Quiz 8.4

1. (2 points) Graph

$$f(x)=(x-1)^2-3$$

2. (6 points) Write the function in the form $f(x)=a(x-h)^2+k$. Then graph the quadratic function using transformations. Determine the vertex and axis of symmetry. Based on the graph, determine the domain and the range of the quadratic function.

$$g(x)=x^2-4x+8$$

3. (3 points) Write a quadratic function in the form $f(x)=a(x-h)^2+k$ with the properties given.

Opens up; vertically stretched by a factor of 4; vertex at (9, -6).

Mar 29-9:42 AM

8.5 Graphing Quadratic Functions Using Properties.

in $f(x)=ax^2+bx+c$

Axis of Symmetry: $x=\dfrac{-b}{2a}$

Discriminant b^2-4ac

Vertex: $\left(\dfrac{-b}{2a}, f\left(\dfrac{-b}{2a}\right)\right)$

Stretch: $|a|$

flip: if there is a negative in front of a

x int: Quadratic Formula

y int: c

Mar 29-9:15 AM

Graph using properties

$f(x)=x^2+2x-3$

$1\ 2\ 3$

$(-1)^2+2(-1)-3$

$(x+3)(x-1)=0$

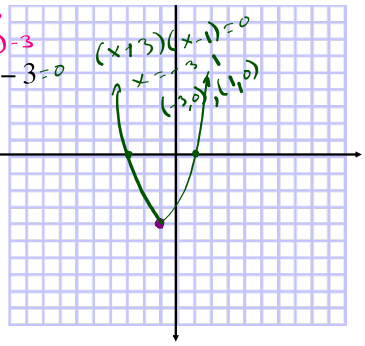
$x=-3,1$

$(-3,0),(1,0)$

Vertex: $\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$

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

$(-1,-4)$



Mar 29-9:15 AM

You Try (fix)

$f(x)=x^2-4x-12$

$4-8-12=-16$

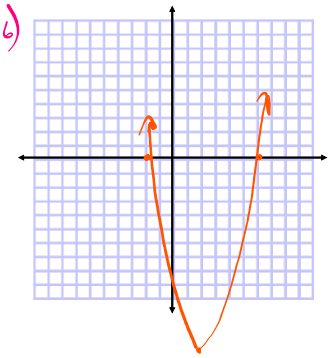
$\frac{-(-4)}{2(1)}=\frac{4}{2}=2$ $(2,-16)$

x-ints: $(6,0)$ $(-2,0)$

$x^2-4x-12=0$

$(x-6)(x+2)=0$

$x=6,-2$



Mar 29-9:15 AM

Graph using properties

$f(x) = -2x^2 + 12x - 5$

$-18 + 36 - 5 = 13$

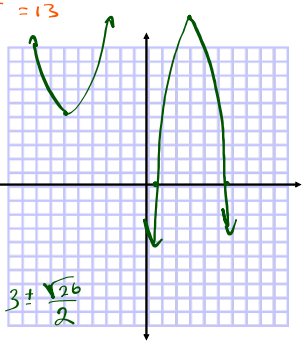
$\frac{-12}{2(-2)} = 3$ Vertex: $(3, 13)$

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

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

$\frac{12 \pm \sqrt{144 - 40}}{4}$

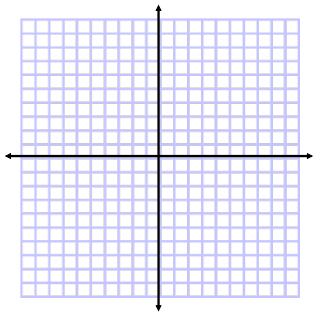
$\frac{12 \pm \sqrt{104}}{4} = \frac{12 \pm 2\sqrt{26}}{4} = \frac{3 \pm \sqrt{26}}{2}$



Mar 29-9:15 AM

You Try

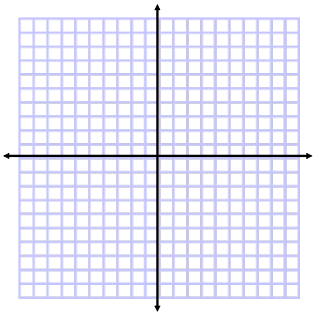
$f(x) = -3x^2 + 12x - 7$



Mar 29-9:15 AM

Graph using properties

$f(x) = x^2 - 8x + 16$



Mar 29-9:15 AM

You Try

$f(x) = x^2 + 6x + 9$

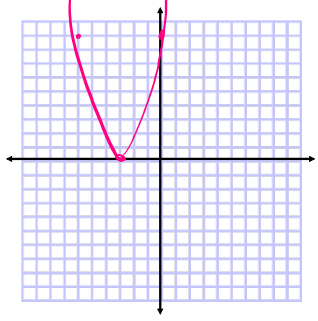
$(x+3)^2 = 0$

Vertex: $(-3, 0)$

Y-int $(0)^2 + 6(0) + 9$

$= (0, 9)$

$\sqrt{-a}$



Mar 29-9:15 AM

Graph using properties

$f(x) = 2x^2 + 6x + 5$

$2\left(\frac{3}{2}\right)^2 + 6\left(\frac{3}{2}\right) + 5$

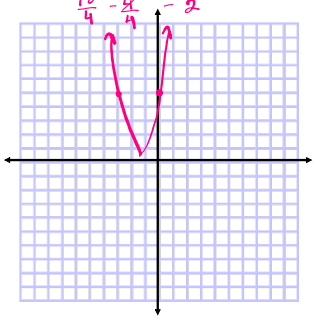
$\frac{18}{4} - 9 + 5$

$\frac{18}{4} - \frac{16}{4} = \frac{1}{2}$

$\frac{-6}{4} = -\frac{3}{2}$ $\left(-\frac{3}{2}, \frac{1}{2}\right)$

$2(0)^2 + 6(0) + 5$

y-int: $(0, 5)$



Mar 29-9:15 AM

Tell whether the following function has a minimum or maximum value. Then state the minimum or maximum value of the function.

$f(x) = 3x^2 + 12x - 7$

$\frac{-12}{6} = -2$ 12 -24 -7

$\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$ minimum

$(-2, -19)$ is a minimum

Mar 29-9:49 AM

You Try

Tell whether the following function has a minimum or maximum value. Then state the minimum or maximum value of the function.

$f(x) = -x^2 + 10x + 8$

$-25 + 50 + 8$ max

$(5, 33)$ is a maximum

Mar 29-10:10 AM

A farmer has 3000 feet of fence to enclose a rectangular field. what is the maximum area that can be enclosed by the fence? What are the dimensions of the rectangle that encloses the most area?

Mar 29-10:10 AM