Name _____ Period _____ Date _____

Assignment #23D

Integral Practice – No Calculators…

31. $\int_0^{\pi/4} \sec^2 t\, dt$

32. $\int_0^{\pi/4} \sec\theta \tan\theta\, d\theta$

33. $\int_1^2 (1 + 2y)^2\, dy$

34. $\int_1^2 \frac{s^4+1}{s^2}\, ds$

35. $\int_1^9 \frac{1}{2x}\, dx$

36. $\int_0^1 10^x\, dx$

37. What is the average (mean) value of $3t^3 - t^2$ over the interval $-1 \le t \le 2$?

- p.302 (1, 15, 21, 28, 37, 41, 46, 57)

In Exercises 1–20, find dy/dx.

1. $y = \int_0^x (\sin^2 t)\, dt$

15. $y = \int_{x^3}^5 \frac{\cos t}{t^2 + 2}\, dt$

In Exercises 21–26, construct a function of the form $y = \int_a^x f(t)\, dt + C$ that satisfies the given conditions.

21. $\frac{dy}{dx} = \sin^3 x$, and $y = 0$ when $x = 5$.

Evaluate each integral. No Calculators...

28. $\int_2^{-1} 3^x\, dx$

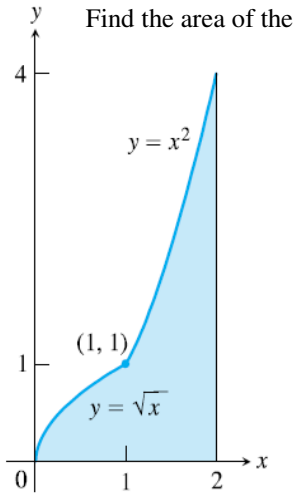
37. $\int_{\pi/4}^{3\pi/4} \csc x \cot x\, dx$

In Exercises 41–44, find the total area of the region between the curve and the x-axis.

41. $y = 2 - x, \quad 0 \le x \le 3$

Name _____ Period _____ Date _____

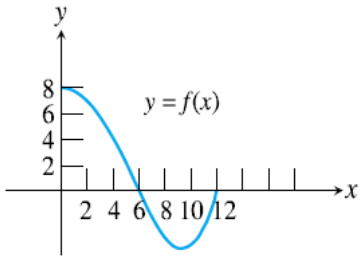
46. Find the area of the shaded region.



57. Let

$$H(x) = \int_0^x f(t)\,dt,$$

where f is the continuous function with domain $[0, 12]$ graphed here.



(a) Find $H(0)$.

(b) On what interval is H increasing? Explain.

(c) On what interval is the graph of H concave up? Explain.

(d) Is $H(12)$ positive or negative? Explain.

(e) Where does H achieve its maximum value? Explain.

(f) Where does H achieve its minimum value? Explain.

No Calculators… Show your thinking.

17. The graph of $y = 5x^4 - x^5$ has a point of inflection at

(A) $(0,0)$ only (B) $(3,162)$ only

(D) $(0,0)$ and $(3,162)$ (E) $(0,0)$ and $(4,256)$

22. $\dfrac{d}{dx}\left(\ln e^{2x}\right) =$

(A) $\dfrac{1}{e^{2x}}$ (B) $\dfrac{2}{e^{2x}}$ (C) $2x$ (D) 1 (E) 2

24. If $\sin x = e^y$, $0 < x < \pi$, what is $\dfrac{dy}{dx}$ in terms of x?

(A) $-\tan x$ (B) $-\cot x$ (C) $\cot x$ (D) $\tan x$ (E) $\csc x$

Solutions to 31-37

31. 1

32. $\sqrt{2} - 1$

33. $\dfrac{49}{3}$

34. $\dfrac{17}{6}$

35. $\dfrac{\ln 18 - \ln 2}{2} = \dfrac{\ln 9}{2}$

36. $\dfrac{9}{\ln 10}$

37. $\dfrac{11}{4}$

17. B

22. E

24. C