1a
3a
5a

6.4 Using a Table

1) Use the table to estimate key features of a given scenario.

The following table represents the movement (in feet) of a soccer ball after x seconds.

x sec	0	1	2	3	4	5	6	7	8
y feet	0	7	12	15	16	15	12	7	0
1st Rate of Change		+7	+5	+3	+1	-1	-3	-5	-7
2nd Rate of Change			-2	-2	-2	-2	-2	-2	

2nd Rate of Change is constant for quadratics

i) At what height does the soccer ball start?

0 feet (0 seconds)

ii) How high is the soccer ball after 6 seconds?

12 feet

iii) How long does it take the ball to hit the ground again?

8 seconds (where height is 0 feet)

iv) After how many seconds is the ball at its maximum height?

4 seconds

v) Write an equation to model the situation.

x-int: $(0,0)$, $(8,0)$ (p, q)

Point: $(1,7)$ (x, y)

$y = a(x-p)(x-q)$

$y = a(x-0)(x-8)$

$7 = a(1-0)(1-8)$

$7 = a(1)(-7)$

$7 = -7a$

$a = -1$

$\boxed{y = -x(x-8)}$

or

$y = -(x-0)(x-8)$

2) The following table represents the movement of a swinging pendulum in centimeters after x minutes.

x min	7	8	9	10	11	12 (Vertex)	13	14	15
y cm	62	44	30	20	14	12	14	20	30
	-18	-14	-10	-6	-2	+2	+6	+10	
				+4	+4	+4	+4		

2nd RoC is constant, so this is a quadratic

i) Fill in the missing blanks

ii) What is the minimum height of the pendulum?

12 cm

iii) After how many seconds does is the pendulum 20 cm off of the ground?

10 seconds, 14 seconds

iv) Write an equation to model the situation.

Vertex: $(12, 12)$ (h, k)

Point: $(11, 14)$ (x, y)

$y = a(x-h)^2 + k$

$y = a(x-12)^2 + 12$

$14 = a(11-12)^2 + 12$

$-12 \qquad -12$

$2 = a(-1)^2$

$2 = 1a$

$2 = a$

$\boxed{y = 2(x-12)^2 + 12}$