

Rational Functions

Investigation Week 2

Each year the McFadden Company publishes the Hawker College yearbook, the Hawks Eye. The company charges an \$8000 fixed cost to set up their printers according to our college's specifications. Additionally, we are charged \$20 per copy (unit cost) to print the yearbooks.

1. Write a function that would describe the cost per copy of the yearbook. Explain any assumptions you have made in your model.
2. Explain why your cost function is or is not a rational function.
3. There are 620 students at Hawker College and 42 members of the staff. What would constitute an appropriate domain for x ? What would be an appropriate range? Explain your choices.
4. Does the function have a x -intercept? If so, use your CAS calculator to find it. Explain its meaning in terms of yearbooks. Does the function have a y -intercept? Explain.
5. Fractional values of x have no meaning for our function. However, it is interesting to observe the behaviour of our function as x approaches 0. Use your CAS to explore this. Use your calculator to evaluate the value of our function for values of the independent variable that are close to 0 (.1, .01, .001, .0001, .00001, etc.) What happens to the function as x approaches 0? Determine any vertical asymptotes for your function.
6. Considering the student population at Hawker College, extremely large values of x are unreasonable. However, the behaviour of our function is interesting as x approaches infinity. Use your CAS to evaluate large values of x (1000, 10000, 100000, 1000000, 10000000). What value does our function appear to approach as x gets larger? Explain in terms of yearbooks. Determine any horizontal asymptotes for your function.
7. Confirm your findings in 1 – 6 by graphing your function using the domain and range you have chosen in your window