

Answer on Question#40202 - Math - Calculus

Question: How do I find the domain of $\frac{x-x^2}{2-3x+x^2}$?

Solution. The domain of a function is comprised of all the values that x may take on.

In this case, the only value that x is **not** allowed to take on is the value at which the denominator is equal to zero (since we may not divide by zero), or

$$x^2 - 3x + 2 = 0.$$

Let us find the corresponding values of x by solving this quadratic equation.

Find the discriminant:

$$D = (-3)^2 - 4 \cdot 1 \cdot 2 = 9 - 8 = 1.$$

Thus,

$$x = \frac{-(-3) \pm \sqrt{1}}{2 \cdot 1} = \frac{3 \pm 1}{2},$$

and we have two values:

$$x_1 = \frac{4}{2} = 2, \quad x_2 = \frac{2}{2} = 1.$$

These are the only values excluded from the domain of our function, so the domain is

$$(-\infty, 1) \cup (1, 2) \cup (2, +\infty).$$

Answer. The domain of the given function is $(-\infty, 1) \cup (1, 2) \cup (2, +\infty)$.