Consider the region bounded by the curves \( y = 2 - 2x^2 \), \( y = 1 \), and the \( y \)-axis, as shown below.

Set up the integral to find the area of this region by \textbf{integrating along the \( x \)-axis}. A typical slice of width \( dx \) is shown in the above graph.

\[
A = \int_{a}^{b} \quad \text{(dx)}
\]

where the bounds of integration are

\( a = \quad \text{(expression)} \)
\( b = \quad \text{(expression)} \)
Consider the region bounded by the curves $y = 2 - 2x^2$, $y = 1$, and the $y$-axis, as shown below.

Set up the integral to find the area of this region by integrating along the $y$-axis. A typical slice of height $dy$ is shown in the above graph.

\[
A = \int_{a}^{b} \ldots
\]

where the bounds of integration are

\[
a = \ldots
\]

\[
b = \ldots
\]

Consider the region bounded by $y = 2 - 2x^2$, $y = 1$, and the $y$-axis, as shown in the previous two problems. Find the area of this region by computing the integral you set up in either of the previous two problems.

Enter in an exact answer, no decimals.

\[
\text{Area} = \ldots
\]
Consider the region bounded between the curves \( y = x^3 - 7x^2 + 10x \) and the \( x \)-axis as shown.

Calculate this area by **integrating along the \( x \)-axis** as follows.

Notice the area is split into two regions. Also take note the top and bottom curves are different in each region. To find this area you need to calculate the area of each region separately.

1. Create the formula for the area of a typical slice in the left region.
   \[ dA_1 = \text{ } \]

2. Create the formula for the area of a typical slice in the right region.
   \[ dA_2 = \text{ } \]

3. Use your mouse to move the typical slice right and left to determine the bounds of integration for each region. Set up the definite integrals to calculate out the area of each region and then find the total shaded area.

Enter in an exact answer, no decimals.

\[ \text{Area} = \text{ } \]
Consider the region bounded by $y = 2 - 2x^2$, $y = k$, and the $y$-axis, as shown below. Here $k$ is a positive constant smaller than 1.

1. Set up an integral for the area of the region using slices as shown.

   \[ A = \int_a^b \]

   where the bounds of integration are

   \[ a = \]

   \[ b = \]

2. Evaluate your integral to find the total area. Give an exact symbolic answer involving $k$. 

   \[ A = \]
Consider the region bounded by \( y = 2 - 2x^2, \ y = kx, \) and the y-axis, as shown below. Here \( k \) is a positive constant smaller than 3.

1. Set up an integral for the area of the region using slices as shown.

\[
A = \int_a^b \int_y \, dx \, dy
\]

where the bounds of integration are

\[
a = \quad \quad b =
\]

2. If the area is exactly 1, find \( k \) accurate to two decimal places.

\[
k =
\]