



### Part 1 – Fundamental Theorem of Calculus

1. What is so fundamental about the Fundamental Theorem of Calculus (FTC)? Why is it important?

Animate the graph of page 1.5 by pressing Play, the ► button.

2. On page 1.6 you see  $\lim_{h \rightarrow 0} \frac{A(x+h) - A(x)}{h}$ . This is the definition of the derivative of \_\_\_\_\_.

3. Use the FTC to show all the steps to find  $\int_1^2 (x^2 + 2) dx$ .

### Part 2 – Properties of Definite Integrals

4. Write out the Positive and Negative Integrands Property. Then, explain it to your neighbor. Finally, on page 2.3, fill in the blanks to write *part* of the Positive and Negative Integrands Property symbolically.

5. List several odd functions and several even functions. What is the property of definite integrals that applies for the odd functions? For the even functions?

6. Reversal of Limits of Integration: Compare  $\int_a^b f(x) dx$  and  $\int_b^a f(x) dx$ .

7. On page 2.13, what happens to the sum of  $\int_a^c f(x) dx + \int_c^b f(x) dx$  as  $c$  is moved to the left?

8. Clearly show your work to indicate the use of definite integral properties which make finding the following integral quick and easy.

$$\int_{-2}^2 (\tan(0.2x) + x^5 + 8x + 5) dx =$$

**Extension/Homework – Exam-type questions**

9.  $\lim_{h \rightarrow 0} \frac{\cos(x+h) - \cos(x)}{h} =$

- (A) 1            (B) 0            (C)  $\sin(x)$     (D)  $-\sin(x)$     (E)  $\cos(x)$     (F) nonexistent

Explain your answer.

10. If  $\int_1^3 f(x) dx = 5$ , what is  $\int_1^3 (f(x) + 2) dx$ ?

- (A) 11            (B) 9            (C) 7            (D) -1            (E) not enough information to solve

Explain your answer.

11. If  $\int_1^3 f(x) dx = 2.3$  in the following graph (or see page 3.4), then what is  $\int_0^3 f(x) dx$ ?

- (A) -2.3    (B) 2.3    (C) 3.3  
 (D) 4.3    (E) none of the these

Explain your answer.

