Calculus I
Section 5.6 – The Definite Integral

Evaluate each integral by using formulas from geometry.

1. $\int_1^3 (1+2x)dx$

2. $\int_{-2}^2 \sqrt{4-x^2}\,dx$

3. $\int_{-3}^0 (1+\sqrt{9-x^2})dx$

4. $\int_{-1}^3 (2-x)dx$
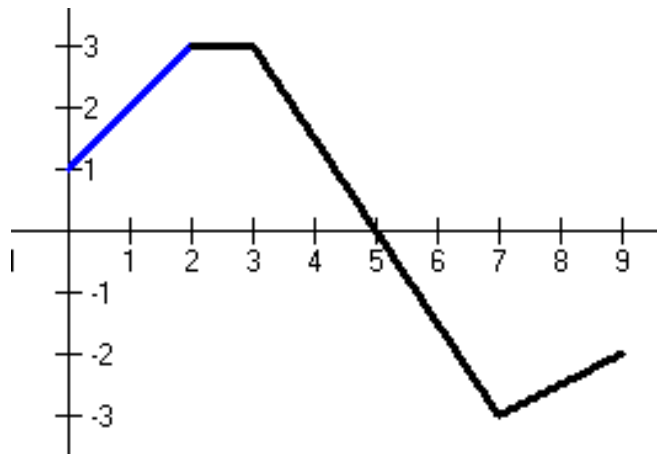
5. $\int_{-2}^2 (1-|x|)dx$

6. $\int_0^3 |3x-5|\,dx$

The graph of *f* is shown. Evaluate each integral by interpreting it in terms of areas.

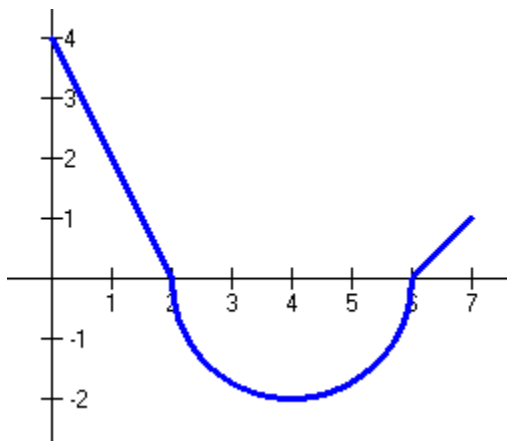7. $\int_0^2 f(x)dx$

8. $\int_0^5 f(x)dx$

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

10. $\int_0^9 f(x)dx$

Calculus I
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The graph of *g* consists of two straight lines and a semicircle. Use it to evaluate each integral.

11. $\int_0^2 g(x)dx$

12. $\int_2^6 g(x)dx$

13. $\int_0^7 g(x)dx$

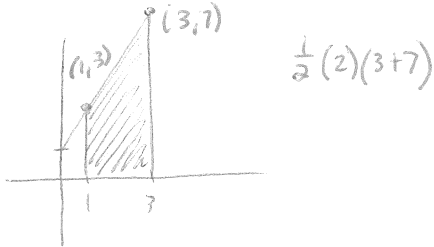14. If $\int_2^8 f(x)dx = 1.7$ and $\int_5^8 f(x)dx = 2.5$, find $\int_2^5 f(x)dx$.

15. If $\int_0^1 f(x)dx = 2$, $\int_0^4 f(x)dx = -6$, and $\int_3^4 f(x)dx = 1$, find $\int_1^3 f(x)dx$.

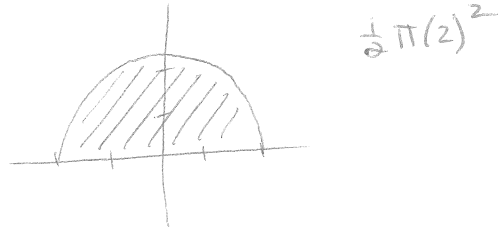16. If we know that $\int_0^1 x^2 dx = \frac{1}{3}$, find $\int_0^1 (5-6x^2)dx$.

Calculus I
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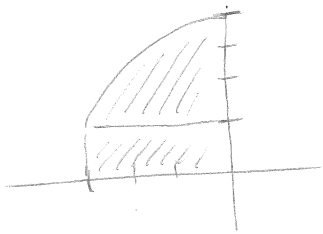
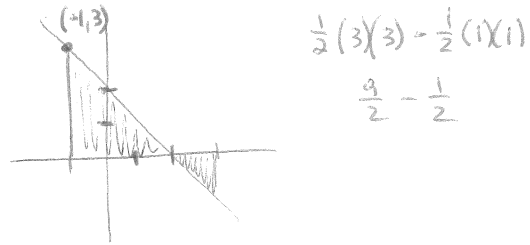**Evaluate each integral by using formulas from geometry.**

1. $\int_{1}^{3}(1+2x)\,dx$ $= 10$

(3,7)
(1,3)

$\frac{1}{2}(2)(3+7)$

2. $\int_{-2}^{2}\sqrt{4-x^2}\,dx$ $= 2\pi$

$\frac{1}{2}\pi(2)^2$

3. $\int_{-3}^{0}(1+\sqrt{9-x^2})\,dx$ $= \frac{9\pi}{4}+3$

4. $\int_{-1}^{3}(2-x)\,dx$ $= 4$
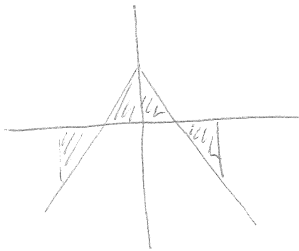
(-1,3)

$\frac{1}{2}(3)(3)-\frac{1}{2}(1)(1)$

$\frac{9}{2}-\frac{1}{2}$

5. $\int_{-2}^{2}(1-|x|)\,dx$ $= 0$

6. $\int_{0}^{3}|3x-5|\,dx$ $= 41/6$

(0,5)   (3,4)

$\frac{1}{2}\left(\frac{5}{3}\right)(5)+\frac{1}{2}\left(\frac{4}{3}\right)(4)$

$\frac{25}{6}+\frac{16}{6}$

$\leftarrow 5|_3 \rightarrow \leftarrow 4|_3 \rightarrow$
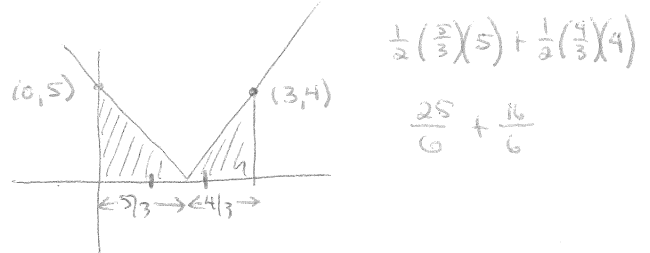
The graph of f is shown. Evaluate each integral by interpreting it in terms of areas.

7. $\int_{0}^{2}f(x)\,dx$ $= 4$

8. $\int_{0}^{5}f(x)\,dx$ $= 10$
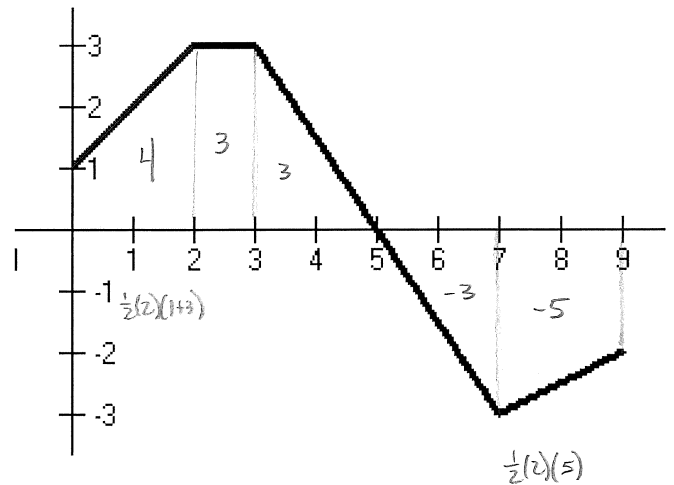
9. $\int_{5}^{7}f(x)\,dx$ $= -3$

10. $\int_{0}^{9}f(x)\,dx$ $= 2$

$10-8$

$\frac{1}{2}(2)(1+3)$

$\frac{1}{2}(2)(5)$
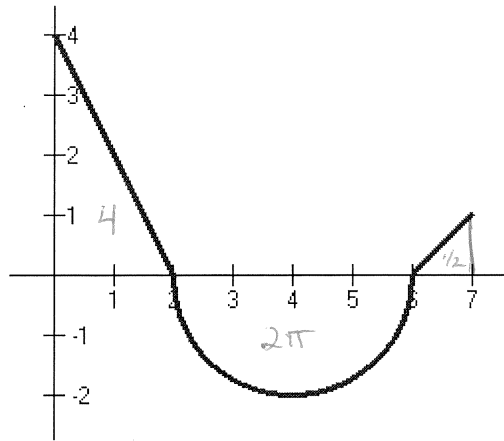
Calculus I
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The graph of g consists of two straight lines and a semicircle. Use it to evaluate each integral.

4

2π

11. $\int_0^2 g(x)dx$ $= 4$

$\frac{1}{2}(2)(4)$

12. $\int_2^6 g(x)dx$ $= -2\pi$

$-\frac{1}{2}\pi(2)^2$

13. $\int_0^7 g(x)dx$ $= \frac{9}{2} - 2\pi$

$4 + \frac{1}{2} - 2\pi$

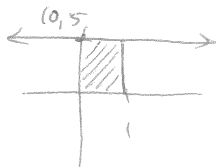14. If $\int_2^8 f(x)dx = 1.7$ and $\int_5^8 f(x)dx = 2.5$, find $\int_2^5 f(x)dx$. $= -.8$

$\int_2^5 f(x)dx + \int_5^8 f(x) = \int_2^8 f(x)dx \Rightarrow \int_2^5 f(x)dx + 2.5 = 1.7$

15. If $\int_0^1 f(x)dx = 2$, $\int_0^4 f(x)dx = -6$, and $\int_3^4 f(x)dx = 1$, find $\int_1^3 f(x)dx$. $= -9$

$\int_0^1 f dx + \int_1^3 f(x)dx + \int_3^4 f(x)dx = \int_0^4 f(x)dx$

$2 + \int_1^3 f(x)dx + 1 = -6$

16. If we know that $\int_0^1 x^2 dx = \frac{1}{3}$, find $\int_0^1 (5 - 6x^2)dx$. $= 3$

(0,5)

$\leftarrow$ $\int_0^1 5 dx - 6\int_0^1 x^2 dx$

$5 - 6\left(\frac{1}{3}\right)$