Integration as Area Problems Competition

Figure 1

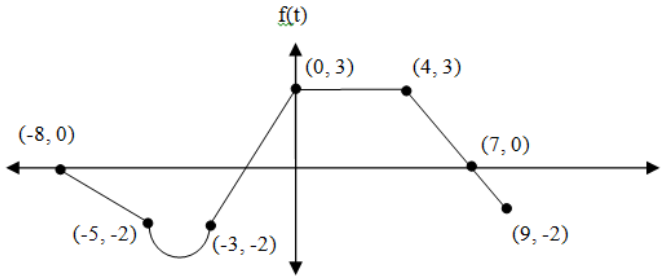
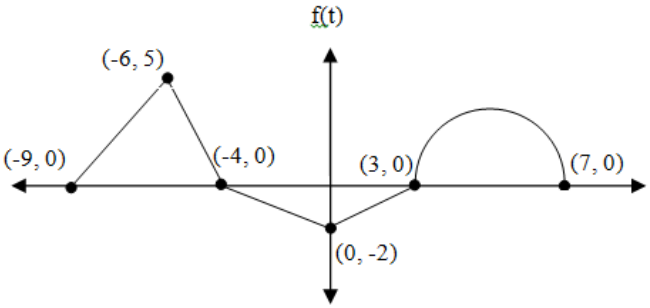


Figure 2



One Point Questions:

1. Figure 2: Find $\int_0^7 f(t)dt$

2. Figure 2: Find $\int_{-9}^3 f(t)dt$

3. Find the area between the functions
   $f(x) = x^2 - 4x + 3$ and $g(x) = -x^2 + 2x + 3$

4. Write an integral for the area between
   $f(x) = 7 - 2x^2$ and $g(x) = x^2 + 4$

Two Point Questions:

5. Find the area in the first quadrant between the curves
   $x = y^3$ and $x = y^2$

6. Write an integral for the area between
   $f(x) = x^2 - 2x - 3$ and the x-axis

7. Write an integral for the area between
   $x = (y-1)^2$ and $x = 3$

8. Figure 1: Find $f(-8)$ given $f(-3) = 1$

9. Write an integral for the area enclosed by
   $y = x$, $y = 4x$, and $y = -x + 2$

Answers:

1. $2\pi - 3$

2. $\frac{11}{2}$

3. 9

4. $\int_{-1}^1 ((7 - 2x^2) - (x^2 + 4))dx$

5. $\frac{1}{12}$

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

7. $\int_{\sqrt{3}-1}^{\sqrt{3}+1} (3 - (y-1)^2)dy$

8. $8 + \frac{\pi}{2}$

9. $\int_{\frac{2}{5}}^1 (-x + 2 - x)dx + \int_0^{\frac{2}{5}} (4x - x)dx$

10. Write an integral for the area between

$x = y^3 - 4y^2 + 3y$ and $x = y^2 - y$

Three Point Questions:

11. Write an integral for the area enclosed by

$y = \sqrt{x}$, $y = x - 2$, and $y = 0$

12. Figure 1:

Given $f'(x)$ and $f(2) = 5$, Find $f(9)$

13. Figure 1:

Given $f'(x)$ and $f(0) = -2$, Find $f(-8)$

(x-int = -1.8) y – 3 = (5/3)(x – 0)

(.5)(3)(2) + (2)(2) + pi/2 + (.5)(2)(1.2) – (.5)(1.8)(3) – 2

3 + 4 + pi/2 +1.2 – 2.7 – 2 = 3.5 + pi/2

10. $\int_1^4 ((y^2 - y) - (y^3 - 4y^2 + 3y))dy +$

$\int_0^1 ((y^3 - 4y^2 + 3y) - (y^2 - y))dy$

11. $\int_0^2 \sqrt{x}dx + \int_2^4 (\sqrt{x} - (x - 2)))dx$

12. 13.5

13. $3.5 + \pi/2$