

Warm Up:

Find the derivative of each:

f $3x^2 - x\sqrt{x}$

g $\frac{5}{x^2\sqrt{x}}$

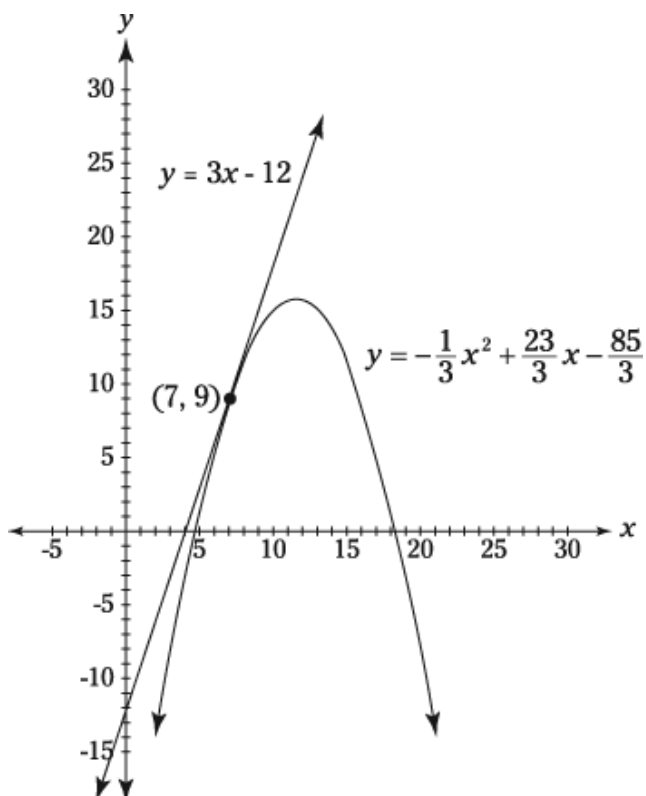
h $2x - \frac{3}{x\sqrt{x}}$

Tangent *and* Normal Lines

- * A tangent to a curve is a line that _____ the curve without _____ over.
 - * A normal to a curve is a line that is _____ to the tangent line.
 - * When lines are perpendicular, the slopes are _____
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Below is a graph of a quadratic function with the equation given.

At the point (7,9), there is a tangent line. The slope of this tangent line represents the slope of the parabola at that point.



a) Find the slope at $x = 7$.

b) Find the equations of the tangent and normal lines at $x = 7$.

$$f(x) = (x - 2)(x^2 - x - 11)$$

Find the equations of all horizontal tangent lines to the given curve.

Write an equation for each line.

- a** The tangent line to the curve $f(x) = x^2 + 1$ at the point $(1, 2)$
- b** The normal line to the curve $f(x) = 2\sqrt{x}$ when $x = 9$
- c** The tangent and normal lines to the curve $f(x) = x + \frac{27}{2x^2}$ when $x = 3$
- d** The tangent to $f(x) = x^3 - 3x^2 - 13x + 15$ that is parallel to the tangent at $(4, -21)$

