


**Math 140 review of integration**  
**From Fall 2015 Final Exam**  
**Spring 2016**

11. Find the indefinite integral.  $\int \frac{5x^2 + 3\sqrt{x} - 2x - 1}{x} dx$

12. The population of the Island of Misfit Toys is decreasing at a rate of  $\frac{dP}{dt} = -8e^{-\frac{1}{2}t}$  

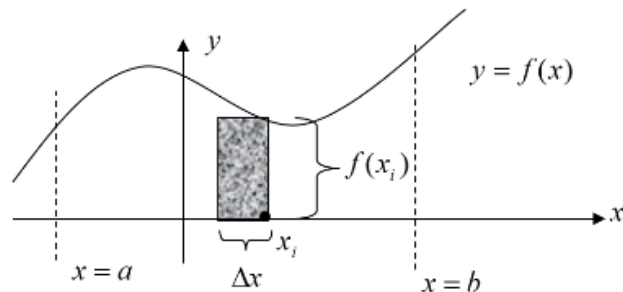
where  $P$  is the population or number of toys and  $t$  is the year, where  $t = 0$  corresponds to 2000. Find the population function,  $P$ , if there were 40 toys on the island in the year 2000.

13. Complete the following (using “words” not “formulas.”)

The limit definition of the area of a region bounded by the graphs of  $y = f(x)$ ,  $x = a$ ,  $x = b$  and the  $x$ -axis is given by

$$A = \lim_{n \rightarrow \infty} \sum_{i=1}^n f(x_i) \Delta x$$

where



$\Delta x$  is the \_\_\_\_\_ of each rectangle, and

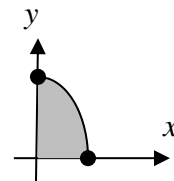
$x_i$  are the \_\_\_\_\_ of each rectangle

$f(x_i)$  are the \_\_\_\_\_ of each rectangle and

$f(x_i) \Delta x$  is the \_\_\_\_\_ of each rectangle.

14. Find the indefinite integral:  $\int \frac{x}{\sqrt{16 - x^2}} dx$

15. Write the definite integral to find the area of the region bounded by the graphs of  $f(x) = \cos x$  and the  $x$ -axis, shown. Then evaluate your integral.



16. Find the indefinite integral.

$$\int \left( \frac{1 + \sin x}{\cos x} \right) dx$$

17. Find the indefinite integral.

$$\int \frac{1}{\sqrt{5 - x^2}} dx$$

18. Find the indefinite integral.

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

19. Find the indefinite integral:

$$\int \frac{4x}{x^2 + 9} dx$$

20. Find the indefinite integral:

$$\int \frac{1}{\sqrt{9 - 8x - x^2}} dx$$



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COURSE LETTER GRADES WILL NOT BE POSTED ON THE WEBSITE BUT BE AVAILABLE THROUGH ELION AS SOON AS POSSIBLE.

HAVE A GREAT BREAK!