Mathematics 11UC

3.6 – Creating a Quadratic Equation

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

a

zeros

$x \neq 5$

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

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

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

(x, y) $r = -2$ $s = 3$

$6 = a(4 + 2)(4 - 3)$

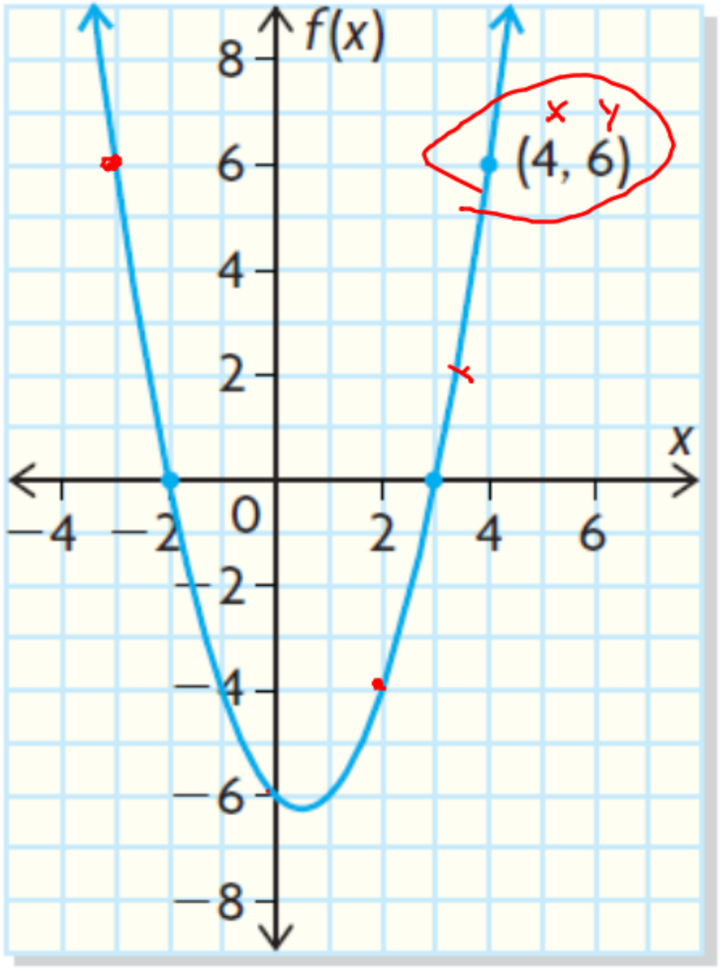
$\frac{6}{6} = \frac{a(6)(1)}{6}$

$1 = a$

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

$y = x^2 - 3x + 2x - 6$

$y = x^2 - x - 6$



x-ints are −10 and 12, y-int is 20

= zeros

r = ↑

s = ↑

(0, 20)
x y

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

$20 = a(0+10)(0-12)$

$20 = a(10)(-12)$

$\frac{20}{-120} = \frac{a(-120)}{-120}$

$-\frac{1}{6} = a$

$\therefore y = -\frac{1}{6}(x+10)(x-12)$

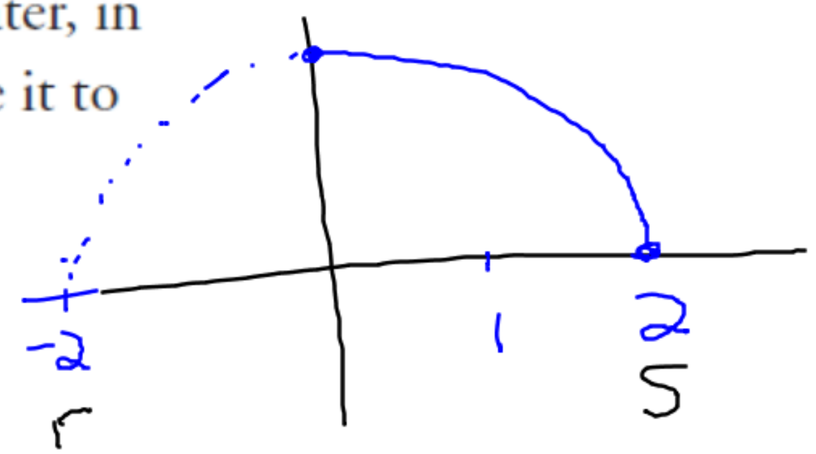
$y = -\frac{1}{6}(x^2 - 12x + 10x - 120)$

$y = -\frac{1}{6}(x^2 - 2x - 120)$

$y = -\frac{1}{6}x^2 + \frac{2}{6}x + 20$

y-int

A stone is dropped from a bridge 20 m above the water. The table of values shows the time, in seconds, and the height of the stone above the water, in metres. Write an algebraic model for the height of the stone, and use it to estimate when the stone will be 10 m above the water.



Collection 1

	1	2	3	4	5
Time (s) x	0.0	0.5	1.0	1.5	2.0
Position (m) y	20.00	18.75	15.00	8.75	0.00

$y = a(x-5)(x-5)$

$20 = a(0+2)(0-2)$

$20 = a(-4)$

$-5 = a$

$\therefore y = -5(x+2)(x-2)$

The stone will be 10 m high after 1.4 seconds.