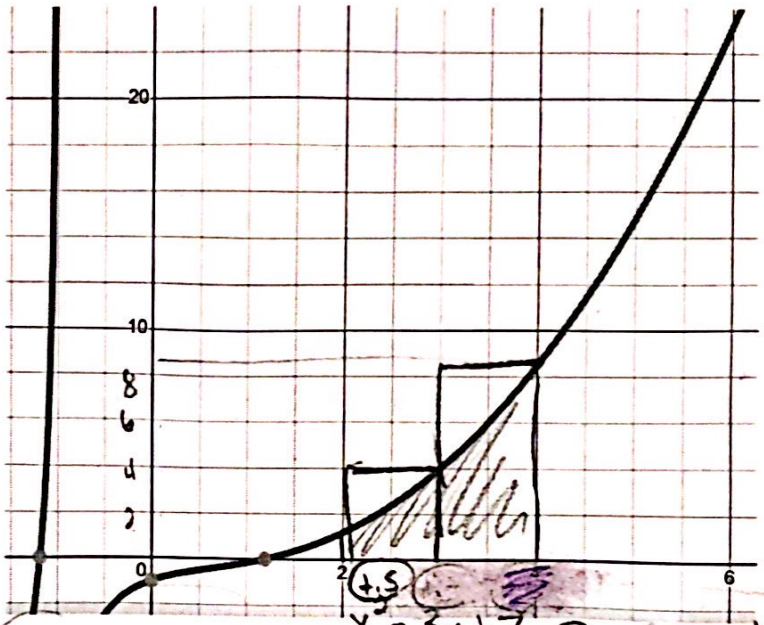
Key

Quiz 7

This is a two-stage quiz. During the first stage, use your knowledge & calculator. You have 15 min. In the second stage, you are now welcome to use your books, notes, and students in the class to retake the same quiz. You have the remainder of the quiz time to write one solution (with everyone's name on it!!!) to be turned in for the group.

Show *all* your work. Reasonable supporting work must be shown for any partial credit.

1. Consider the function $f(x) = \dfrac{x^4 - 2}{x^2 + 3x + 2}$ that is graphed on the right.



(a) [1] Estimate or find $f(4)$.

tech: 8,467

graph: 8

(b) [5] Write out the form of the partial fraction decomposition of the function.
Do not determine the numerical values of the coefficients.

start (+.5)

(+.5) note deg.num ≥ deg den ⇒ long ÷ first

$x^2+3x+2 \overline{)\, x^4+0x^3+0x^2+0x-2}$

$-(x^4+3x^3+2x^2)$

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

$-(-3x^3-9x^2-6x)$

$7x^2+6x-2$

$-(7x^2+21x+14)$

$x^2-3x+7 \quad R\ -15x-16$

algorithm (+1.5)

(+1) note den $= (x^2+3x+2) = (x+1)(x+2)$

So $x^2-3x+7 + \dfrac{A}{x+1} + \dfrac{B}{x+2}$ (+.5) (+.5)

(c) [2] Either approximate (with rectangles), find, or write down an expression that technology can compute that gives the average value of f from $x = 2$ to $x = 4$.

$$\frac{1}{4-2}\int_2^4 \frac{x^4-2}{x^2+3x+2}\,dx$$

notation (+.5) integral (+.5) bounds (+.5)

OR

rectangles:

$\frac{1}{4-2}$(area shaded) $= \frac{1}{2}(4+8) = 6$

I'll use left hand side

area (+.5)

notation (+.5)

compute (+.5)

graph reading (+.5)

2. [2] Find $\displaystyle\int \frac{1}{1+x^2}\,dx$.

notation (+.5) $\arctan(x) + C$ (+.5) 1

(+1)

note: if tried another technique (+.5)

if declared did not work +.5