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Read Me First: *Show all essential work very neatly.   Use correct notation when presenting your computations and arguments.   Write using complete sentences.   Communicate.   Show me all the magic on the page. Eschew obfuscation.*

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7. (10 pts.)   Find the x-coordinates of all points on the graph of

$y = 3 - x^2$ at which the tangent line passes through the point (2,0).

     Here is a second solution to this problem.   This is based on a partially correct solution provided by a student.
     Instead of first obtaining an equation for the tangent line to the curve at an arbitrary point x_0 on the real line, we will obtain an equation for the line throught the point (2,0) with slope provided by that of the tangent line at any point $(x_0, f(x_0))$ on the curve Plainly, this is given by

$$y - (0) = -2x_0(x-2) \ ,$$

or in slope-intercept form,

$$y = -2x_0 x + 4x_0 \ ,$$

after routine algebra.   Since the line defined by this equation also contains the point $(x_0, f(x_0))$, we must have

$$3 - x_0^2 = -2x_0 x_0 + 4x_0 \ .$$

Consequently, as in the first solution,

$$0 = x_0^2 - 4x_0 + 3$$
$$= (x_0 - 1)(x_0 - 3) \ .$$

Thus, $x_0 = 1$ *or* $x_0 = 3$.