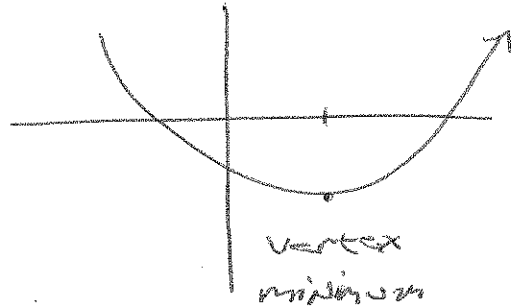
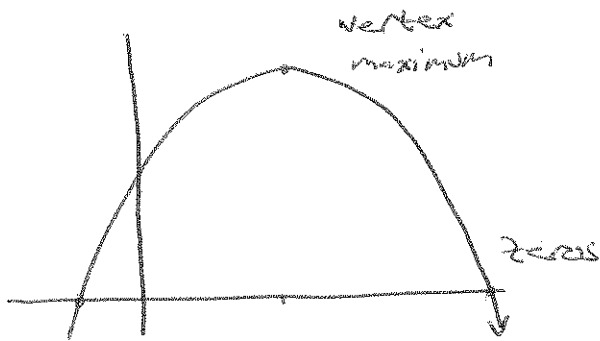


2,2
1/2

The vertex AND zeros



We can find zeros using the quadratic

formula:
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-b}{2a} \pm \frac{\sqrt{b^2 - 4ac}}{2a}$$

mid point between zeros at $x = -\frac{b}{2a}$.

We call this the axis of symmetry.

The vertex is a point: $\left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$.

③ Ex 1: Find the vertex $y = x^2 - 2x$

① Ex 2: Find the vertex $y = 6 - 4x - 2x^2$

② Ex 3: Find the vertex of $f(x) = 4 + 3x - x^2$

Ex 4: Find the vertex & zeros. $y = x^2 + 4x + 4$

④ Ex 5: Find the vertex & zeros. $y = x^2 + x + 2y = 5$

Ex 6: (calc) $y = 0.1(x^2 + 4x - 32)$

Ex 7: (calc) $y = x^2 - 2x + 5$

Ex 8: The daily profit from the sale of a product is given by $P(x) = 16x - 0.1x^2 - 100$

Ex 9: A ball thrown vertically into the air has its height above ground given by

$$S = 112t - 16t^2$$

Find the max height of the ball.