

Quadratic Functions and Graphs: math test, Grade 9

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Suggested time: 45 minutes. Out of 20 points. Calculator allowed only when the problem says so.

1 Features of a parabola

/ 3 pts

Let $y = x^2 - 8x + 12$.

- Give a , b , c and say whether the parabola opens up or down.
- Find the axis of symmetry.
- Find the vertex and the minimum or maximum value.

2 Solving by factoring

/ 4 pts

Solve each equation by factoring.

- $x^2 + 2x - 35 = 0$
- $x^2 - 11x + 24 = 0$

3 Reading a vertex form

/ 3 pts

Let $f(x) = -2(x - 3)^2 + 18$.

- Give the vertex and the direction of the opening.
- Find the y -intercept.
- Find the zeros of f .

4 Transformations and equations

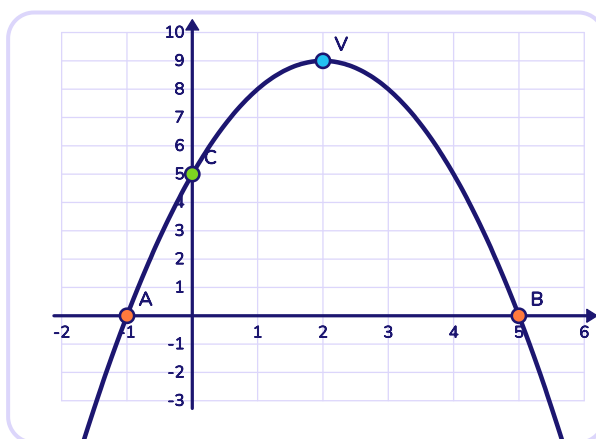
/ 4 pts

- Describe the transformations that turn $y = x^2$ into $y = \frac{1}{2}(x + 2)^2 - 3$, and give the vertex.
- A parabola has vertex $(1, 4)$ and passes through $(3, 0)$. Write its equation in vertex form.

5 Reading a graph

/ 3 pts

The graph below shows a parabola with points A , B , V , and C marked.



- Read the coordinates of A , B , V , and C and name the axis of symmetry.
- Write the equation of the parabola in the form $y = a(x - x_A)(x - x_B)$, then in standard form.

6

A stone off a bridge

/ 3 pts

A stone is thrown upward from a bridge. Its height in feet after t seconds is

$h(t) = -16t^2 + 16t + 20$. A calculator is allowed.

- At what time is the stone at its highest point?
- What is the maximum height?
- When does the stone reach the ground? Round to the nearest hundredth.

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