Mathematics 10D

3.3 – Factored Form of a Quadratic Relation

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Standard Form: $y = ax^2 + bx + c$

↳ y-intercept

Factored Form: $y = a(x - r)(x - s)$

∴ Zeros ↗

$y = 2(x - 1)(x + 3)$

$(x - 1)(x - -3)$

Find the zeros, equation of axis of symmetry, vertex, y-int

a) $y = -3(x-1)(x+2)$

zeros: $x = 1$ and $x = -2$

eqn of symmetry:

$$\frac{1 + -2}{2} = \frac{-1}{2} = -0.5$$

$x = -0.5$

vertex $(-0.5, 6.75)$ max

$y = -3(-0.5-1)(-0.5+2)$

$y = 6.75$

y-int is 6 : $(0, 6)$

b) $y = 2(x+4)(x+6)$

zeros: $x = -4$ and $x = -6$

eqn: $\frac{-4 + -6}{2} = -5$ $x = -5$

vertex: $(-5, -2)$

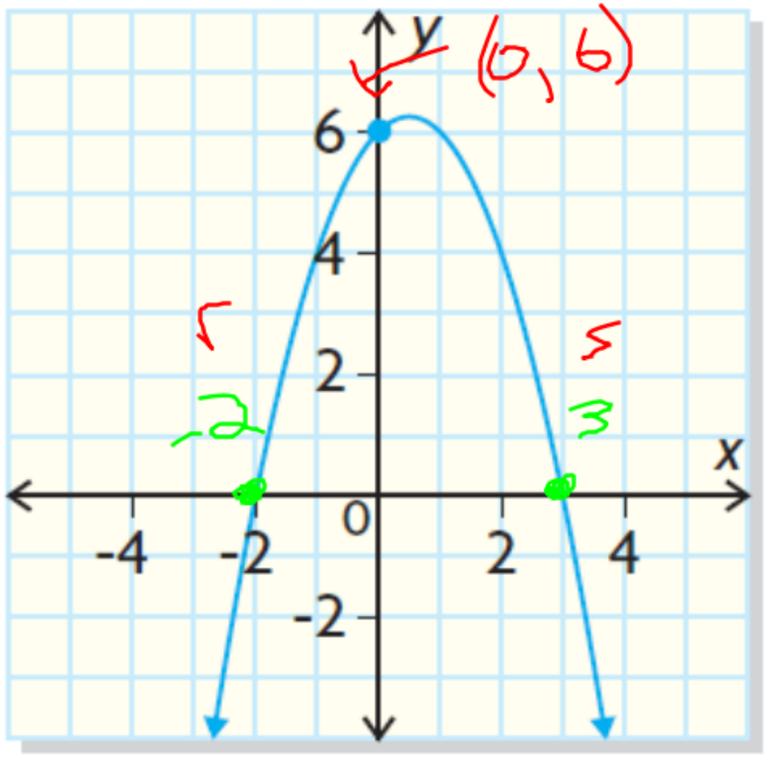
$y = 2(-5+4)(-5+6)$

$y = 2(-1)(1)$

$y = -2$

y-int is 48

$x = 0$



write the zeros form equation of the parabola:

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

$$6 = a(0 + 2)(0 - 3)$$

$$6 = a(-6)$$

$$-1 = a$$

$$\therefore \quad y = -1(x + 2)(x - 3)$$

A bus company usually transports 12 000 people per day at a ticket price of $1. The company wants to raise the ticket price. For every $0.10 increase in the ticket price, the number of riders per day is expected to decrease by 400. Calculate the ticket price that will maximize revenue.

Let x be the number changes

$R = (\$)(\text{people})$

$R = (1)(12000)$

$R = (1 + 0.1x)(12000 - 400x)$

Zeros: $\frac{-10 + 30}{2} = 10$

max: $(10, 16000)$

$\therefore$ the ticket price is

$1 + 0.1(10) = \$2$