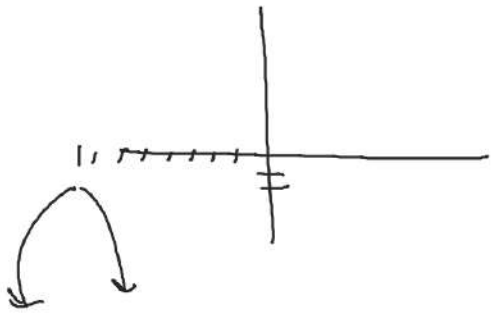
$y = a(x-h)^2+k$

Give the vertex, axis of symmetry, domain and range.

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



V (h, k)

V $(-8, -2)$

A.O.S $x = h$

$x = -8$

Domain: $(-\infty, \infty)$

Range: $(-\infty, -2]$

Find the x-intercepts, y-intercept, and vertex of the function.

$$y = x^2 - x - 56$$

$a = 1 \quad b = -1 \quad c = -56$

X-intercepts.

1) Set equal to zero
2) Factor and solve

$0 = x^2 - x - 56$

$0 = (x-8)(x+7)$

$x-8=0 \quad x+7=0$

$x=8 \quad x=-7$

Y-intercept

Y-intercept
C-value

$(0, -56)$

Vertex

$x = \frac{-b}{2a}$

$= \frac{1}{2(1)} = \frac{1}{2}$

$y = (\frac{1}{2})^2 - \frac{1}{2} - 56$

$\frac{1}{4} - \frac{1}{2} - 56$

$-\frac{1}{4} - 56$

$-56\frac{1}{4}$

$-\frac{225}{4}$

$(\frac{1}{2}, -\frac{225}{4})$

Solve by factoring.

$x^2 - 5x - 14 = 0$

$(x-7)(x+2) = 0$

$x-7=0 \quad x+2=0$

$x=7 \quad x=-2$

$5x^2 + 12x = 9$

-45
$-3 \cdot 15$

$5x^2+12x-9=0$

$(5x^2-3x)+(15x-9)=0$

$x(5x-3)+3(5x-3)=0$

$(5x-3)(x+3)=0$

$5x-3=0 \quad x+3=0$

$5x=3 \quad x=-3$

$x=\frac{3}{5}$

$3x^2 - 60 = 3x$

$\frac{3x^2}{3} - \frac{3x}{3} - \frac{60}{3} = \frac{0}{3}$

-20
$-5 \cdot 4$

$x^2 - x - 20 = 0$

$(x-5)(x+4)=0$

$x-5=0 \quad x+4=0$

$x=5 \quad x=-4$

$6x^2 = 5x + 6$

-36
$-9 \cdot 4$

$6x^2-5x-6=0$

$(6x^2-9x)+(4x-6)=0$

$3x(2x-3)+2(2x-3)=0$

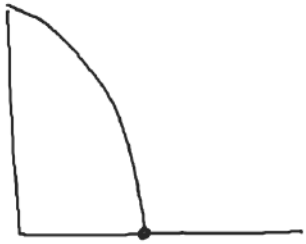
$(3x+2)(2x-3)=0$

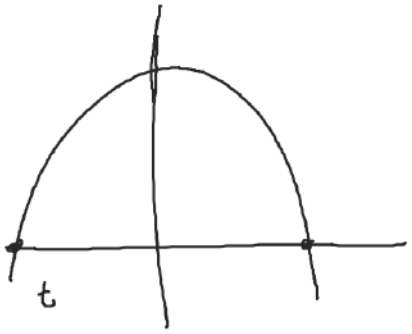
$3x+2=0 \quad 2x-3=0$

$3x=-2 \quad 2x=3$

$x=\frac{-2}{3} \quad x=\frac{3}{2}$

A penny is dropped from the top of a new building. Its height in feet can be modeled by the equation $y = 256 - 16x^2$, where x is the time in seconds since the penny was dropped. How long does it take the penny to reach the gound? Show all your work!





$0 = 256 - 16x^2$

$\frac{0}{-16} = \frac{-16x^2}{-16} + \frac{256}{-16}$

$0 = x^2 - 16$

$0 = (x-4)(x+4)$

$x-4=0$ $\quad x+4=0$

$x=4$ $\quad x=-4$

$\frac{-16}{4 \cdot -4}$

Write the equation for the parabola with x-intercepts at (1, 0) and (-3, 0) and passes through the point (3, -48). Write the equation in **Factored Form** and then in **Standard Form.**

p q

x y

$y = ax^2 + bx + c$

$y = a(x-p)(x-q)$ → $y = -4(x-1)(x+3)$

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

$-48 = a(3-1)(3+3)$

$-48 = a(2)(6)$

$-48 = 12a$

$a = -4$

$-4(x^2+3x-x-3)$

$-4(x^2+2x-3)$

$y = -4x^2 - 8x + 12$