

MAC2311
Ref. #: 829232
Term: Spring 2015 (2014_2)
Exam #5

Name _____

Grade _____

Student ID _____

Date _____

SHORT ANSWER. Show ALL work NEATLY in the space provided, and write the final answer on the answer line. No credit will be given if work is not shown or is not legible.

Find the value of the specified finite sum.

1) Given $\sum_{k=1}^n a_k = 3$ and $\sum_{k=1}^n b_k = 7$, find $\sum_{k=1}^n (a_k - 2b_k)$.

1) _____

Answer each question appropriately.

2) Suppose that $\int_0^5 f(x) dx = 13$. Find $\int_{-5}^0 f(x) dx$, if f is even.

2) _____

Use the substitution formula to evaluate the integral.

3) $\int x \sin(2x^2) dx$

3) _____

Given the acceleration a , the initial velocity, and initial position of a body moving along a coordinate line, find the body's position at time t .

4) $y^{(4)} = \sin t + \cos t$

$y'''(0) = 5$

$y''(0) = y'(0) = -1$

$y(0) = 0$

4) _____

Use the substitution formula to evaluate the integral.

5) $\int x^2 e^{x^3} dx$

5) _____

Solve the problem.

- 6) An object is dropped from 260 ft above the surface of the moon. How long will it take the object to hit the surface of the moon if $d^2s/dt^2 = -5.2 \text{ ft/sec}^2$? 6) _____

Evaluate the integral.

- 7) $\int (4\sec x \tan x - 2 \sec^2 x) dx$ 7) _____

Solve the problem.

8) Suppose that f and g are continuous and that $\int_1^2 f(x) dx = -4$, $\int_1^5 f(x) dx = 6$, and

8) _____

$$\int_1^5 g(x) dx = 8.$$

Find a) $\int_5^1 g(x) dx$;

b) $\int_1^5 [4f(x) - g(x)] dx$;

c) $\int_2^5 f(x) dx$.

Evaluate the integral.

9) $\int_{-5}^5 |x| dx$

9) _____

Solve the problem.

10) Find a curve $y = f(x)$ with the following properties:

10) _____

i. $\frac{d^2y}{dx^2} = 6x$

ii. The graph passes through the point $(0,1)$ and has a horizontal tangent at that point.

Evaluate the sum using algebra rules for finite sums and other formulas.

11) $\sum_{k=1}^6 (k-5)$

11) _____

Evaluate the integral.

$$12) \int_0^1 (8s^3 - 12s^2 + 5) dx$$

12) _____

Evaluate the integral.

$$13) \int \frac{2}{9+4t^2} dt$$

13) _____

Use the substitution formula to evaluate the integral.

14) $\int_{\pi}^{3\pi/2} \frac{\sin \theta}{2 + \cos \theta} d\theta$

14) _____

Solve the initial value problem.

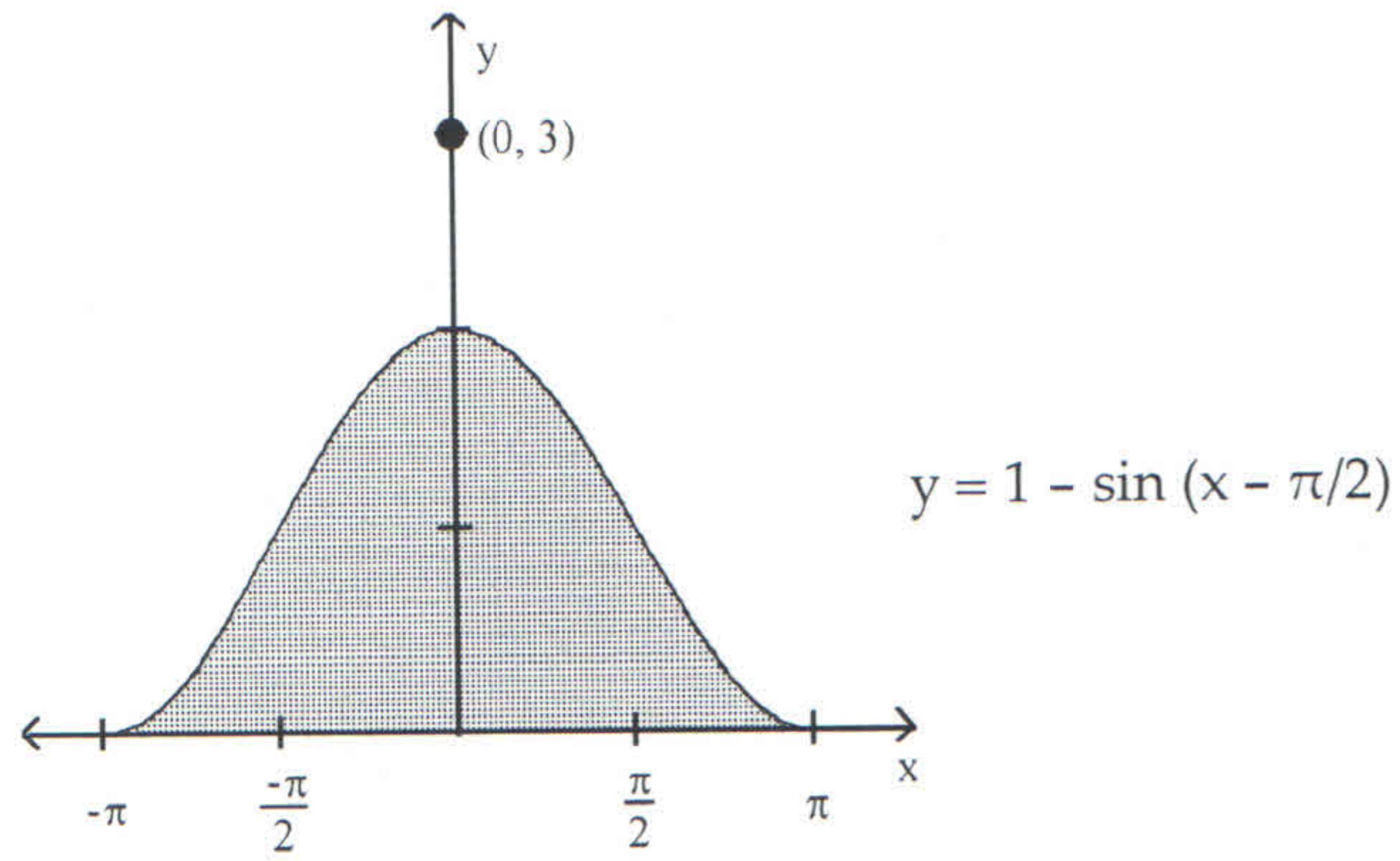
- 15) Given the acceleration, initial velocity, and initial position of a body moving along a coordinate line at time t , find the body's position at time t .
 $a = 50 \cos 5t$, $v(0) = 10$, $s(0) = -14$

15) _____

Find the area of the shaded region.

16)

16) _____



Evaluate the integral.

17) $\int \frac{dx}{x \ln x}$

17) _____

Solve the problem.

18) Find the area between the x-axis and the graph of $f(x) = 4x^3 - 3x^2 + 2x$, over $0 \leq x \leq 2$.

18) _____

Use the substitution formula to evaluate the integral.

19) $\int \sec^2 x (1 + e^{\tan x}) dx$

19) _____

Express the sum in sigma notation.

20) $1 - 2 + 4 - 8 + 16$

20) _____

Find the most general antiderivative (Extra Credit - 5 points).

$$21) \int \sin \theta (\cot \theta + \csc \theta) d\theta$$

21) _____

Find the most general antiderivative (Extra Credit - 10 points).

$$22) \int \frac{\sec \theta}{\sec \theta - \cos \theta} d\theta$$

22) _____

Answer Key

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1) -11

2) 13

3) Yes

4) -18

5) Minimum value is 0 at $x = 0$; no maximum value.

6) 1.39 sec

7) 15,561

8) -14

9) 41

10) $y = \frac{5}{6}x^3 + 1$

11) $\cos 2\pi - \cos 4\pi + \cos 6\pi = 1$

12) 45

13) $-\frac{\pi}{12}$

14) -24

15) $s = -\frac{32}{25} \cos 5t + 10t - 14$

16) 2π

17) $\frac{1}{3} \ln(\ln x^3) + C$

18) $s = \frac{1}{2}(3t^2 - 1)^4 - 12$

19) $-\ln 2$

20) $\sum_{k=0}^4 (-1)^k 2^k$

21) $\sin \theta + \theta + C$

22) $-\cot \theta + C$