HW 4 Date: _____ Name_____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Evaluate.

1) $\int (5x^2 + 1)\ dx$ 1) _____

2) $\int (8x^2 - 3x)\ dx$ 2) _____

3) $\int (10t^2 - 4t - 7)\, dt$ 3) _____

4) $\int (x - 3)^2\ dx$ 4) _____

5) $\int (x^3 - 5x)\ dx$ 5) _____

6) $\int (3x^8 - 7x^3 + 6)\ dx$ 6) _____

7) $\int 15x^{-8}\, dx$ 7) _____

8) $\int \frac{61}{x}\ dx$ 8) _____

9) $\int \frac{37}{x^2}\ dx$ 9) _____

10) $\int 23x^{1/4}\ dx$ 10) _____

11) $\int 12x^3\ \sqrt{x}\ dx$ 11) _____

12) $\int 4\ \sqrt[3]{x^2}\ dx$ 12) _____

13) $\int (x^{4/3} - 3x^{5/2})\ dx$ 13) _____

14) $\int 8e^{4x}\ dx$ 14) _____

15) $\int (x^6 + e^{3x})\ dx$ 15) _____

Find f such that the given conditions are satisfied.

16) $f'(x) = x - 6,\ f(2) = 0$ 16) _____

17) $f'(x) = x^2 - 7x + 11,\ f(0) = 6$ 17) _____

18) $f'(x) = 5x^2 - 7x + 4,\ f(0) = 2$ 18) _____

19) $f'(x) = \sqrt{x} - \frac{1}{\sqrt{x}},\ f(9) = 17$ 19) _____

Evaluate the indefinite integral.

20) $\int (x - 4)^2 x^2\, dx$ 20) _____

21) $\int \frac{x^5 - 5x + 6}{x^2}\, dx$ 21) _____

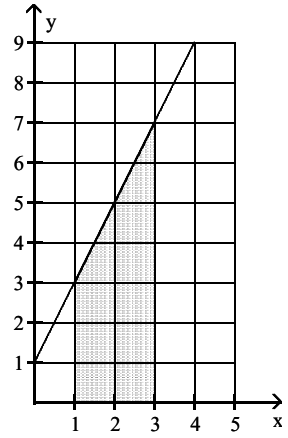
22) $\int (x - 4)(2x + 5)\, dx$ 22) _____

Find the integral.

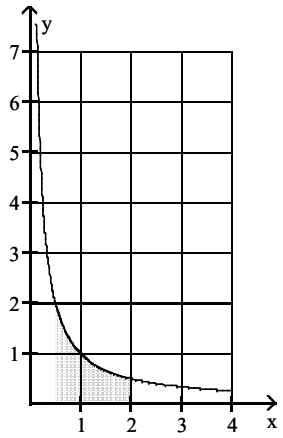
23) $\int (4x^{11} - 7x^3 + 6)\, dx$ 23) _____

Find the area under the given curve over the indicated interval.

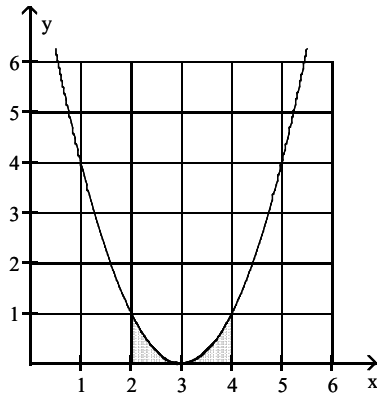
24) $y = 2x + 1;\ [1, 3]$ 24) _____



25) $y = \frac{1}{x}$; [0.5, 2] 25) _____



26) $y = (x - 3)^2$; [2, 4] 26) _____



Find the area under the graph of the function over the interval given.

27) $y = 2x + 7$; [1, 5] 27) _____

28) $y = x^2 - 6x + 9$; [2, 4] 28) _____

29) $y = \frac{3}{x^3}$; [1, 3] 29) _____

30) $y = -x^2 + 9$; [0, 3] 30) _____

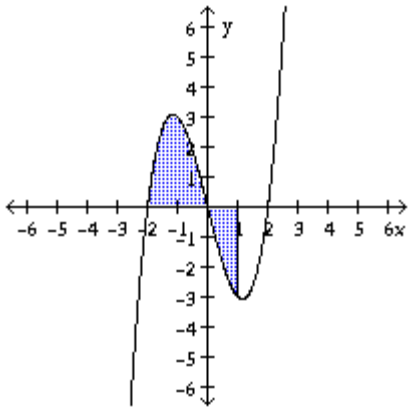
31) $y = x^2(x - 2)^2$; [0, 2] 31) _____

32) $y = \frac{1}{\sqrt{x}}$; [1, 4] 32) _____

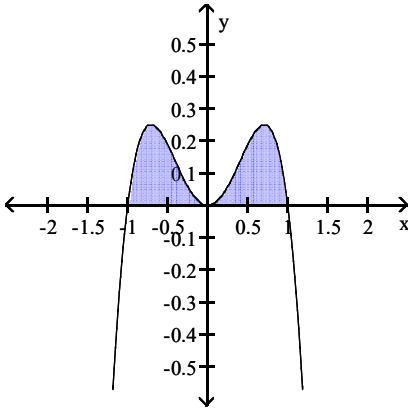
33) $y = \frac{9}{x}$; [1, 8] 33) _____

Evaluate the definite integral and interpret the result.

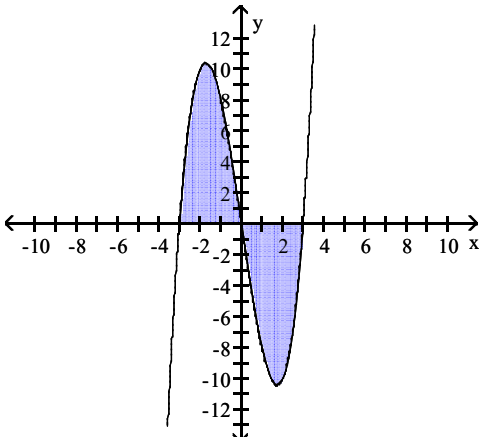
34) $\int_{-2}^{1} (x^3 - 4x)\,dx$ 34) _____



35) $\int_{-1}^{1} (x^2 - x^4)\,dx$ 35) _____



36) $\int_{-3}^{3} (x^3 - 9x)\,dx$ 36) _____



Evaluate.

37) $\int_0^{16} 2\sqrt{x}\, dx$ 37) _____

38) $\int_0^{b} 3e^x\, dx$ 38) _____

39) $\int_0^{b} 9x^8\, dx$ 39) _____

A) $\frac{1}{9}b^9$ B) $9b^9$ C) b^9 D) b^7

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

40) $\int_{-2}^{6} 6x^5\, dx$ 40) _____

41) $\int_0^{3} (4x + 3)(5x - 1)\, dx$ 41) _____

42) $\int_3^{4} (t + \sqrt{2})\,(t - \sqrt{2})\, dt$ 42) _____

Solve the problem.

43) A computer manufacturer has found that its expenditure rate per day (in hundreds of dollars) on a certain type of job is given by $C'(x) = 10x + 6$, where x is the number of days since the start of the job. Find the expenditure if the job takes 8 days. 43) _____

44) A company has found that its expenditure rate per day (in hundreds of dollars) on a certain type of job is given by $E'(x) = 10x + 11$, where x is the number of days since the start of the job. Find the expenditure if the job takes 6 days. 44) _____

45) The rate at which an assembly line worker's efficiency E (expressed as a percent) changes with respect to time t is given by $E'(t) = 75 - 6t$, where t is the number of hours since the worker's shift began. Assuming that $E(1) = 92$, find E(t). 45) _____

46) Red Plains Roasting has found that the cost, in dollars per pound, of the peanuts it roasts, is 46) _____

$C'(x) = -0.014x + 6.50$, for $x \leq 500$,

where x is the number of pounds of peanuts roasted. Find the total cost of roasting 300 pounds of peanuts.

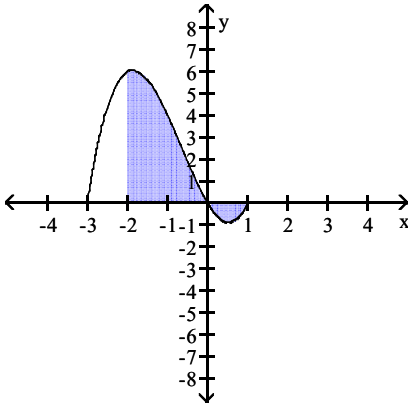
47) Creamy Bugs Yogurt has found that the cost, in dollars per pound, of the yogurt it produces, is

$C'(x) = -0.003x + 4.50$, for $x \leq 300$,

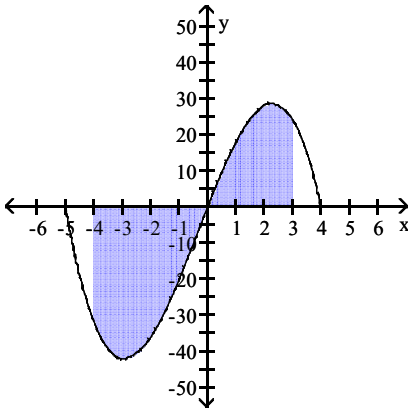
where x is the number of pounds of yogurt produced. Find the total cost of producing 260 pounds of yogurt. 47) _____

Find the area of the shaded region.

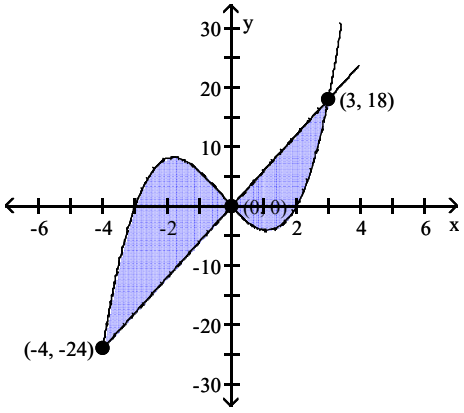
48) $f(x) = x^3 + 2x^2 - 3x$, $g(x) = 0$ 48) _____



49) $f(x) = -x^3 - x^2 + 20x$, $g(x) = 0$ 49) _____



50) $f(x) = x^3 + x^2 - 6x$, $g(x) = 6x$ 50) _____



1) $\frac{5}{3}x^3 + x + C$

2) $\frac{8}{3}x^3 - \frac{3}{2}x^2 + C$

3) $\frac{10}{3}t^3 - 2t^2 - 7t + C$

4) $\frac{1}{3}x^3 - 3x^2 + 9x + C$

5) $\frac{x^4}{4} - \frac{5x^2}{2} + C$

6) $\frac{1}{3}x^9 - \frac{7}{4}x^4 + 6x + C$

7) $-\frac{15}{7}x^{-7} + C$

8) $61 \ln x + C$

9) $-\frac{37}{x} + C$

10) $\frac{92}{5}x^{5/4} + C$

11) $\frac{8}{3}x^{9/2} + C$

12) $\frac{12}{5}x^{5/3} + C$

13) $\frac{3}{7}x^{7/3} - \frac{6}{7}x^{7/2} + C$

14) $2e^{4x} + C$

15) $\frac{x^7}{7} + \frac{e^{3x}}{3} + C$

16) $f(x) = \frac{x^2}{2} - 6x + 10$

17) $f(x) = \frac{1}{3}x^3 - \frac{7}{2}x^2 + 11x + 6$

18) $f(x) = \frac{5}{3}x^3 - \frac{7}{2}x^2 + 4x + 2$

19) $f(x) = \frac{2}{3}x^{3/2} - 2\sqrt{x} + 5$

20) $\frac{x^5}{5} - 2x^4 + \frac{16}{3}x^3 + C$

21) $\frac{x^4}{4} - 5 \ln|x| - \frac{6}{x} + C$

22) $\frac{2}{3}x^3 - \frac{3}{2}x^2 - 20x + C$

23) $\frac{1}{3}x^{12} - \frac{7}{4}x^4 + 6x + C$

24) 10

25) 1.39

26) $\frac{2}{3}$

27) 52

28) $\frac{2}{3}$

29) $\frac{4}{3}$

30) 18

31) $\frac{16}{15}$

32) 2

33) 9 ln 8

34) $\frac{9}{4}$; the area between the x–axis and the graph of $y = x^3 - 4x$ over the interval [–2, 0] minus the area between the x–axis and the graph of $y = x^3 - 4x$ over the interval [0, 1] is $\frac{9}{4}$.

35) $\frac{4}{15}$; the area bounded by the x–axis and the graph of $y = x^2 - x^4$ is $\frac{4}{15}$.

36) 0; the shaded area above the x–axis is equal to the shaded area below the x–axis.

37) $\frac{256}{3}$

38) $3e^b - 3$

39) C

40) 46,592

41) $\frac{441}{2}$

42) $\frac{31}{3}$

43) $36,800

44) $24,600

45) $E(t) = 75t - 3t^2 + 20$

46) $1320.00

47) $1068.60

48) $\frac{95}{12}$

49) $\frac{2137}{12}$

50) $\frac{937}{12}$