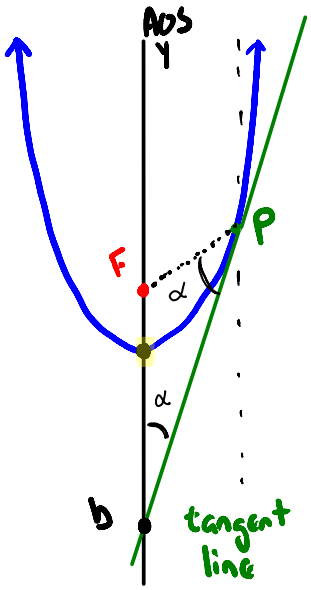
10.1 Continued

Friday, May 08, 2015
11:15 AM

A line is **tangent** to a parabola at a point on the parabola if the line **intersects**, but **does not cross** the parabola at the point.



Line touches (intersects) at only one point

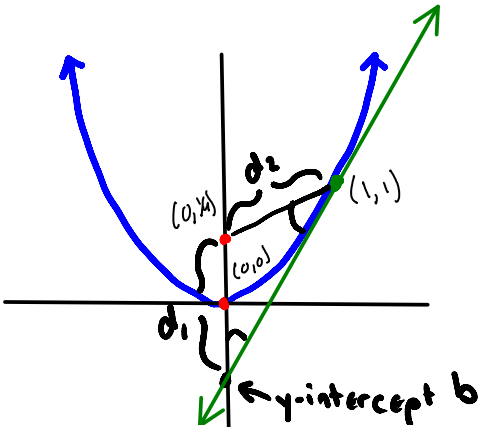
The tangent line to a parabola at Point P makes equal ∠ with the following 2 lines.

1) The line passing through Point P and the Focus
2) The AOS

Tangent Lines have special properties that are related to the use of Parabolas in constructing reflective surfaces.

Ex. 4 Find the equation of the tangent line to the given parabola.

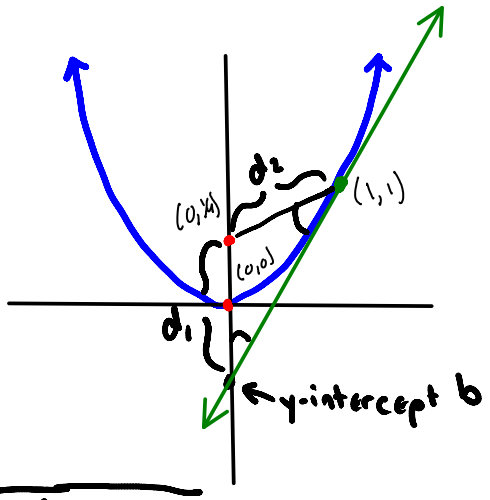
a) $y = x^2$ at the point $(1,1)$
v $(0,0)$ focus $(0, \frac{1}{4})$



$$d_1 = d_2$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

a) $y = x^2$ at the point $(1,1)$ & $(0,0)$ focus $(0, 1/4)$



$$d_1 = d_2$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$d_1 = \frac{1}{4} - b$

$d_2 = \sqrt{(1-0)^2 + (1 - \frac{1}{4})^2}$

$d_2 = \frac{5}{4}$

Focus Tangent Point

$\frac{5}{4} = \frac{1}{4} - b$

$b = -1$

$y = mx + b$

$y = mx - 1$

tangent Pt y-intercept

$(1,1)\ (0,-1)$

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$m = 2$

tangent line is $y = 2x - 1$