

Math 2215 - Calculus 1

Quiz #2 - 2016.08.24

Solutions

Consider the following function:

$$R(x) = \frac{x(x-1)(x-2)(x-3)^2}{(x^2+1)(x-1)(x+4)(x-3)}$$

1. State the domain of $R(x)$.

Since $R(x)$ is a rational function, the domain is simply all values except those which make the denominator zero. Luckily for us, the denominator is factored completely. The zeros of the denominator are: $x = 1$, $x = -4$, and $x = 3$. Thus the domain is all real numbers except $x = 1$, $x = -4$, and $x = 3$.

2. Locate all removable discontinuities of $R(x)$.

Removable discontinuities are where the denominator and numerator are both zero, and can be factored so that the zero in the denominator can be canceled out in the limit. For this function, the removable discontinuities are at $x = 1$ and $x = 3$. Notice that a factor of $(x - 1)$ can be pulled out of both the numerator and denominator. The same goes for $x - 3$, even though there is an $x - 3$ left in the numerator, there are no more in the denominator.