

DIRECTIONS:

Show all your work, use exact values and units where appropriate. Full credit will be given only when the work you show on paper supports your final answer.

1. [4 pts] Simplify the following expression as much as possible.

$$\frac{(2x^2 - 3)5x + (5 - x^3)3x}{(2x^2 - 3)^2}$$

2. [4 pts] If $f(x) = \frac{5}{x-1}$

a) Find $f(3)$.

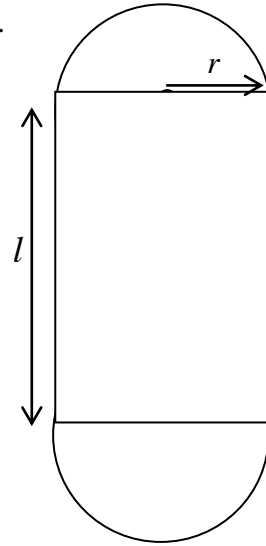
b) Evaluate and **simplify**: $\frac{f(x) - f(3)}{x - 3}$

[4 pts]

3. Given $f(x) = \frac{1}{x+1}$; find $\frac{f(x+h) - f(x)}{h}$

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4. [4 pts] A field has the shape of a rectangle with a semicircle at each end. The length of the rectangular portion of the field is l , and the radius of each semicircle is r . If the outside perimeter of the field is 250 meters, express the **area** of the field as a function of r , and simplify your answer.



5. [4 pts] *This problem is copied from the homework exercises, #15, section 1.2 of your textbook.* Biologists have noticed that the chirping rate of crickets of a certain species is related to temperature, and the relationship appears to be very nearly linear. A cricket produces 113 chirps per minute at 70°F and 173 chirps per minute at 80°F .
- (a) Find a linear equation that models the temperature T as a function of the number of chirps per minute N .
- (b) What is the slope of the graph? What does it represent in terms of the story?
- (c) If the crickets are chirping at 150 chirps per minute, estimate the temperature.