MATH 171 PRACTICE QUIZ SEPTEMBER 28, 2009

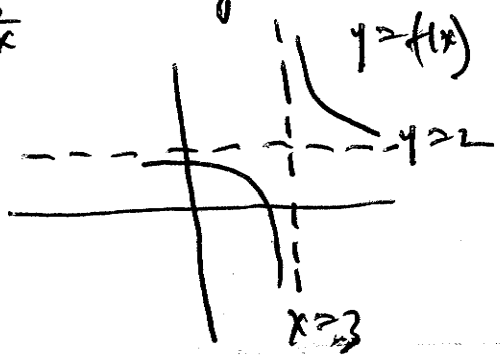
NAME: SOLUTIONS

1. Find the horizontal and vertical asymptotes for the graph of $f(x) = 2x/(x-3)$ and use them to sketch a graph for f.

HORIZONTAL: $\lim_{x\to\pm\infty} \frac{2x}{x-3}\cdot\frac{\frac{1}{x}}{\frac{1}{x}} = \lim_{x\to\pm\infty} \frac{2}{1-\frac{3}{x}} = 2$. $y=2$.

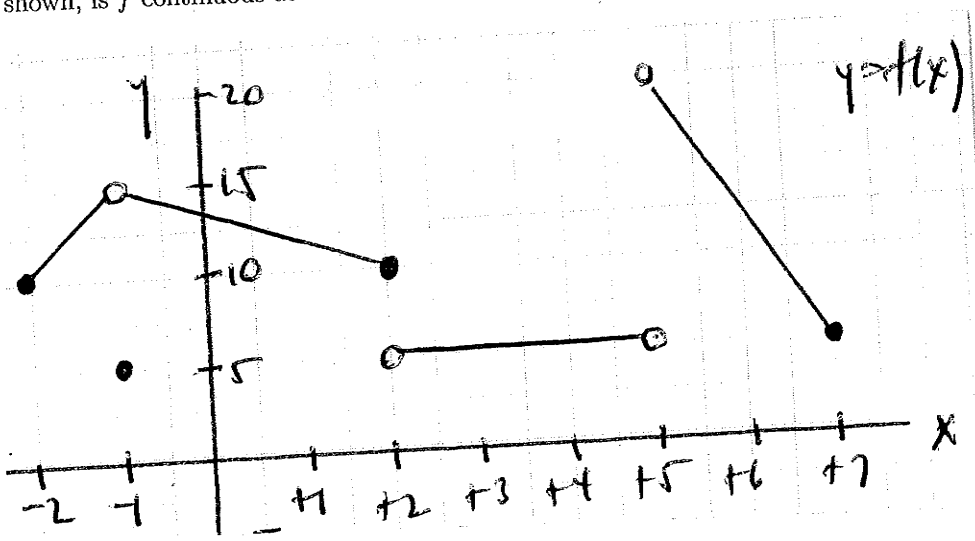
VERTICAL: as $x \to 3^+$, $\frac{\text{pos}}{\text{pos } 0} \sim +\infty$

as $x \to 3^-$, $\frac{\text{pos}}{\text{neg } 0} \sim -\infty$



2. For the function f whose graph is shown, is f continuous at the following locations? Using the definition of continuity, briefly explain why.

- at $x = -1$?
  NO - (iii) fails
- at $x = +2$?
  NO - (iii) fails
- at $x = +3$?
  YES!
- at $x = +5$?
  NO - (i) fails



3. Use the Intermediate Value Theorem (IVT) to show that there is a positive value of x for which $x^3 - 2x^2 - 4 = 0$.

- Apply IVT to $f(x) = x^3 - 2x^2 - 4$ ← polynomial, so continuous
- Let $C = 0$
- Then $f(0) = 0 - 0 - 4 = -4$, $f(10) = 1000 - 200 - 4 = 796$.
- Use interval $[0,10]$. There is c inside $(0,10)$ with $f(c) = 0$