

This print-out should have 16 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

001 10.0 points

Determine the integral

$$I = \int \frac{4 - 5x}{\sqrt{x}} dx.$$

1. $I = 8x^{1/2} - \frac{5}{3}x^{3/2} + C$
2. $I = 4x^{1/2} + \frac{5}{3}x^{3/2} + C$
3. $I = 4x^{1/2} + \frac{10}{3}x^{3/2} + C$
4. $I = 4x^{1/2} - \frac{10}{3}x^{3/2} + C$
5. $I = 8x^{1/2} + \frac{10}{3}x^{3/2} + C$
6. $I = 8x^{1/2} - \frac{10}{3}x^{3/2} + C$

002 10.0 points

Determine the integral

$$I = \int (3 - t)(3 + t^2) dt.$$

1. $I = 9t - \frac{3}{2}t^2 + t^3 - \frac{t^4}{4} + C$
2. $I = 9t + \frac{3}{2}t^2 + t^3 - \frac{t^4}{4} + C$
3. $I = 9t + \frac{3}{2}t^2 - t^3 - \frac{t^4}{4} + C$
4. $I = 3t - \frac{3}{2}t^2 - 3t^3 - \frac{t^4}{4} + C$
5. $I = 3t + \frac{3}{2}t^2 - 3t^3 + \frac{t^4}{4} + C$
6. $I = 3t - \frac{3}{2}t^2 + 3t^3 - \frac{t^4}{4} + C$

003 10.0 points

Evaluate the integral

$$I = \int_0^{\pi/6} \left(\frac{3}{\cos^2 \theta} - 4 \sin \theta \right) d\theta.$$

1. $I = 3\sqrt{3} - 4$
2. $I = -\sqrt{3} - 4$
3. $I = 3\sqrt{3} + 4$
4. $I = 3\sqrt{3} + 2$
5. $I = -\sqrt{3} + 4$
6. $I = -\sqrt{3} + 2$
7. $I = -\sqrt{3} - 2$
8. $I = 3\sqrt{3} - 2$

004 10.0 points

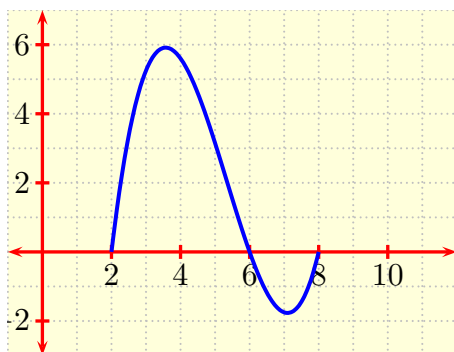
Evaluate the integral

$$I = \int_0^3 (1 + 2y - y^2) dy.$$

1. $I = 6$
2. $I = 7$
3. $I = 5$
4. $I = 4$
5. $I = 3$

005 10.0 points

The graph of f is shown in the figure



If

$$g(x) = \int_2^x f(t) dt,$$

for what value of x does $g(x)$ have a maximum?

1. $x = 6$
2. $x = 8$
3. $x = 7$
4. not enough information given
5. $x = 3.5$
6. $x = 2$

006 10.0 points

Evaluate the definite integral

$$I = \int_0^5 (x^2 - |x^2 - 1|) dx.$$

1. $I = -\frac{5}{3}$
2. $I = -\frac{11}{3}$
3. $I = \frac{11}{3}$
4. $I = -\frac{8}{3}$
5. $I = \frac{5}{3}$
6. $I = \frac{8}{3}$

007 10.0 points

Find the value of the integral

$$I = \int_0^5 |4x - x^2| dx.$$

1. $I = \frac{25}{2}$
2. $I = \frac{79}{6}$
3. $I = \frac{38}{3}$
4. $I = 13$
5. $I = \frac{77}{6}$

008 10.0 points

Find the value of

$$I = \int_0^{\pi/5} 3 \sin(5t) dt.$$

1. $I = \frac{3}{5}$
2. $I = \frac{2}{5}$
3. $I = 1$
4. $I = \frac{6}{5}$
5. $I = \frac{4}{5}$

009 10.0 points

Evaluate the integral

$$I = \int x^2 \sqrt{x^3 + 6} dx.$$

1. $I = \frac{2}{9} (x^3 + 6)^{3/2} + C$

$$2. I = \frac{1}{9} (x^3 + 6)^{1/2} + C$$

$$3. I = 3 (x^3 + 6)^{1/2} + C$$

$$4. I = \frac{1}{9} (x^3 + 6)^{3/2} + C$$

$$5. I = 3 (x^3 + 6)^{3/2} + C$$

$$6. I = \frac{2}{9} (x^3 + 6)^{1/2} + C$$

010 10.0 points

Evaluate the integral

$$I = \int_1^9 \frac{6}{\sqrt{x}(\sqrt{x} + 1)^2} dx.$$

$$1. I = \frac{25}{8}$$

$$2. I = \frac{13}{4}$$

$$3. I = \frac{23}{8}$$

$$4. I = \frac{11}{4}$$

$$5. I = 3$$

011 10.0 points

Evaluate the integral

$$I = \int_0^1 x \{f'(x^2) - 3\} dx$$

when $f(0) = 2$ and $f(1) = 5$.

$$1. I = 0$$

$$2. I = -1$$

$$3. I = \frac{1}{2}$$

$$4. I = -\frac{1}{2}$$

$$5. I = -\frac{3}{2}$$

012 10.0 points

Evaluate the integral

$$I = \int_0^{\pi/4} \sec \theta (4 \tan \theta + \sec \theta) d\theta.$$

$$1. I = \frac{4}{\sqrt{2}} - 3$$

$$2. I = \frac{1}{\sqrt{2}} + 3$$

$$3. I = 4\sqrt{2} - 3$$

$$4. I = \frac{1}{\sqrt{2}} - 3$$

$$5. I = 4\sqrt{2} + 3$$

$$6. I = \sqrt{2} + 3$$

013 10.0 points

Evaluate the integral

$$I = \int_4^{12} \frac{x+1}{\sqrt{x-3}} dx.$$

$$1. I = 34$$

$$2. I = \frac{100}{3}$$

$$3. I = \frac{67}{3}$$

$$4. I = 35$$

$$5. I = \frac{104}{3}$$

014 10.0 points

Determine the integral

$$I = \int \cos^5 x \sin x dx.$$

(Hint: remember L'Hospital's Rule.)

1. $I = \frac{1}{5} \sin^5 x + C$

2. $I = -\frac{1}{6} \cos^6 x + C$

3. $I = \frac{1}{4} \sin^4 x + C$

4. $I = -\frac{1}{4} \cos^4 x + C$

5. $I = \frac{1}{6} \sin^6 x + C$

6. $I = -\frac{1}{5} \cos^5 x + C$

1. limit $= \frac{1}{2}$

2. limit $= \frac{3}{2}\pi$

3. limit $= \frac{1}{4}$

4. limit $= \frac{1}{2}\pi$

5. limit $= \frac{1}{4}\pi$

015 10.0 pointsIf f is a continuous function such that

$$\int_0^x f(t) dt = \frac{7x}{5x^2 + 2},$$

find the value of $f(1)$.

1. $f(1) = -\frac{19}{49}$

2. $f(1) = -\frac{18}{49}$

3. $f(1) = -\frac{17}{49}$

4. $f(1) = -\frac{3}{7}$

5. $f(1) = -\frac{20}{49}$

016 10.0 points

The Fresnel function

$$S(x) = \int_0^x \sin\left(\frac{9}{2}\pi t^2\right) dt$$

is important in the theory of Fourier Optics in Physics. Find the value of

$$\lim_{x \rightarrow 0} \frac{S(x)}{6x^3}.$$