5.3.1 Rules for Integrals

1. $\int_b^a f(x)dx = -\int_a^b f(x)dx$ 2. $\int_a^a f(x)dx = 0$

RS#74 3. $\int_a^b kf(x)dx = k\int_a^b f(x)dx$

RS#73 4. $\int_a^b (f(x)+g(x))dx = \int_a^b f(x)dx + \int_a^b g(x)dx$

5. $\int_a^b f(x)dx + \int_b^c f(x)dx = \int_a^c f(x)dx$

Given $\int_3^7 f(x)dx = 6$ $\int_7^{10} f(x)dx = -1$

$\int_7^{10} g(x)dx = 4$ $\int_3^5 f(x)dx = 2$

Find each of the following integrals

1. $\int_7^3 f(x)dx$ 2. $\int_2^2 f(x)dx$

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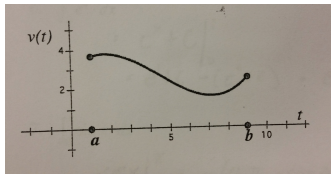
3. $\int_7^{10} (2f(x)+3g(x))dx$

4. $\int_{10}^{3} f(x)dx$

5. $\int_5^7 f(x)dx$

Consider the following velocity graph of the motion of a particle.



Using an integral, express the distance traveled by the particle:

Find another way to express the distance traveled by the particle (using s(t)).

Put the two results above together

What is the significance of the above equation?

Evaluate the following integrals analytically.

6. $\int_0^1 e^x \, dx$

7. $\int_0^{\pi} \sin x \, dx$

8. $\int_1^e \frac{1}{x} dx$

9. $\int_0^4 x^3 \, dx$

Find the area between $y = x^2$ and the x-axis over [0,2]