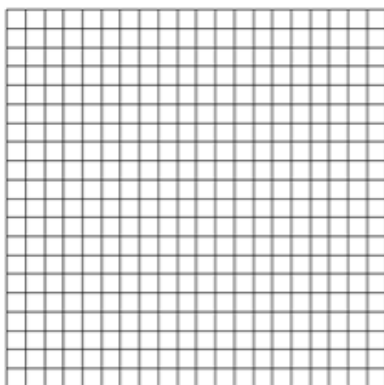
Ex. 3   A projectile is launched from ground level and reaches a maximum height of 122.5 m after 5 seconds.

a) Write an equation to model this situation. Find "a" algebraically.
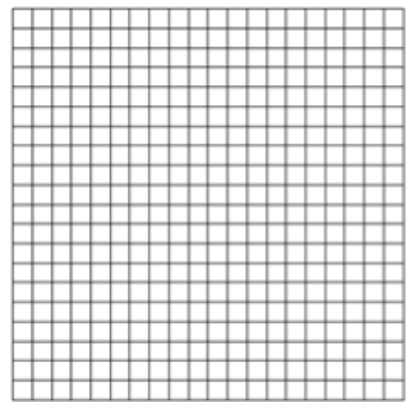
b) When does the projectile hit the ground?

c) What is the projectile's height after 3 seconds?
   At what other time does it reach the same height?

Ex. 4 Find the equation of a parabola that has:

a) vertex at (-2,5) and goes through (1,-3)

b) stretch factor of 2, reflected about the x-axis, equation of the axis of symmetry x = 3 and goes through the point (2,5)

Homework
pages 186 -188
#10,11,12,13,14,15

Ball's Motion Path