

Parabolas from Focus and Directrix, and Tangents

Grade 10 – Geometry math · Test · Standards: G-GPE.A.2, G-C.A.4

Name: _____ Date: _____ Class: _____

This test has 8 questions worth 20 points and is designed for 45 minutes. A calculator is allowed. Show the vertex and the value of p , and justify each tangent length with a right triangle.

Standards: G-GPE.A.2, G-C.A.4 · **Level:** Grade 10 Geometry

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Equation from the Focus (2 points)

Write the equation of the parabola with focus $(0, 10)$ and directrix $y = -10$.

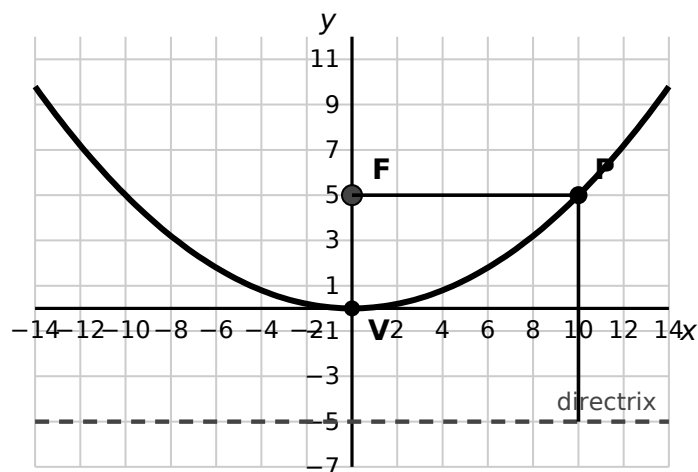
Question 2 Parabola Opening Left or Right (3 points)

Write the equation of the parabola with focus $(-3, 2)$ and directrix $x = -7$.

Question 3 Complete the Square (3 points)

Rewrite $x^2 + 10x + 12y + 49 = 0$ in vertex form and give the focus and directrix.

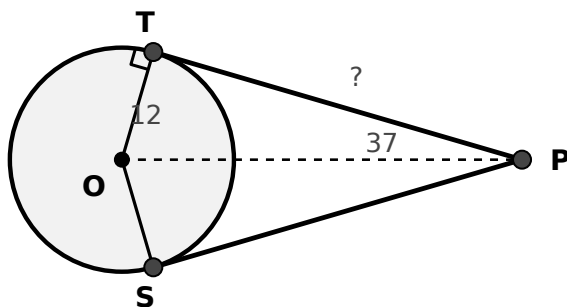
Question 4 Is the Point on the Parabola? (2 points)



Focus $(0, 5)$, directrix $y = -5$.

Is $P(10, 5)$ on the parabola? Compare distances to the focus and the directrix.

Question 5 Tangent Segment Length (2 points)



Not drawn to scale.

A circle has radius 12 and $OP = 37$. Find the length of the tangent segment PT .

Question 6 Tangent Segments with Algebra (3 points)

Tangent segments PA and PB to a circle of radius 12 have lengths $PA = 4x - 9$ and $PB = 2x + 11$. Find x , PA , and the distance OP from P to the center to the nearest tenth.

Question 7 Telescope Dish (3 points)

A dish has a parabolic cross-section with vertex at the origin opening up. It is 36 inches wide and 6 inches deep. How far above the vertex is the focus?

Question 8 Why the Construction Works (2 points)

In the construction of a tangent from an outside point P , a circle is drawn on diameter OP and meets circle O at T . Explain why PT is tangent to circle O .