Mathematics 10D

3.2 – Properties of Graphs of Quadratic Relations

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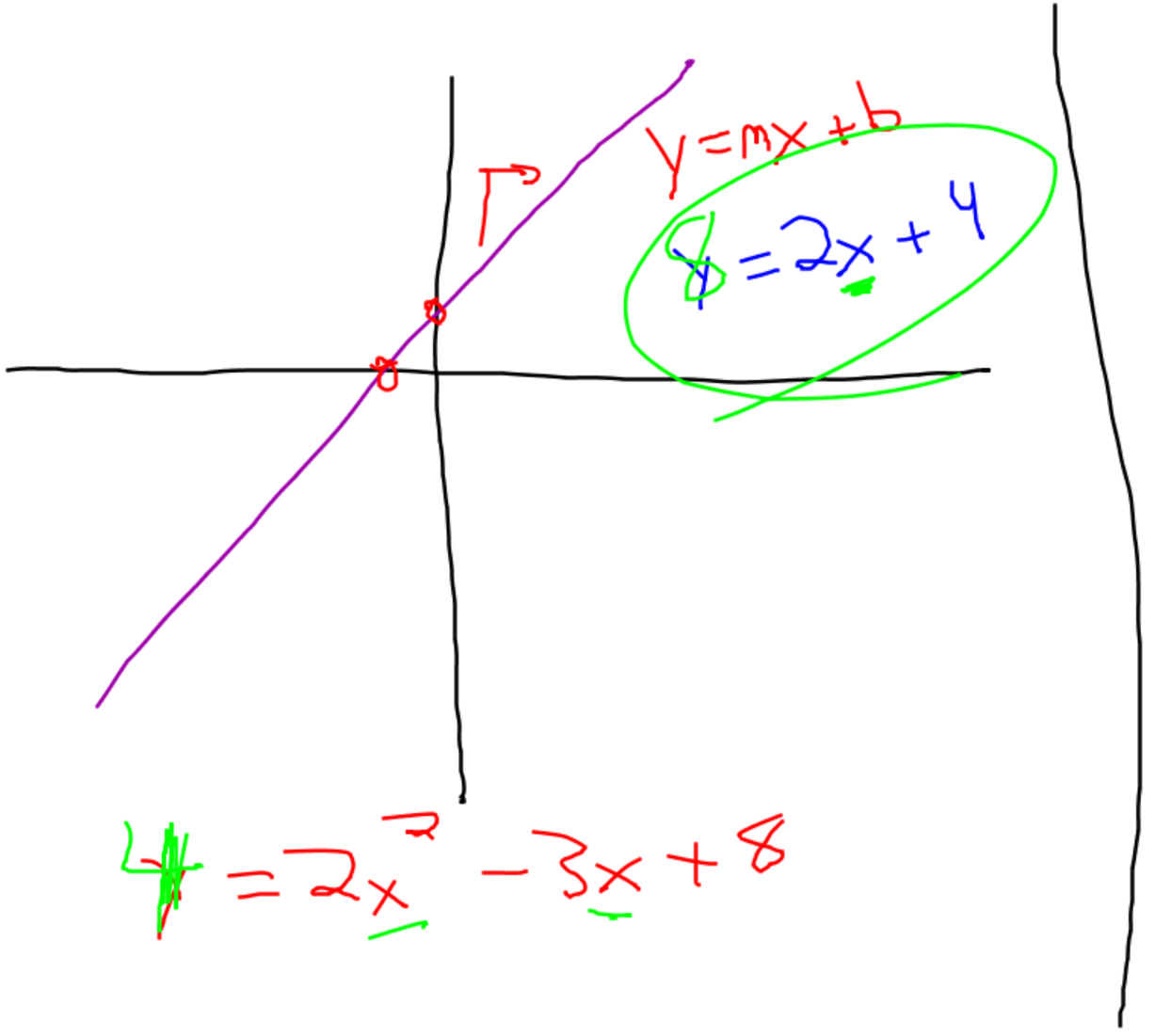
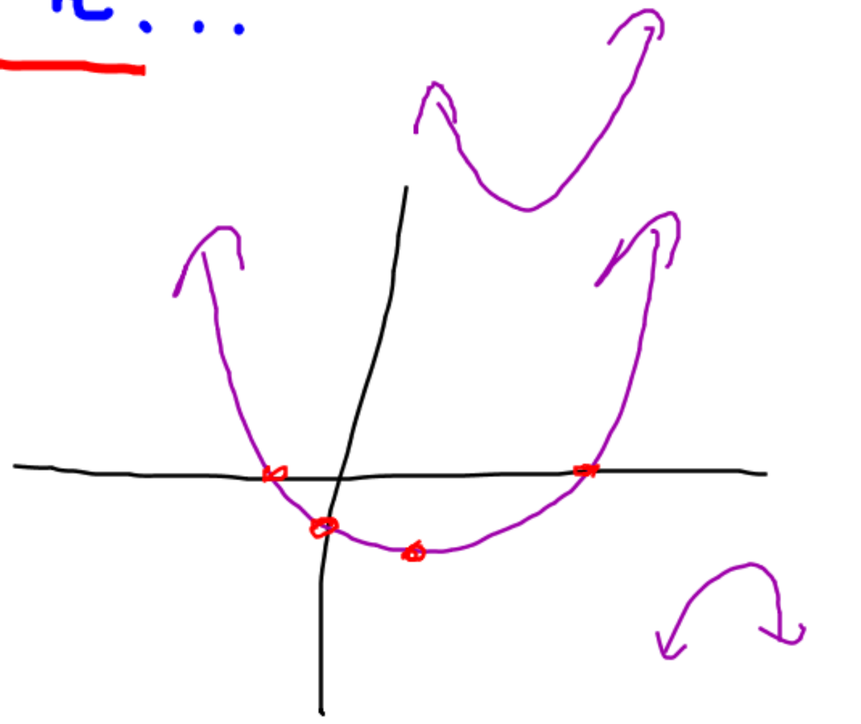
My parabolic preamble...



$y = 2x^2 - 3x + 8$

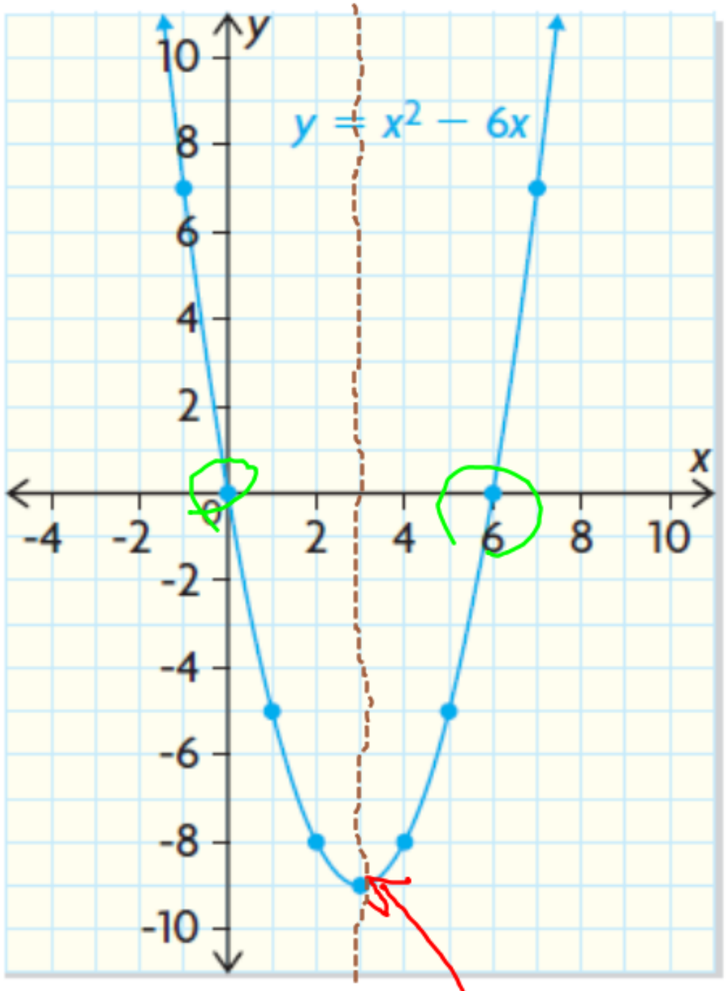


$y = ax^2 + bx + c$ ←

$y = a(x - r)(x - s)$

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

x	y
−1	7
0	0
1	−5
2	−8
3	−9
4	−8
5	−5
6	0
7	7



vertex

↳ min or max

x-intercepts, zeros, roots, solutions:

x = 0 and 6

(0, 0) and (6, 0)

equation of the axis of symmetry.

Average the x's of two points that share the same y-coordinate

$\frac{1+5}{2} = 3$ | $\frac{-1+7}{2} = 3$ $\quad x = 3$

(3, −9)

y-intercept:

↳ x = 0

Standard Form:

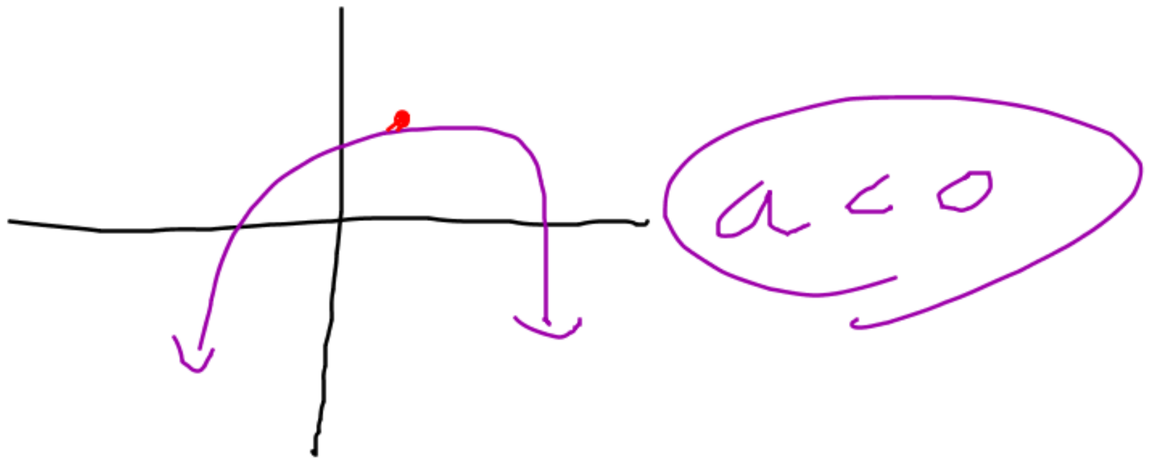
$$y = ax^2 + bx + c$$

c ← y-intercept

a ↑

$a > 0$, parabola opens up, ∴ vertex is a min

$a < 0$, parabola opens down. ∴ vertex is a max



A model rocket is shot into the air from the roof of a building. Its height, h, above the ground, measured in metres, can be modelled by the equation $h = -5t^2 + 35t + 5$, where t is the time elapsed since liftoff in seconds.

a) Determine the greatest height reached by the rocket. — 66.25 m

b) How long is the rocket in flight? — 7.1 seconds

c) Determine the height of the building. — y-int = 5 m

d) When is the height of the rocket 61.25 m?

\ at 2.5 and 4.5 seconds

Given $y = 2x^2 - 8x + 6$, determine...

i) the equation of the axis of symmetry $x = 2$

ii) the coordinates of the vertex – $(2, -2)$

iii) the y-intercept -6

iv) the zeros – 1 and 3

v) the maximum or minimum value $= -2$

$$\frac{|+3}{2} = \frac{4}{2} = 2$$