Section 7.3 Part 2	Writing Equations of Parabolas
Objective:	Given three ordered pairs for a parabola students will write a systems of equations in threevariables to find the equation of the quadratic.

Study Problems

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What are the equation for quadratics?

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

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

Intercept form $y = a(x-p)(x-q)$

Example

Write an equation of the parabola with vertex (4,-1) and passing through the origin.

(0,0)

$y = a(x-4)^2 - 1$

(0,0)

$0 = a(0-4)^2 - 1$

$0 = a(-4)^2 - 1$

$0 = a(16) - 1$

$1 = a(16)$

$a = 1/16$

$$\boxed{y = \frac{1}{16}(x-4)^2 - 1}$$

Example

Write an equation of the parabola with x-intercepts (5,0) and (-3,0) and passing through (2,6).

$y = a(x-5)(x+3)$

(2,6)

$6 = a(2-5)(2+3)$

$6 = a(-3)(5)$

$6 = a(-15)$

$a = \frac{6}{-15} = -\frac{2}{5}$

$$\boxed{y = -\frac{2}{5}(x-5)(x+3)}$$

Example

Write an equation of the parabola with x-intercepts (5,0) and (-3,0) and passing through (2,6).

$y=a(x-5)(x+3)$

$6=a(2-5)(2+3)$

$6=-15a$

$a=6/-15$

$a=-2/5$

$y=-2/5(x-5)(x+3)$

Example

Find the quadratic equation whose graph passes through the points (-1, 7), (1, 11) and (2, 25).

$y = ax^2+bx+c$

when: $(-1,7)$

$7=a(-1)^2+b(-1)+c$

$\boxed{7=a-b+c}$

when $(1,11)$

$11=a(1)^2+b(1)+c$

$\boxed{11=a+b+c}$

when $(2,25)$

$25=a(2)^2+b(2)+c$

$\boxed{25=4a+2b+c}$

① $7=a-\cancel{b}+c$
$11=a+\cancel{b}+c$
$18=2a+2c$

② $-22=-2a-\cancel{2b}-2c$
$25=4a+\cancel{2b}+c$

$y = 4x^2 + 2x + 5$