REVISION 11 TERM 2

12 ADVANCED

MATH 2021-2022

11

النموذج التجريبي الثالث

Mock 3 Math 12 ADA

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خطوة واحدة للتفوق

1

Suppose that a raindrop evaporates in such a way that it maintains a spherical shape. Given that the volume of a sphere of radius r is $V = \frac{4}{3}\pi r^2$ and its surface area is $A = 4\pi r^2$, if the radius changes in time, show that $V' = Ar'$. If the rate of evaporation (V') is proportional to the surface area, then radius changes the radius changes at a constant rate

a) *radius changes at a constant rate*

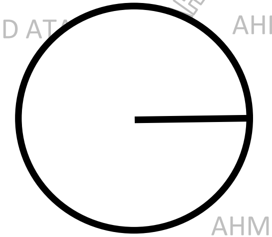
b) *radius changes by rate* 4

c) *rat of radius decreasing by* 2

d) *radius changes by rate* $\frac{4}{3}$

2

Suppose a forest fire spreads in a circle with radius changing at a rate of 5 feet per minute. When the radius reaches 200 feet, at what rate is the area of the burning region increasing?



$a)$ $2000\ ft^2/min$

$b)$ $2000\pi\ ft/min$

$c)$ $2000\pi\ ft^2/min$

$d)$ $1500\pi\ ft^2/min$

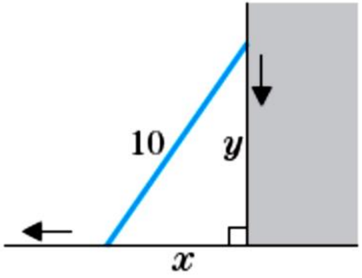
A 10-feet ladder leans against the side of a building If the bottom of the ladder is pulled away from the wall at the rate of 3 ft/s and the ladder remains in contact with the wall, find the rate at which the top of the ladder is dropping when the bottom is 6 feet from the wall.

a) $y'(t) = 2.25\ ft/sec$

b) $y'(t) = -2.25\ ft/sec$

c) $y'(t) = 3.25\ ft/sec$

d) $y'(t) = -3.25\ ft/sec$



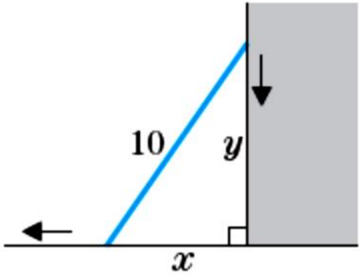
A 10-feet ladder leans against the side of a building If the bottom of the ladder is pulled away from the wall at the rate of 3 ft/s and the ladder remains in contact with the wall,
Find the rate at which the angle between the ladder and the horizontal is changing when the bottom of the ladder is 6 feet from the wall.

a) $\theta'(t) = \frac{3}{8}\ rad/sec$

b) $\theta'(t) = -\frac{5}{8}\ rad/sec$

c) $\theta'(t) = -\frac{3}{8}\ rad/sec$

d) $\theta'(t) = -\frac{7}{8}\ rad/sec$



5

Suppose that $C(x) = 0.02x^2 + 2x + 4000$
is the total cost (in AED) for a company to produce x units of a certain product.
Compute the marginal cost at $x = 100$

$a)$ $2\ AED$

$b)$ $5.98\ AED$

$c)$ $4\ AED$

$d)$ $6\ AED$

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Suppose that $C(x) = 0.02x^2 + 2x + 4000$
is the total cost (in AED) for a company to produce x units of a certain product.
Compute actual cost of producing the 100th unit

$a)$ $2\ AED$

$b)$ $5.98\ AED$

$c)$ $4\ AED$

$d)$ $6\ AED$

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Find the general antiderivative

$$\int 2secxtanxdx$$

a) $tanx + secx + c$

b) $secx - tanx + c$

c) $tanx - secx + c$

d) $2secx + c$

8

Find the general antiderivative

$$\int 5sec^2x dx$$

a) $-5tanx + c$

b) $5tanx + c$

c) $5\, tanxsecx + c$

d) $5secx + c$

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Find the general antiderivative

$$\int \frac{4\cos x}{\sin^2 x}\,dx$$

a) $-4\csc x + c$

b) $4\csc x + c$

c) $4\sec x + c$

d) $-4\sec x + c$

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Find the general antiderivative

$$\int \frac{cosx}{sinx}\,dx$$

$a)\ -ln|sinx| + c$

$b)\ ln|sinx| + c$

$c)\ ln|cosx| + c$

$d)\ -\ ln|cosx| + c$

11

Find the general antiderivative

$$\int \frac{4x}{x^2+4}\,dx$$

a) $\frac{1}{2} ln|x^2+4| + c$

b) $ln|x^2+4| + c$

c) $2ln|x^2+4| + c$

d) $2ln|x+4| + c$

12

Find the general antiderivative

$$\int \frac{e^x}{e^x + 3}\,dx$$

a) $ln|e^x + 3| + c$

b) $ln|e^x| + c$

c) $-ln|e^x + 3| + c$

d) $ln|e^{-x} + 3| + c$

Determine the position function if the velocity function is

$v(t) = 3 - 12t$ and the initial position is $s(0) = 3$.

a) $s(t) = 3t^2 - 6t + 3$

b) $s(t) = 3t - 6t^2 +$

c) $s(t) = 3t - 6t^2 + 3$

d) $s(t) = 3t - 6t^2 + 2$

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Determine the position function if the velocity function is

$v(t) = 3e^{-t} - 2$ and the initial position is $s(0) = 0$

$a)\ s(t) = -3e^{-t} - 2t$

$b)\ s(t) = 3e^{-t} - 2t + 3$

$c) s(t) = -3e^{-t} + 2t + 3$

$d)\ s(t) = -3e^{-t} - 2t + 3$

Determine the position function if the acceleration function is $a(t) = 3\sin t + 1$, the initial velocity is $v(0) = 0$ and the initial position is $s(0) = 4$

$$a)\ s(t) = -3\sin t + \frac{1}{2}t^2 + 3t + 3$$

$$b)\ s(t) = -3\sin t + \frac{1}{2}t^2 + 3t + 4$$

$$c)\ s(t) = -3\sin t + 2t^2 + 3t + 4$$

$$d)\ s(t) = -3\sin t + \frac{1}{2}t^2 + 4t + 3$$

Determine the position function if the acceleration function is $a(t) = t^2 + 1$, the initial velocity is $v(0) = 4$ and the initial position is $s(0) = 0$

$a)\ s(t) = \frac{1}{12}t^2 + \frac{1}{2}t + 4$

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

$c)\ s(t) = \frac{1}{12}t^4 + \frac{1}{2}t^2 + 4t$

$d)\ s(t) = \frac{1}{12}t^4 + \frac{1}{2}t^2 + 4$

write out all terms and compute the sums

$$\sum_{i=3}^{7}(i^2+i)$$

$a)\ 2+6+12+20+30+42+56=168$

$b)\ 12+20+30+42+56=160$

$c)\ 6+12+20+30+42+56=166$

$d)\ 2+6+12+20=40$

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write out all terms and compute the sums

$$\sum_{i=6}^{8}(i^2+2)$$

$a)\ 38+51+66=155$

$b)\ 38+51=89$

$c)51+66=121$

$d)\ 38+51+64=153$

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use summation rules to compute the sum

$$\sum_{i=4}^{20}(i-3)(i+3)$$

$a)$ 3362

$b)$ 2653

$c)$ 2730

$d)$ 1259

use the given function values to estimate the area under the curve using left-endpoint and right-endpoint evaluation

x	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
$f(x)$	2.0	2.4	2.6	2.7	2.6	2.4	2.0	1.4	0.6

a) $left\ endpoint = 1.81$
$right\ endpoint = 1.67$

b) $left\ endpoin = 1.67$
$right\ endpoint = 1.81$

c) $left\ endpoint = 1.23$
$right\ endpoint = 1.56$

d) $left\ endpoin = 1.76$
$right\ endpoint = 1.18$

use the given function values to estimate the area under the curve using left-endpoint and right-endpoint evaluation

x	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6
$f(x)$	2.0	2.2	1.6	1.4	1.6	2.0	2.2	2.4	2.0

a) *left endpoint* $= 3.08$
right endpoint $= 3.80$

b) *left endpoin* $= 3.08$
right endpoint $= 3.008$

c) *left endpoint* $= 3.08$
right endpoint $= 3.08$

d) *left endpoin* $= 3.08$
right endpoint $= 2.08$

use the given function values to estimate the area under the curve using left-endpoint and right-endpoint evaluation

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8
$f(x)$	1.8	1.4	1.1	0.7	1.2	1.4	1.8	2.4	2.6

$a)\ left\ endpoint\ = 1.6$
$right\ endpoint = 1.4$

$b)\ left\ endpoin\ = 1.8$
$right\ endpoint = 1.2$

$c)\ left\ endpoint\ = 1.4$
$right\ endpoint = 1.6$

$d)\ left\ endpoin\ = 1.2$
$right\ endpoint = 1.8$

use the given function values to estimate the area under the curve using left-endpoint and right-endpoint evaluation

x	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6
$f(x)$	0.0	0.4	0.6	0.8	1.2	1.4	1.2	1.4	1.0

$a)\ left\ endpoint = 1.182$
$right\ endpoint = 1.362$

$b)\ left\ endpoin = 1.182$
$right\ endpoint = 1.262$

$c)\ left\ endpoint = 2.362$
$right\ endpoint = 1.262$

$d)\ left\ endpoin = 1.262$
$right\ endpoint = 1.181$

write the given (total) area as an integral or sum of integrals.

The area above the x-axis and below $y = 4 - x^2$

a) $\int_{-2}^{2} (4 - x^2)dx = \frac{32}{3}$

b) $\int_{0}^{2} (4 - x^2)dx = \frac{16}{3}$

c) $\int_{-1}^{1} (4 - x^2)dx = \frac{22}{3}$

d) $\int_{-2}^{0} (4 - x^2)dx = \frac{16}{3}$

write the given (total) area as an integral or sum of integrals.

The area above the x-axis and below $y = 4x - x^2$

a) $\int_{-2}^{2}(4 - x^2)dx = \frac{32}{3}$

b) $\int_{0}^{4}(4 - x^2)dx = \frac{32}{3}$

c) $\int_{2}^{4}(4 - x^2)dx = \frac{32}{3}$

d) $\int_{0}^{2}(4 - x^2)dx = \frac{16}{3}$

write the given (total) area as an integral or sum of integrals.

The area below the x-axis and above $y = x^2 - 4$

a) $\int_{-2}^{2} -(x^2 - 4)dx = \frac{32}{3}$

b) $\int_{0}^{4} (x^2 - 4)dx = \frac{16}{3}$

c) $\int_{-2}^{0} -(x^2 - 4)dx = \frac{16}{3}$

d) $\int_{-2}^{2} (x^2 - 4)dx = -\frac{32}{3}$

write the given (total) area as an integral or sum of integrals.

The area below the x-axis and above $y = x^2 - 4x$

a) $\int_{-2}^{2} -(x^2 - 4x)dx = \frac{16}{3}$

b) $\int_{0}^{4} -(x^2 - 4)dx = \frac{16}{3}$

c) $\int_{0}^{4} -(x^2 - 4x)dx = \frac{32}{3}$

d) $\int_{0}^{4} (x^2 - 4x)dx = -\frac{32}{3}$

compute the average value of the function on the given interval.

$$f(x) = 2x + 1 \quad on\ [0, 4]$$

$a)\ f_{avg} = 5$

$b)\ f_{avg} = 20$

$c)\ f_{avg} = 10$

$d)\ f_{avg} = 100$

compute the average value of the function on the given interval.

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

a) $f_{avg} = \frac{5}{3}$

b) $f_{avg} = \frac{4}{3}$

c) $f_{avg} = \frac{2}{3}$

d) $f_{avg} = \frac{8}{3}$

compute the average value of the function on the given interval.

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

a) $f_{avg} = \dfrac{1}{3-1}\displaystyle\int_1^3 (x^2-1)dx$

b) $f_{avg} = \displaystyle\int_1^3 (x^2-1)dx$

c) $f_{avg} = \dfrac{1}{3-1}\displaystyle\int_0^3 (x^2-1)dx$

d) $f_{avg} = \dfrac{1}{1-3}\displaystyle\int_1^3 (x^2-1)dx$