WORKSHEET: LIMITS 1

Names and student IDs: _____

1. You want to find $\lim_{x\to 1} \dfrac{x^2-3x+2}{x-2}$. Set $f(x) = \dfrac{x^2-3x+2}{x-2}$ for $x \neq 2$.

Step 1: Does anything go wrong if you try to substitute $x = 1$?

Step 2: Your answer above should have been "no". So what do you think the limit should be?

2. You want to find $\lim_{x\to 2} \dfrac{x^2-3x+2}{x-2}$.

Step 1: Does anything go wrong if you try to substitute $x = 2$?

Step 2: Your answer above should have been "yes". So what do you do? Hint: Factor the numerator.

3. You want to find $\lim_{x\to 2} \dfrac{x^2-3x+2}{x^2-4}$.

Step 1: Does anything go wrong if you try to substitute $x = 2$?

Step 2: Your answer above should have been "yes". So what is the first algebraic step you do?

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4. You want to find $\lim_{x\to 3} \dfrac{\sqrt{x}-\sqrt{3}}{x-3}$.

Does anything go wrong if you try to substitute $x = 3$?

Your answer above should have been "yes". It isn't obvious how to factor, so let's try to estimate the limit numerically. Use a calculator to approimate the following:

$f(2) \approx$ _____ $\qquad$ $f(4) \approx$ _____

$f(2.9) \approx$ _____ $\qquad$ $f(3.1) \approx$ _____

$f(2.99) \approx$ _____ $\qquad$ $f(3.01) \approx$ _____

What is your guess for the limit?

Let's try to find the exact value. Rationalize the numerator: multiply the numerator and denominator by $\sqrt{x}-\sqrt{3}$. Multiply out in the numerator but **not** in the denominator.

Suppose you **do** multiply out in the denominator. What do you get, and what do you do next?