



مؤسسة الإمارات للتعليم
EMIRATES SCHOOLS ESTABLISHMENT

مدرسة بدع المطاوعة 1151 Beda Al Mutwa'a 1151



Mock Exam

Math

Grade : 12 Advanced

Trimester 3

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Each Question = 1 Point



- 1- Find the area of the region determined by the intersections of the curves.

$$y = x, y = 2, y = 6 - x, y = 0$$

- A- 10
B- 6
C- 8
D- 12

- 2- Estimate the volume from the cross-sectional areas.

x (ft)	0	0.5	1	1.5	2
$A(x)$ (ft ²)	1	1.2	1.4	1.3	1.2

- A- 25 ft^3
B- 15 ft^3
C- 3 ft^3
D- 2.5 ft^3

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- 3- Use cylindrical shells to compute the volume.

The region bounded by $y = x^2$ and $y = 2 - x^2$, revolved about $x = -2$

- A- 100.53
B- 33.51
C- 10.67
D- 37

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- 4- compute the arc length exactly.

$$y = 2x + 1, 0 \leq x \leq 2$$

- A- $2\sqrt{5}$
B- $4\sqrt{5}$
C- $2\sqrt{10}$
D- $5\sqrt{2}$



- 5- A diver drops from 30 ft above the water (about the height of an Olympic platform dive). What is the diver's velocity at impact?

A-

$$y = -16t^2 + 30, y'(\sqrt{\frac{15}{8}}) \approx -43.8 \text{ ft/s}$$

B-

$$y = -32t^2 + 30, y'(\sqrt{\frac{15}{16}}) \approx -43.8 \text{ ft/s}$$

C-

$$y = -4.9t^2 + 30, y'(\sqrt{\frac{300}{94}}) \approx -43.8 \text{ ft/s}$$

D-

$$y = -9.8t^2 + 30, y'(\sqrt{\frac{150}{49}}) \approx -43.8 \text{ ft/s}$$

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- 6- A bucket is lifted a distance of 80 feet at the rate of 4 ft/s. The bucket initially contains 100 pounds of sand but leaks at a rate of 2 lb/s. Compute the work done.

A- 6040 ft-lb

B- 6440 ft-lb

C- 6400 ft-lb

D- 6400 lb-ft

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- 7- Find a value of c for which $f(x)$ is a pdf on the indicated interval.

$$f(x) = cx + x^2, \quad [0,1]$$

A- 4

B- 3

C- $\frac{4}{3}$

D- 1.5



8- Find (a) the mean and (b) the median of the random variable with the given pdf.

$$f(x) = 3x^2, \quad [0,1]$$

- A- (a)0.95 (b)0.7937
- B- (a)0.75 (b)0.7937
- C- (a)0.75 (b)0.8937
- D- (a)0.95 (b)0.9937

9- Evaluate $\int \sec 2x \tan 2x \, dx$

- A- $= 0.5 \sec 2x$
- B- $= -0.5 \sec 2x$
- C- $= 0.5 \tan 2x$
- D- $= -0.5 \tan 2x$

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10- Evaluate $\int \frac{1}{\sqrt{3-2x-x^2}} \, dx$

- A- $= 2\cos^{-1}(x+1) + c$
- B- $= 2\sin^{-1}(x+1) + c$
- C- $= \cos^{-1}\left(\frac{x+1}{2}\right) + c$
- D- $= \sin^{-1}\left(\frac{x+1}{2}\right) + c$

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11- Evaluate $\int x e^{2x} \, dx$

- A- $= \frac{1}{2} x e^{2x} - \frac{1}{4} e^{2x} + c$
- B- $= \frac{1}{4} x e^{2x} - \frac{1}{4} e^{2x} + c$
- C- $= \frac{1}{2} x e^{2x} - \frac{1}{2} e^{2x} + c$
- D- $= \frac{1}{2} x e^{2x} - e^{2x} + c$



12- Evaluate $\int_0^1 x^2 \cos \pi x \, dx$

- A- $\frac{2}{\pi^2}$
- B- $-\frac{2}{\pi^2}$
- C- $-\frac{4}{\pi^2}$
- D- $\frac{1}{\pi^2}$

13- Evaluate $\int \cos^3 x \sin^4 x \, dx$

- A- $= -\frac{1}{7} \sin^7 x + \frac{1}{5} \sin^5 x + c$
- B- $= \frac{1}{7} \sin^7 x - \frac{1}{5} \sin^5 x + c$
- C- $= -\frac{1}{7} \cos^7 x - \frac{1}{5} \sin^5 x + c$
- D- $= \frac{1}{7} \sin^7 x + \frac{1}{5} \cos^5 x + c$

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14- Evaluate $\int \cos^2(x+1) \, dx$

- A- $= \frac{1}{4} \sin(2x+2) + c$
- B- $= -\frac{1}{4} \sin(2x+2) + \frac{1}{2}x + c$
- C- $= \frac{1}{4} \sin(2x+2) + \frac{1}{2}x + c$
- D- $= \frac{1}{2} \sin(2x+1) + \frac{1}{2}x + c$

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15- Use a partial fractions decomposition to find $\int \frac{1}{x^3+4x} \, dx$

- A- $= \frac{-1}{8} \ln(x^2+4) + \frac{1}{4} \ln(|x|) + c$
- B- $= \frac{-1}{8} \ln(x^2+4) - \frac{1}{4} \ln(|x|) + c$
- C- $= \frac{1}{8} \ln(x^2+4) + \frac{1}{4} \ln(|x|) + c$
- D- $= \frac{1}{4} \ln(x^2+4) - \frac{1}{8} \ln(|x|) + c$



16- Evaluate the integral $\int \frac{x^3+x+2}{x^2+2x-8} dx$

- A- $= 2\ln(|x-2|) + 7\ln(|x+4|) + 0.5x^2 - 2x + c$
- B- $= 2\ln(|x-2|) + 11\ln(|x+4|) + 0.5x^2 - 2x + c$
- C- $= 2\ln(|x-2|) - 11\ln(|x+4|) + 0.5x^2 - 2x + c$
- D- $= 2\ln(|x-2|) + 11\ln(|x-4|) + 0.5x^2 - 2x + c$

17- Find the solution of the given differential equation satisfying the indicated initial condition.

$$y' = y - 50, y(0) = 70$$

- A- $y = 20e^t - 50$
- B- $y = 20e^t + 50$
- C- $y = 50e^t + 20$
- D- $y = 50e^t - 20$

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18- Suppose a bacterial culture initially has 400 cells. After 1 hour, the population has increased to 800.

Find an equation for the population at any time and find population after 3 hours.

- A- $y = 400e^{t(\ln 2)} \dots y(3) = 3200$
- B- $y = 800e^{t(\ln 2)} \dots y(3) = 6400$
- C- $y = 400e^{t(\ln 0.5)} \dots y(3) = 50$
- D- $y = 400e^{t(\ln 0.5)} \dots y(3) = 100$



19- Find the general solution, in an explicit form if possible. $y' = 2x^2y^2$

A- $y = \frac{-1}{\frac{2}{3}x^3 + c}$

B- $y = \frac{1}{3x^3 + c}$

C- $y = \frac{3}{x^3 + c}$

D- $y = \frac{1}{\frac{2}{5}x^3 + c}$

20- Solve the IVP, explicit if possible. $y' = \frac{\tan y}{x}$, $y(1) = \frac{\pi}{2}$ عبدالقادر عمرو 566028336

A- $\cos y = x$

B- $\sin y = x$

C- $\sin x = y$

D- $\sin y = -x$

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Good Luck