Name ____ Date______________ Score _______________

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Use the limit process to find the area of the region between the graph of $y = 4 - x^2$, the x-axis, and the vertical lines $x = -2$ and $x = 2$.

a. Sketch the region.

b. We will find the area of the region by dividing it into upright rectangles. First, we determine the width of each rectangle by dividing the interval [-2, 2] into n subintervals of equal width. What is the width of each subinterval?

c. Determine the endpoints of the first three subintervals by filling in the following:

$$a = x_0 = -2 + 0(\qquad) < -2 + 1(\qquad) < -2 + \_\_\_(\qquad) < \_\_\_ + \_\_\_(\qquad) < \ldots$$

d. Determine the endpoints of the last two subintervals by filling in the following:

$$\ldots < -2 + (n-2)(\qquad) < -2 + \_\_\_(\qquad) < \_\_\_ + \_\_\_(\qquad) = x_n = b$$

e. Use the right endpoint of each subinterval to determine the height of each rectangle. What is the height of a representative rectangle?

f. Write an expression for the area of the representative rectangle by choosing an appropriate c_i.

g. How many such rectangles are in the region? ___________

h. Write an expression for the sum of all the rectangles in the region in terms of n. Use Theorem 4.2 to write the appropriate summation formulas.

i. Find the sum of 100 rectangles.

j. If the number of rectangles approaches infinity, find this sum. This is the area of the region.