

Limits & Derivative

1) Given the function $f(x) = \frac{x^2 - 4}{x^3 - 8}$

Find the following:

- All vertical asymptotes.
- All removable discontinuities.
- Graph the function.

- 2) A baseball is thrown upward from the roof of BMCC and will fall to the ground. The function giving the height of the ball after t seconds is given by:

$$h(t) = -16t^2 + 27t + 100$$

- Graph the function,
- Find the time when the ball hits the ground.
- Find the velocity when the ball hits the ground.

3) Consider the function $g(x) = x^{\frac{3}{2}}$.

- Where is $g(x)$ defined?
- Where is $g(x)$ differentiable?
- Find $g(4)$
- Find the line tangent to the graph at $(4, g(x))$.
- Graph the above line and $g(x)$ on the same coordinate axis.

4) Given the equation: $x^3 + y^3 = 6xy$.

- Graph the given equation.
- Find the equation of the line tangent to the graph at $(4, 1)$
- Graph this line on the same coordinate axis.