Practice TEST

1. Identify whether each equation or table given is linear, quadratic or neither. Explain why.

a.

$y = 2x - 5$

Linear
since no powers on x

b.

$y = x^3 + x - 4$

Neither
has power of 3

c.

x	y
−4	57
−3	34
−2	17
−1	6
0	1
1	2
2	9

ΔX Δy ΔΔy
+1( )−23
+1( )−17)+6
( )−11)+6
( )−5)+6
( )+1)+6
( )+7)+6

∴ Quad.

d.

x	y	Δy
-2	22	)−4
-1	18	)−4
0	14	)−4
1	10	)−4
2	6	)−4
3	2	)−4

∴ Linear

2. Identify all the key features of the following graphs
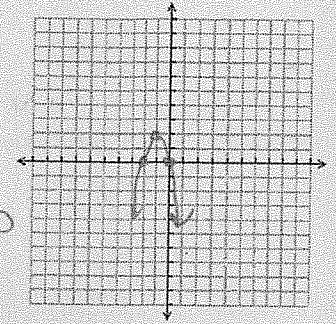
a.
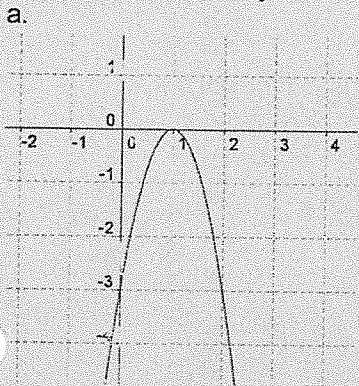
max or min? MAX
optimal value $y = 0$
Axis of symm $x = 1$
Vertex $(1, 0)$
Zeros $(1, 0)$
Y-int $(0, -3)$

b.
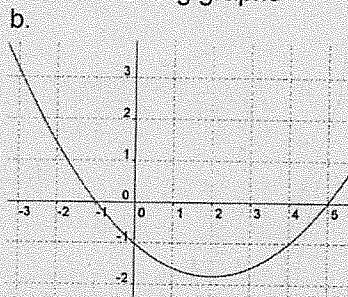
max or min? MIN
optimal value $y = -1.8$
Axis of symm $x = 2$
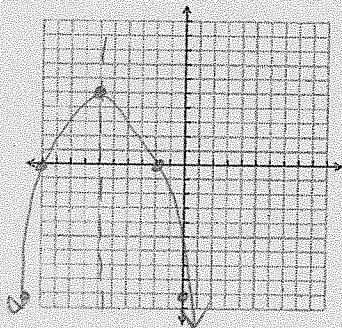Vertex $(2, -1.8)$
Zeros $(-1, 0)$ $(5, 0)$
Y-int $(0, -1)$

c.

x	$y = -2x^2 - 4x$
0	$-2(0)^2 - 4(0) = 0$
-1	$-2(-1)^2 - 4(-1) = -2 + 4 = 2$
-2	$-2(-2)^2 - 4(-2) = -8 + 8 = 0$

max or min? MAX
optimal value $y = 2$ max
Axis of symm $x = -1$
Vertex $(-1, 2)$
Zeros $(0, 0)$ $(-2, 0)$
Y-int $(0, 0)$

3. Use the information provided to sketch the parabola

axis of symm x= −6
vertex (−6, 5)
x-int (−2, 0)
y-int (0, −9)

4. What form(s) are the following and what can you see from them?

a. $y = -4(x + 5)(x - 7)$

Factored form
2 zeros
$(-5, 0)$ $(7, 0)$

b. $y = 3x^2 + 6$

standard
+
vertex form
y-int = vertex
= $(0, 6)$

5. Factor to find the zeros

a. $y = x^2 - 11x + 18$

x
x

18 (2)
(9)

$0 = (x - 2)(x - 9)$
$x - 2 = 0$ $x - 9 = 0$
$x = 2$ $x = 9$

b. $y = x^2 - 81$

$y = (x + 9)(x - 9)$

$x + 9 = 0$ $x - 9 = 0$
$x = -9$ $x = 9$

6.

A ball is dropped from a platform. Its path can be represented by the relation $h = -5t^2 + 45$, where h represents the height of the ball in metres and t represents the time in seconds taken for the ball to fall to the ground.
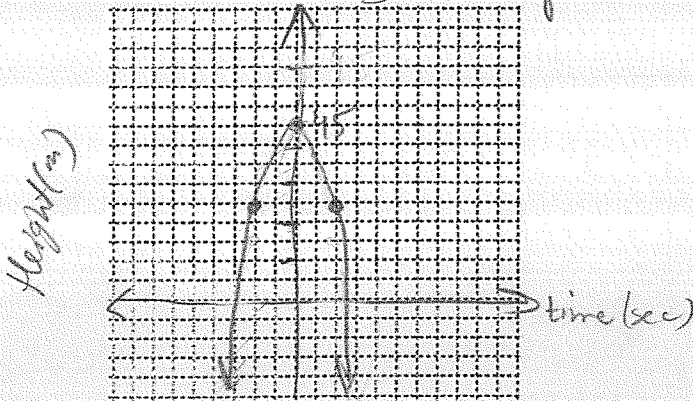
a) What is the vertex?

$(0, 45)$

b) Fill in table using vertex and two other points

t	h
-2	$-5(-2)^2 + 45 = -5(4) + 45 = -20 + 45 = 25$
0	45
2	$-5(2)^2 + 45 = 25$

Sketch   Ball Drop

c) From what height was the ball dropped?

45m

d) How long did it take for the ball to reach the ground?
(sub h= 0)

$0 = -5t^2 + 45$
$5t^2 = 45$
$t^2 = 9$
$t = \pm 3$

∴ 3 sec

d) What is the height at 2 sec after the drop?

$h = -5(2)^2 + 45$
$= -5(4) + 45$
$= -20 + 45$
$= 25$ ∴ 25m

7.

A model rocket is launched from a platform. The trajectory of the rocket can be modelled by the relation $h = -5t^2 + 100t - 180$, where h is the height of the model rocket in metres and t is the time in seconds.
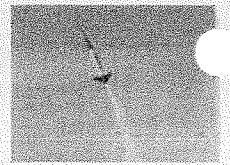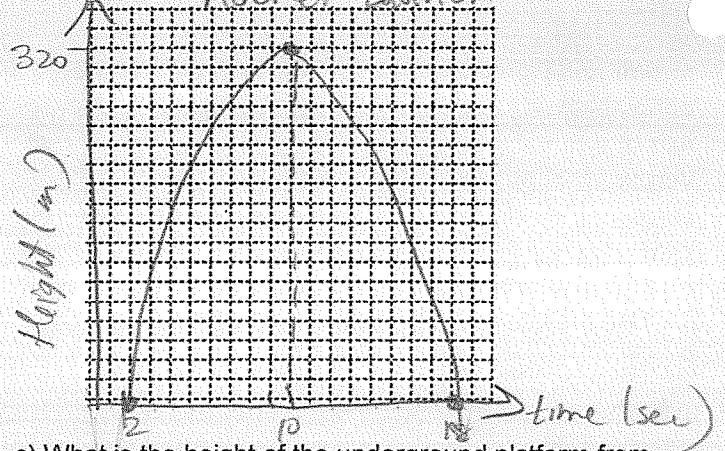
a) Factor to find the zeros

$h = -5(t^2 - 20t + 36)$

$\begin{array}{ccc} 1 & -2 & 3 \\ 36 & -18 & 12 \end{array}$

$h = -5(t - 2)(t - 18)$

$t - 2 = 0$ $t - 18 = 0$
$t = 2$ $t = 18$

b) Fill in table using zeros and middle point

$\frac{2 + 18}{2}$

t	h
2	0
10	$-5(10)^2 + 100(10) - 180 = -500 + 1000 - 180 = 500 - 180 = 320$
18	0

Sketch   Rocket Launch

c) What is the height of the underground platform from which the rocket was released?

at t=0 $h = -5(0)^2 + 100(0) - 180$
∴ 180 m below

d) What is the maximum height?

320m

e) How long is the rocket in the air?

18 sec

f) What is the height of the rocket at 5 sec?

$-5(5)^2 + 100(5) - 180$

480
-305
195

$-125 + 500 - 180$
$= 195$ m