

Quadratic Functions and Equations: math test, Grade 11 – download the PDF

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

1 Vertex form

/ 3 pts

Let $f(x) = x^2 - 8x + 11$.

- Write $f(x)$ in vertex form by completing the square.
- Give the vertex, the axis of symmetry and the y-intercept.

2 Factoring

/ 4 pts

- Factor $2x^2 - 7x - 15$.
- Factor $4x^2 - 81$.
- Solve $2x^2 - 7x - 15 = 0$.

3 Quadratic formula (calculator allowed)

/ 4 pts

Solve $2x^2 + 3x - 7 = 0$. Give the exact solutions, then round to the nearest hundredth.

4 The discriminant

/ 3 pts

- How many real solutions does $x^2 - 6x + 9 = 0$ have?
- Are the solutions of $3x^2 - 2x + 4 = 0$ real or complex?
- Find k so that $2x^2 - 5x + k = 0$ has exactly one real solution.

5 Inequalities

/ 3 pts

Solve each inequality.

- $x^2 - 2x - 8 \leq 0$
- $x^2 + 3x > 10$

6 A water jet (calculator allowed)

/ 3 pts

The water from a fountain follows the curve $h(x) = -0.25x^2 + 2x + 1.75$, where x is the horizontal distance in feet and h the height in feet.

- Find the maximum height of the jet.
- At what horizontal distances is the water 4.75 feet high?
- How far from the nozzle does the water land? Round to the nearest tenth of a foot.



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