

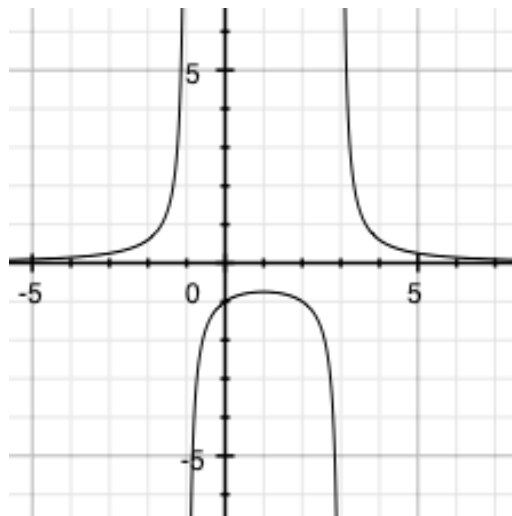
Name: _____

Date: _____

Radical & Composite Functions Assignment

Please show all of your work for the questions below. Write your solutions on a separate piece of paper with the question numbers clearly labelled. Due the class before the test! (15 marks total)

- 1) Determine the equation of a rational function of the form $y = \frac{ax+b}{cx+d}$ that has a vertical asymptote at $x = 5$, a horizontal asymptote at $y = 3$, and an x -intercept of -1 . (2 marks)
- 2) Two taxis offer different rates. SMARTcab charges a fixed fee of \$2 with an additional \$0.50/km. FabCab has a \$3.50 fixed fee plus \$0.35/km. Write equations for the average cost per kilometre driven for each taxi cab company. Graph the functions. Explain how to decide which is the better choice? (2 marks)
- 3) Write the equation for the rational function graphed below. Note that although it is not visible in the image below, there is a point of discontinuity at $(2, -1)$. (2 marks)



- 4) Solve the equation $\frac{x+3}{2x-6} = 2x - \frac{x}{3-x}$ algebraically and graphically. How do the solutions compare? (2 marks)
- 5) Consider the functions $f(x) = |x|$ and $g(x) = x - 5$. (2 marks)
 - a) Determine the equation of the function $h(x) = (f - g)(x)$ and state its domain and range.
 - b) Sketch the graphs of $f(x)$, $g(x)$, $h(x)$ on the same set of axes.
- 6) Consider the functions $f(x) = x + 2$, $g(x) = x^2 + 7x + 8$, $h(x) = 2x + 6$. (2 marks)
 - a) Determine the equation of the combined function $y = \left(\frac{g+h}{f}\right)(x)$ and sketch its graph.
 - b) State the domain and range of the combined function. How do they compare to the domain and range of the individual functions from which it is composed?

7) Let $f(x) = \sqrt{x-5}$ and $g(x) = -x^2$. (2 marks)

a) Determine $(f \circ g)(x)$ and $(g \circ f)(x)$.

b) State the domain and range of $f(x)$, $g(x)$, $(f \circ g)(x)$, $(g \circ f)(x)$.

8) If $h(x) = f(g(x))$, determine an equation for $f(x)$ and $g(x)$. $h(x) = \sqrt[3]{x} + \frac{3}{3 + \sqrt[3]{x}}$ (1 mark)