



TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

Grade 12 Advance

End of Term 2 (EoT2) Questions



www.bestmath.in



www.youtube.com/@bestmathuae



YouTube

JUSTIN DSOUZA



TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

Justin Daryl Dsouza

www.bestmath.in



JUSTIN DSOUZA



www.youtube.com/@bestmathuae



YouTube



TikTok



Instagram

G12Adv End of Term 2

Part I: MCQ & Part II: FRQ



www.bestmath.in



www.youtube.com/@bestmathuae



YouTube

JUSTIN DSOUZA



TikTok



Instagram

Best Math UAE



@bestmathuae • 9.76K subscribers • 1K videos

I am Justin Dsouza, Math Teacher. ...more

Customize channel

Manage videos



Justin Dsouza



www.youtube.com/@bestmathuae



YouTube

JUSTIN DSOUZA



TikTok



Instagram

G12Adv End of Term 2

Part I: MCQ – Electronic (Q1 to Q15)



www.bestmath.in



www.youtube.com/@bestmathuae



YouTube

JUSTIN DSOUZA



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 1

Find the critical points of a given function



JUSTIN DSOUZA

Page 255
Example 10
Lesson 4.3



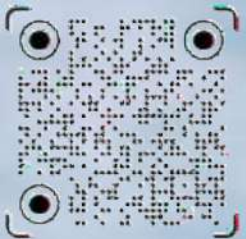
YouTube

Example 3.10 Finding Critical Numbers of a Rational Function

Find all the critical numbers of $f(x) = \frac{2x^2}{x+2}$.

Solution:





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 1

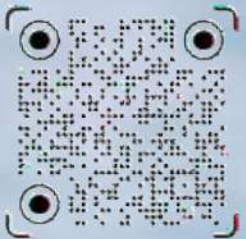


Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 2

Find the absolute extrema of a given function



JUSTIN DSOUZA

Page 258
Exercise 25 -34
Lesson 4.3



YouTube

In exercises 25–34, find the absolute extrema of the given function on each indicated interval.

25. $f(x) = x^3 - 3x + 1$ on (a) $[0, 2]$ and (b) $[-3, 2]$



In exercises 25–34, find the absolute extrema of the given function on each indicated interval.

25. $f(x) = x^3 - 3x + 1$ on (a) $[0, 2]$ and (b) $[-3, 2]$



In exercises 25–34, find the absolute extrema of the given function on each indicated interval.

26. $f(x) = x^4 - 8x^2 + 2$ on (a) $[-3, 1]$ and (b) $[-1, 3]$

Justin Daryl Dsouza
www.bestmath.in



In exercises 25–34, find the absolute extrema of the given function on each indicated interval.

27. $f(x) = x^{2/3}$ on (a) $[-4, -2]$ and (b) $[-1, 3]$



In exercises 25–34, find the absolute extrema of the given function on each indicated interval.

28. $f(x) = \sin x + \cos x$ on (a) $[0, 2\pi]$ and (b) $[\pi/2, \pi]$

Justin Daryl Dsouza
www.bestmath.in



In exercises 25–34, find the absolute extrema of the given function on each indicated interval.

29. $f(x) = e^{-x^2}$ on (a) $[0, 2]$ and (b) $[-3, 2]$



In exercises 25–34, find the absolute extrema of the given function on each indicated interval.

30. $f(x) = x^2 e^{-4x}$ on (a) $[-2, 0]$ and (b) $[0, 4]$



In exercises 25–34, find the absolute extrema of the given function on each indicated interval.

31. $f(x) = \frac{3x^2}{x-3}$ on (a) $[-2, 2]$ and (b) $[2, 8]$

Justin Daryl Dsouza
www.bestmath.in



In exercises 25–34, find the absolute extrema of the given function on each indicated interval.

32. $f(x) = \tan^{-1}(x^2)$ on (a) $[0, 1]$ and (b) $[-3, 4]$

Justin Daryl Dsouza
www.bestmath.in



In exercises 25–34, find the absolute extrema of the given function on each indicated interval.

33. $f(x) = \frac{x}{x^2 + 1}$ on (a) $[0, 2]$ and (b) $[-3, 3]$

Justin Daryl Dsouza
www.bestmath.in

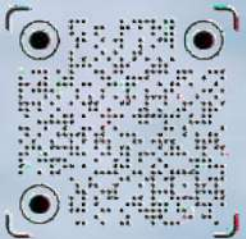


In exercises 25–34, find the absolute extrema of the given function on each indicated interval.

34. $f(x) = \frac{3x}{x^2 + 16}$ on (a) $[0, 2]$ and (b) $[0, 6]$

Justin Daryl Dsouza
www.bestmath.in





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 2

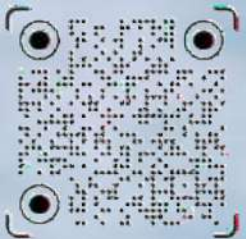


Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 3

Find the local extrema of a given function using the
First Derivative test



JUSTIN DSOUZA

Page 267
Exercise 1 - 10
Lesson 4.4



YouTube

In exercises 1–10, find (by hand) the intervals where the function is increasing and decreasing. Use this information to determine all local extrema and sketch a graph.

1. $y = x^3 - 3x + 2$

Justin Daryl Dsouza
www.bestmath.in



In exercises 1–10, find (by hand) the intervals where the function is increasing and decreasing. Use this information to determine all local extrema and sketch a graph.

2. $y = x^3 + 2x^2 + 1$



In exercises 1–10, find (by hand) the intervals where the function is increasing and decreasing. Use this information to determine all local extrema and sketch a graph.

3. $y = x^4 - 8x^2 + 1$

Justin Daryl Dsouza
www.bestmath.in



In exercises 1–10, find (by hand) the intervals where the function is increasing and decreasing. Use this information to determine all local extrema and sketch a graph.

4. $y = x^3 - 3x^2 - 9x + 1$



In exercises 1–10, find (by hand) the intervals where the function is increasing and decreasing. Use this information to determine all local extrema and sketch a graph.

5. $y = (x + 1)^{2/3}$

Justin Daryl Dsouza
www.bestmath.in



In exercises 1–10, find (by hand) the intervals where the function is increasing and decreasing. Use this information to determine all local extrema and sketch a graph.

6. $y = (x - 1)^{1/3}$



In exercises 1–10, find (by hand) the intervals where the function is increasing and decreasing. Use this information to determine all local extrema and sketch a graph.

7. $y = \sin x + \cos x$



In exercises 1–10, find (by hand) the intervals where the function is increasing and decreasing. Use this information to determine all local extrema and sketch a graph.

8. $y = \sin^2 x$



In exercises 1–10, find (by hand) the intervals where the function is increasing and decreasing. Use this information to determine all local extrema and sketch a graph.

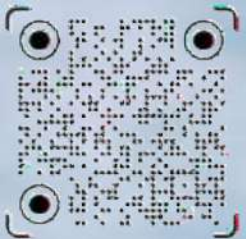
9. $y = e^{x^2-1}$



In exercises 1–10, find (by hand) the intervals where the function is increasing and decreasing. Use this information to determine all local extrema and sketch a graph.

10. $y = \ln(x^2 - 1)$





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 3

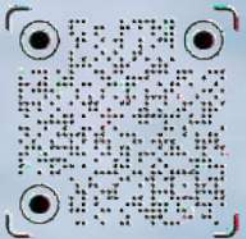


Any Questions/Doubts?
Post them in the Comments!



YouTube

JUSTIN DSOUZA



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 4

Identify increasing and decreasing functions



JUSTIN DSOUZA

Page 267
Exercise 33 - 38
Lesson 4.4



YouTube

In exercises 33–38, find (by hand) all asymptotes and extrema, and sketch a graph.

33. $y = \frac{x}{x^2 - 1}$



In exercises 33–38, find (by hand) all asymptotes and extrema, and sketch a graph.

34. $y = \frac{x^2}{x^2 - 1}$

Justin Daryl Dsouza
www.bestmath.in



In exercises 33–38, find (by hand) all asymptotes and extrema, and sketch a graph.

35. $y = \frac{x^2}{x^2 - 4x + 3}$



In exercises 33–38, find (by hand) all asymptotes and extrema, and sketch a graph.

36. $y = \frac{x}{1 - x^4}$



In exercises 33–38, find (by hand) all asymptotes and extrema, and sketch a graph.

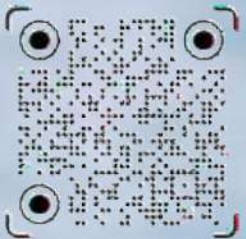
37. $y = \frac{x}{\sqrt{x^2 + 1}}$



In exercises 33–38, find (by hand) all asymptotes and extrema, and sketch a graph.

38. $y = \frac{x^2 + 2}{(x + 1)^2}$





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 4

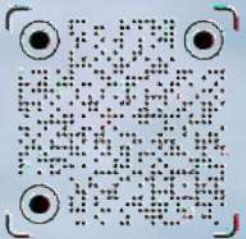


Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 5

Find the local extrema of a given function using the
First Derivative test



JUSTIN DSOUZA

Page 267

Exercise 11 - 20

Lesson 4.4



YouTube

In exercises 11–20, find (by hand) all critical numbers and use the First Derivative Test to classify each as the location of a local maximum, local minimum or neither.

11. $y = x^4 + 4x^3 - 2$

12. $y = x^5 - 5x^2 + 1$



In exercises 11–20, find (by hand) all critical numbers and use the First Derivative Test to classify each as the location of a local maximum, local minimum or neither.

13. $y = xe^{-2x}$

14. $y = x^2e^{-x}$



In exercises 11–20, find (by hand) all critical numbers and use the First Derivative Test to classify each as the location of a local maximum, local minimum or neither.

15. $y = \tan^{-1}(x^2)$

16. $y = \sin^{-1}\left(1 - \frac{1}{x^2}\right)$



In exercises 11–20, find (by hand) all critical numbers and use the First Derivative Test to classify each as the location of a local maximum, local minimum or neither.

17. $y = \frac{x}{1 + x^3}$

18. $y = \frac{x}{1 + x^4}$

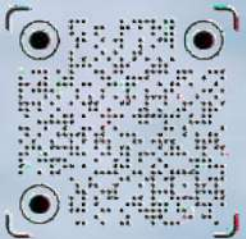


In exercises 11–20, find (by hand) all critical numbers and use the First Derivative Test to classify each as the location of a local maximum, local minimum or neither.

19. $y = \sqrt{x^3 + 3x^2}$

20. $y = x^{4/3} + 4x^{1/3}$





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 5

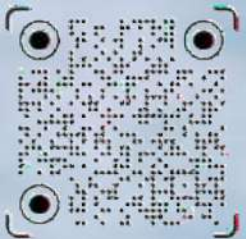


Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 6

Learn the notion of an Inflection Point and find one



JUSTIN DSOUZA

Page 276
Exercise 1 - 8
Lesson 4.5



YouTube

In exercises 1–8, determine the intervals where the graph of the given function is concave up and concave down, and identify inflection points.

1. $f(x) = x^3 - 3x^2 + 4x - 1$

Justin Daryl Dsouza
www.bestmath.in



In exercises 1–8, determine the intervals where the graph of the given function is concave up and concave down, and identify inflection points.

2. $f(x) = x^4 - 6x^2 + 2x + 3$



In exercises 1–8, determine the intervals where the graph of the given function is concave up and concave down, and identify inflection points.

3. $f(x) = x + 1/x$

Justin Daryl Dsouza
www.bestmath.in



In exercises 1–8, determine the intervals where the graph of the given function is concave up and concave down, and identify inflection points.

4. $f(x) = x + 3(1 - x)^{1/3}$



In exercises 1–8, determine the intervals where the graph of the given function is concave up and concave down, and identify inflection points.

5. $f(x) = \sin x - \cos x$

Justin Daryl Dsouza
www.bestmath.in



In exercises 1–8, determine the intervals where the graph of the given function is concave up and concave down, and identify inflection points.

6. $f(x) = \tan^{-1}(x^2)$

Justin Daryl Dsouza
www.bestmath.in



In exercises 1–8, determine the intervals where the graph of the given function is concave up and concave down, and identify inflection points.

7. $f(x) = x^{4/3} + 4x^{1/3}$

Justin Daryl Dsouza
www.bestmath.in

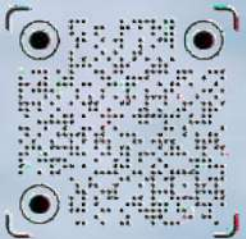


In exercises 1–8, determine the intervals where the graph of the given function is concave up and concave down, and identify inflection points.

8. $f(x) = xe^{-4x}$

Justin Daryl Dsouza
www.bestmath.in





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 6

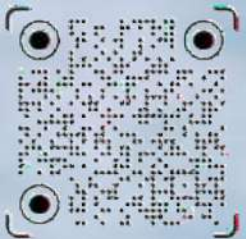


Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 7

Determine the concavity of a function using the first and second derivatives



JUSTIN DSOUZA

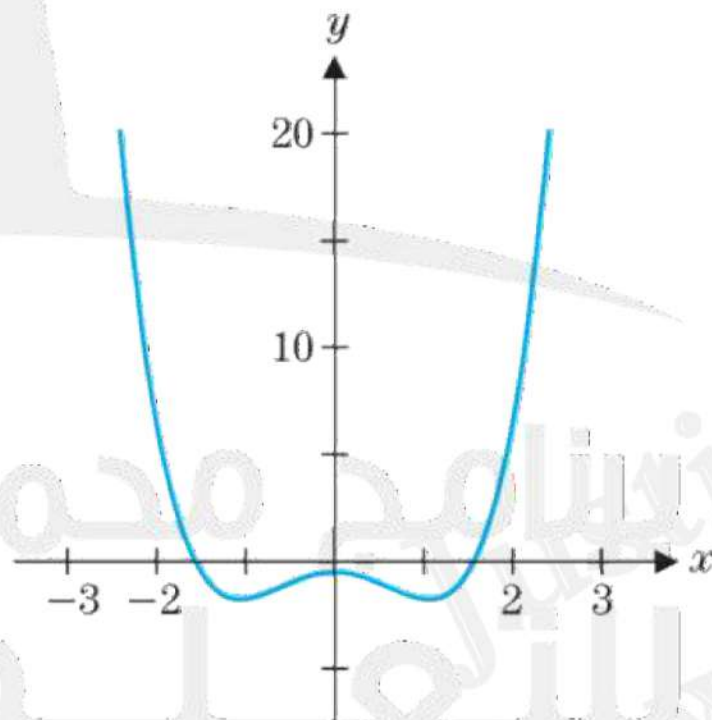
Page 276
Exercise 45, 46
Lesson 4.5



YouTube

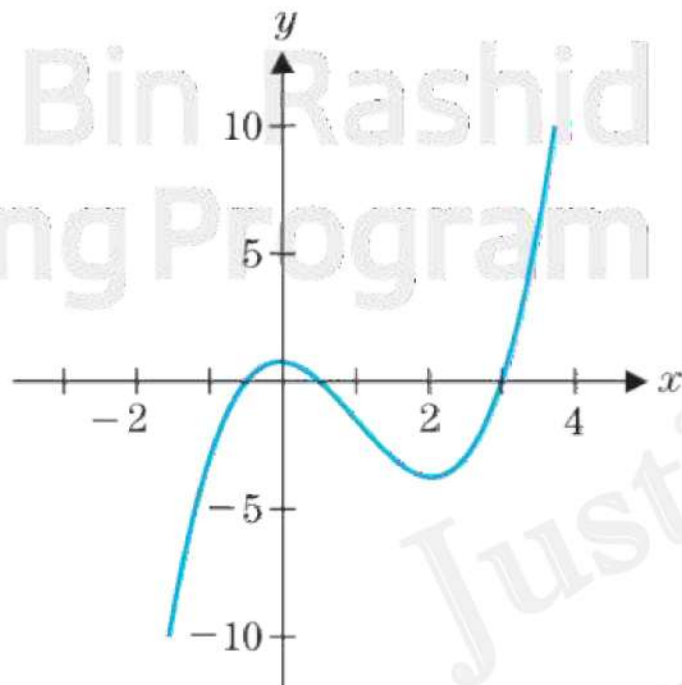
In exercises 45 and 46, estimate the intervals of increase and decrease, the locations of local extrema, intervals of concavity and locations of inflection points.

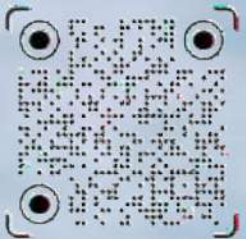
45.



In exercises 45 and 46, estimate the intervals of increase and decrease, the locations of local extrema, intervals of concavity and locations of inflection points.

46.





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 7

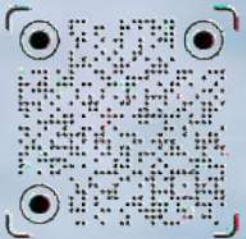


Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 8

Sketch the graph of a given function using its properties and its first and second derivative



JUSTIN DSOUZA

Page 287
Exercise 49, 52
Lesson 4.6



YouTube

In exercises 49–52, find a function whose graph has the given asymptotes.

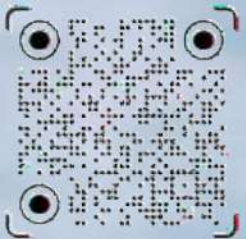
49. $x = 1$, $x = 2$ and $y = 3$

50. $x = -1$, $x = 1$ and $y = 0$

51. $x = -1$, $x = 1$, $y = -2$ and $y = 2$

52. $x = 1$, $y = 2$ and $x = 3$





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 8

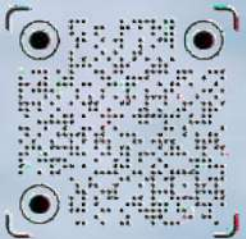


Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 9

Find the antiderivative of a given function



JUSTIN DSOUZA

Page 329
Exercise 5 - 28
Lesson 5.1



YouTube

In exercises 5–28, find the general antiderivative.

5. $\int (3x^4 - 3x) dx$

6. $\int (x^3 - 2) dx$

7. $\int \left(3\sqrt{x} - \frac{1}{x^4} \right) dx$

8. $\int \left(2x^{-2} + \frac{1}{\sqrt{x}} \right) dx$



In exercises 5–28, find the general antiderivative.

9. $\int \frac{x^{1/3} - 3}{x^{2/3}} dx$

10. $\int \frac{x + 2x^{3/4}}{x^{5/4}} dx$

11. $\int (2 \sin x + \cos x) dx$

12. $\int (3 \cos x - \sin x) dx$



In exercises 5–28, find the general antiderivative.

13. $\int 2 \sec x \tan x \, dx$

14. $\int \frac{4}{\sqrt{1-x^2}} \, dx$

15. $\int 5 \sec^2 x \, dx$

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



In exercises 5–28, find the general antiderivative.

17. $\int (3e^x - 2) dx$

18. $\int (4x - 2e^x) dx$

19. $\int (3 \cos x - 1/x) dx$

20. $\int (2x^{-1} + \sin x) dx$



In exercises 5–28, find the general antiderivative.

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

22. $\int \frac{3}{4x^2 + 4} dx$

23. $\int \frac{\cos x}{\sin x} dx$

24. $\int \left(2 \cos x - \sqrt{e^{2x}} \right) dx$



In exercises 5–28, find the general antiderivative.

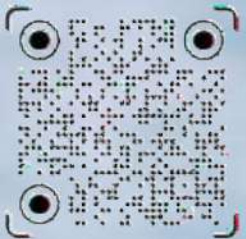
25. $\int \frac{e^x}{e^x + 3} dx$

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

27. $\int x^{1/4}(x^{5/4} - 4) dx$

28. $\int x^{2/3}(x^{-4/3} - 3) dx$





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 9

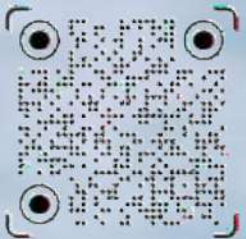


Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 10

Understand the notion of indefinite integral as
finding an antiderivative



JUSTIN DSOUZA

Page 330
Exercise 35 - 48
Lesson 5.1



YouTube

In exercises 35–40, find the function $f(x)$ satisfying the given conditions.

35. $f'(x) = 3e^x + x, f(0) = 4$

36. $f'(x) = 4 \cos x, f(0) = 3$

Justin Daryl Dsouza
www.bestmath.in



In exercises 35–40, find the function $f(x)$ satisfying the given conditions.

37. $f''(x) = 12x^2 + 2e^x, f'(0) = 2, f(0) = 3$

Justin Daryl Dsouza
www.bestmath.in



In exercises 35–40, find the function $f(x)$ satisfying the given conditions.

38. $f''(x) = 20x^3 + 2e^{2x}, f'(0) = -3, f(0) = 2$

Justin Daryl Dsouza
www.bestmath.in



In exercises 35–40, find the function $f(x)$ satisfying the given conditions.

39. $f''(t) = 2 + 2t, f(0) = 2, f(3) = 2$

Justin Daryl Dsouza
www.bestmath.in



In exercises 35–40, find the function $f(x)$ satisfying the given conditions.

40. $f''(t) = 4 + 6t, f(1) = 3, f(-1) = -2$

Justin Daryl Dsouza
www.bestmath.in



In exercises 41–44, find all functions satisfying the given conditions.

41. $f''(x) = 3 \sin x + 4x^2$

42. $f''(x) = \sqrt{x} - 2 \cos x$



In exercises 41–44, find all functions satisfying the given conditions.

43. $f'''(x) = 4 - 2/x^3$

44. $f'''(x) = \sin x - e^x$



45. Determine the position function if the velocity function is $v(t) = 3 - 12t$ and the initial position is $s(0) = 3$.
46. Determine the position function if the velocity function is $v(t) = 3e^{-t} - 2$ and the initial position is $s(0) = 0$.



47. 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 $s(0) = 4$.

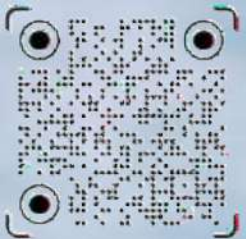
Justin Daryl Dsouza
www.bestmath.in



48. 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 $s(0) = 0$.

Justin Daryl Dsouza
www.bestmath.in





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 10

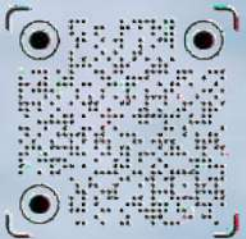


Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 11

Use the sigma notation to compute basic summation



JUSTIN DSOUZA

Page 337
Exercise 9 - 18
Lesson 5.2



YouTube

In exercises 9–18, use summation rules to compute the sum.

9. $\sum_{i=1}^{70} (3i - 1)$

10. $\sum_{i=1}^{45} (3i - 4)$



In exercises 9–18, use summation rules to compute the sum.

11. $\sum_{i=1}^{40} (4 - i^2)$

12. $\sum_{i=1}^{50} (8 - i)$



In exercises 9–18, use summation rules to compute the sum.

$$13. \sum_{n=1}^{100} (n^2 - 3n + 2)$$

$$14. \sum_{n=1}^{140} (n^2 + 2n - 4)$$



In exercises 9–18, use summation rules to compute the sum.

15. $\sum_{i=3}^{30} [(i-3)^2 + i - 3]$

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



In exercises 9–18, use summation rules to compute the sum.

17. $\sum_{k=3}^n (k^2 - 3)$

Justin Daryl Dsouza
www.bestmath.in

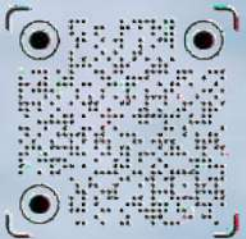


In exercises 9–18, use summation rules to compute the sum.

18. $\sum_{k=0}^n (k^2 + 5)$

Justin Daryl Dsouza
www.bestmath.in





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 11

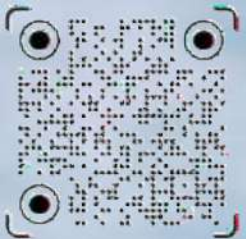


Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 12

Estimate the area under a curve on a given interval
using rectangles



JUSTIN DSOUZA

Page 344
Exercise 5 - 10
Lesson 5.3



YouTube

12	5.3	Estimate the area under a curve on a given interval using rectangles	5 - 10	344
----	-----	--	--------	-----

In exercises 5–10, approximate the area under the curve on the given interval using n rectangles and the evaluation rules (a) left endpoint (b) midpoint (c) right endpoint.

5. $y = x^2 + 1$ on $[0, 1]$, $n = 16$



12	5.3	Estimate the area under a curve on a given interval using rectangles	5 - 10	344
----	-----	---	--------	-----

In exercises 5–10, approximate the area under the curve on the given interval using n rectangles and the evaluation rules (a) left endpoint (b) midpoint (c) right endpoint.

6. $y = x^2 + 1$ on $[0, 2]$, $n = 16$



12	5.3	Estimate the area under a curve on a given interval using rectangles	5 - 10	344
----	-----	---	--------	-----

In exercises 5–10, approximate the area under the curve on the given interval using n rectangles and the evaluation rules (a) left endpoint (b) midpoint (c) right endpoint.

7. $y = \sqrt{x+2}$ on $[1, 4]$, $n = 16$

Justin Daryl Dsouza
www.bestmath.in



12	5.3	Estimate the area under a curve on a given interval using rectangles	5 - 10	344
----	-----	---	--------	-----

In exercises 5–10, approximate the area under the curve on the given interval using n rectangles and the evaluation rules (a) left endpoint (b) midpoint (c) right endpoint.

8. $y = e^{-2x}$ on $[-1, 1]$, $n = 16$

Justin Daryl Dsouza
www.bestmath.in



12	5.3	Estimate the area under a curve on a given interval using rectangles	5 - 10	344
----	-----	--	--------	-----

In exercises 5–10, approximate the area under the curve on the given interval using n rectangles and the evaluation rules (a) left endpoint (b) midpoint (c) right endpoint.

9. $y = \cos x$ on $[0, \pi/2]$, $n = 50$



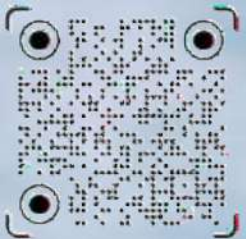
12	5.3	Estimate the area under a curve on a given interval using rectangles	5 - 10	344
----	-----	--	--------	-----

In exercises 5–10, approximate the area under the curve on the given interval using n rectangles and the evaluation rules (a) left endpoint (b) midpoint (c) right endpoint.

10. $y = x^3 - 1$ on $[-1, 1]$, $n = 100$

Justin Daryl Dsouza
www.bestmath.in





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 12

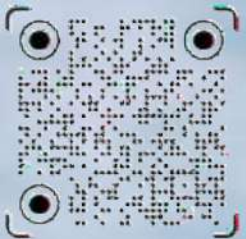


Any Questions/Doubts?
Post them in the Comments!



YouTube

JUSTIN DSOUZA



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 13

Learn the properties of definite integrals



JUSTIN DSOUZA

Page 356
Exercise 23, 24
Lesson 5.4



YouTube

In exercises 23 and 24, compute $\int_0^4 f(x) dx$.

$$23. f(x) = \begin{cases} 2x & \text{if } x < 1 \\ 4 & \text{if } x \geq 1 \end{cases}$$

Justin Daryl Dsouza
www.bestmath.in

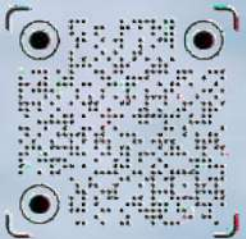


In exercises 23 and 24, compute $\int_0^4 f(x) dx$.

$$24. f(x) = \begin{cases} 2 & \text{if } x \leq 2 \\ 3x & \text{if } x > 2 \end{cases}$$

Justin Daryl Dsouza
www.bestmath.in





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 13

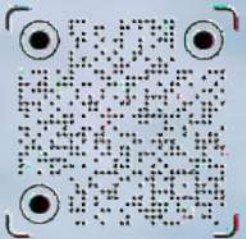


Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 14

Apply the Integral Mean Value Theorem



JUSTIN DSOUZA

Page 367
Exercise 55 - 58
Lesson 5.5



YouTube

In exercises 55–58, find the average value of the function on the given interval.

55. $f(x) = x^2 - 1, [1, 3]$

56. $f(x) = 2x - 2x^2, [0, 1]$

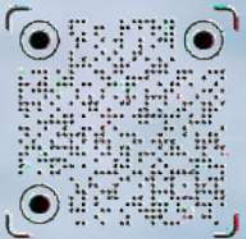


In exercises 55–58, find the average value of the function on the given interval.

57. $f(x) = \cos x, [0, \pi/2]$

58. $f(x) = e^x, [0, 2]$





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 14

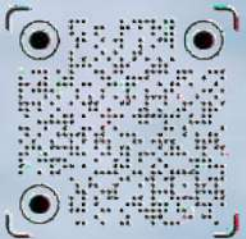


Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 15

Use substitution to compute integrals



JUSTIN DSOUZA

Page 376
Exercise 5 - 16
Lesson 5.6



YouTube

In exercises 5–30, evaluate the indicated integral.

5. $\int x^3 \sqrt{x^4 + 3} \, dx$

6. $\int \sqrt{1 + 10x} \, dx$



In exercises 5–30, evaluate the indicated integral.

7. $\int \frac{\sin x}{\sqrt{\cos x}} dx$

8. $\int \sin^3 x \cos x dx$



In exercises 5–30, evaluate the indicated integral.

9. $\int t^2 \cos t^3 dt$

10. $\int \sin t (\cos t + 3)^{3/4} dt$



In exercises 5–30, evaluate the indicated integral.

11. $\int x e^{x^2+1} dx$

12. $\int e^x \sqrt{e^x + 4} dx$



In exercises 5–30, evaluate the indicated integral.

13. $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$

14. $\int \frac{\cos(1/x)}{x^2} dx$



In exercises 5–30, evaluate the indicated integral.

15. $\int \frac{\sqrt{\ln x}}{x} dx$

16. $\int \sec^2 x \sqrt{\tan x} dx$





TikTok



Instagram

End of Electronic Part



Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

All the Best!



JUSTIN DSOUZA



www.youtube.com/@bestmathuae



YouTube



TikTok



Instagram

G12Adv End of Term 2

Part II: FRQ – Writing (Q16 to Q20)



www.bestmath.in



www.youtube.com/@bestmathuae



YouTube

JUSTIN DSOUZA



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 16

**Solve economical and scientific problems on
extrema**



JUSTIN DSOUZA

Page 307
Example 9.1 & 9.2
Lesson 4.9



YouTube

Example 9.1**Analyzing the Marginal Cost of Producing a Commercial Product**

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 $x = 100$ and compare this to the actual cost of producing the 100th unit.

Solution:



Example 9.2 Minimizing the Average Cost of Producing a Commercial Product

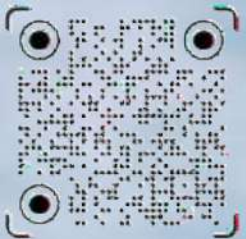
Suppose that $C(x) = 0.02x^2 + 2x + 4000$

is the total cost (in dollars) for a company to produce x units of a certain product.

Find the production level x that minimizes the average cost.

Solution:





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 16

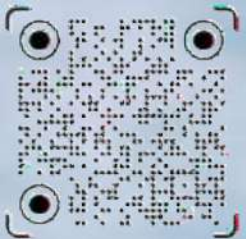


Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 17

**Solve mathematical and real-life problems on
related rates**



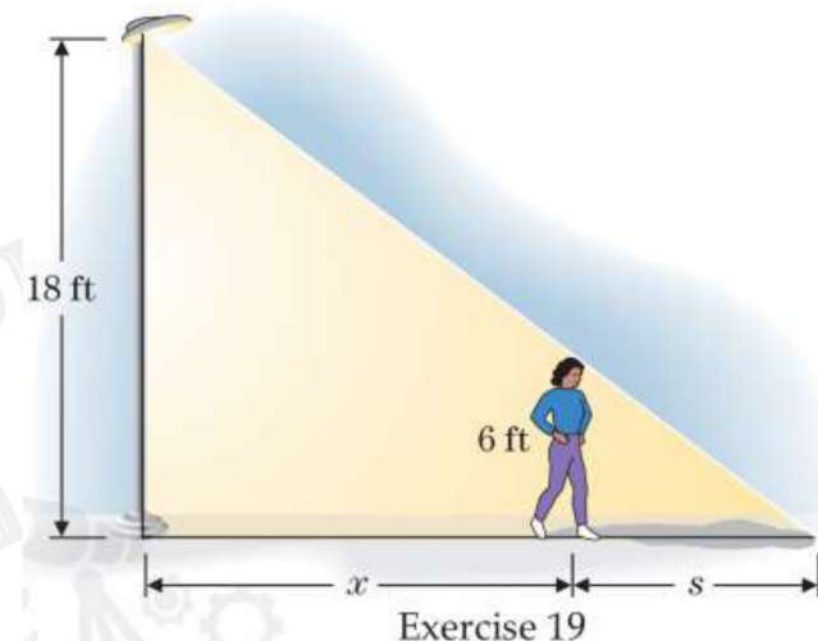
JUSTIN DSOUZA

Page 304
Exercise 19 - 26
Lesson 4.8



YouTube

19. Suppose a 6 ft-tall person is 12 ft away from an 18-ft-tall lamppost (see the figure). (a) If the person is moving away from the lamppost at a rate of 2 ft/sec² at what rate is the length of the shadow changing? (Hint: Show that $\frac{x+s}{18} = \frac{s}{6}$.) (b) Repeat with the person 6 ft away from the lamppost and walking toward the lamppost at a rate of 3 ft/sec.



20. Boyle's law for a gas at constant temperature is $PV = c$, where P is pressure, V is volume and c is a constant. Assume that both P and V are functions of time.
- (a) Show that $P'(t)/V'(t) = -c/V^2$. (b) Solve for P as a function of V . Treating V as an independent variable, compute $P'(V)$. Compare $P'(V)$ and $P'(t)/V'(t)$ from parts (a) and (b).



21. A dock is 6 ft above water. Suppose you stand on the edge of the dock and pull a rope attached to a boat at the constant rate of 2 ft/sec. Assume that the boat remains at water level. At what speed is the boat approaching the dock when it is 20 feet from the dock? 10 feet from the dock? Isn't it surprising that the boat's speed is not constant?



22. Sand is poured into a conical pile with the height of the pile equalling the diameter of the pile. If the sand is poured at a constant rate of $5 \text{ m}^3/\text{s}$, at what rate is the height of the pile increasing when the height is 2 meters?



23. The frequency at which a guitar string vibrates (which determines the pitch of the note we hear) is related to the tension T to which the string is tightened, the density ρ of the string and the effective length L of the string by the equation $f = \frac{1}{2L} \sqrt{\frac{T}{\rho}}$. By running his finger along a string, a guitarist can change L by changing the distance between the bridge and his finger. Suppose that $L = \frac{1}{2}$ ft and $\sqrt{\frac{T}{\rho}} = 220$ ft/s so that the units of f are Hertz (cycles per second). If the guitarist's hand slides so that $L'(t) = -4$, find $f'(t)$. At this rate, how long will it take to raise the pitch one octave (that is, double f)?



24. Suppose that you are blowing up a balloon by adding air at the rate of $1 \text{ ft}^3/\text{s}$. If the balloon maintains a spherical shape, the volume and radius are related by $V = \frac{4}{3}\pi r^3$. Compare the rate at which the radius is changing when $r = 0.01 \text{ ft}$ versus when $r = 0.1 \text{ ft}$. Discuss how this matches the experience of a person blowing up a balloon.

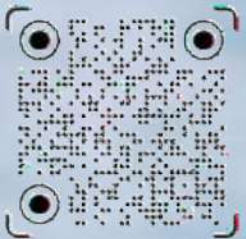


25. Water is being pumped into a spherical tank of radius 60 feet at the constant rate of $10 \text{ ft}^3/\text{sec}$.
- (a) Find the rate at which the radius of the top level of water in the tank changes when the tank is half full.
- (b) Find the height at which the height of the water in the tank changes at the same rate as the radius.



26. Sand is dumped such that the shape of the sandpile remains a cone with height equal to twice the radius. (a) If the sand is dumped at the constant rate of $20 \text{ ft}^3/\text{sec}$, find the rate at which the radius is increasing when the height reaches 6 feet.





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 17

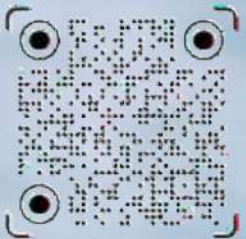


Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 18

Learn the properties of definite integrals



JUSTIN DSOUZA

Page 356
Exercise 37 - 38
Lesson 5.4



YouTube

In exercises 37 and 38, assume that $\int_1^3 f(x) dx = 3$ and $\int_1^3 g(x) dx = -2$ and find

37. (a) $\int_1^3 [f(x) + g(x)] dx$

(b) $\int_1^3 [2f(x) - g(x)] dx$

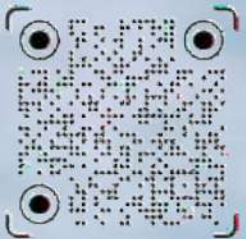


In exercises 37 and 38, assume that $\int_1^3 f(x) dx = 3$ and $\int_1^3 g(x) dx = -2$ and find

38. (a) $\int_1^3 [f(x) - g(x)] dx$

(b) $\int_1^3 [4g(x) - 3f(x)] dx$





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 18

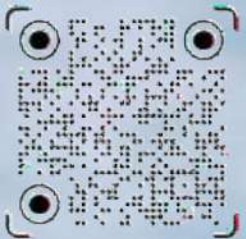


Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 19

Write the equation of a tangent line at a given point to a function defined as a definite integral



JUSTIN DSOUZA

Page 366 - 367
Exercise 39 - 42
Lesson 5.5



YouTube

In exercises 39–42, find an equation of the tangent line at the given value of x .

39. $y = \int_0^x \sin \sqrt{t^2 + \pi^2} dt, x = 0$

Justin Daryl Dsouza
www.bestmath.in



In exercises 39–42, find an equation of the tangent line at the given value of x .

40. $y = \int_{-1}^x \ln(t^2 + 2t + 2) dt, x = -1$

Justin Daryl Dsouza
www.bestmath.in



In exercises 39–42, find an equation of the tangent line at the given value of x .

41. $y = \int_2^x \cos(\pi t^3) dt, x = 2$

Justin Daryl Dsouza
www.bestmath.in

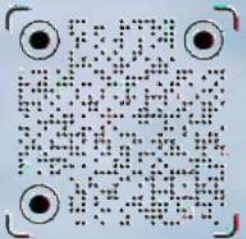


In exercises 39–42, find an equation of the tangent line at the given value of x .

42. $y = \int_0^x e^{-t^2+1} dt, x = 0$

Justin Daryl Dsouza
www.bestmath.in





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Question 19

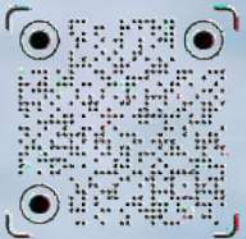


Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok

Grade 12Adv



End of Term 2



Instagram

Question 20

Use substitution to compute integrals



JUSTIN DSOUZA

Page 376
Exercise 5 - 40
Lesson 5.6



YouTube

In exercises 5–30, evaluate the indicated integral.

5. $\int x^3 \sqrt{x^4 + 3} \, dx$

6. $\int \sqrt{1 + 10x} \, dx$



In exercises 5–30, evaluate the indicated integral.

7. $\int \frac{\sin x}{\sqrt{\cos x}} dx$

8. $\int \sin^3 x \cos x dx$



In exercises 5–30, evaluate the indicated integral.

9. $\int t^2 \cos t^3 dt$

10. $\int \sin t (\cos t + 3)^{3/4} dt$



In exercises 5–30, evaluate the indicated integral.

11. $\int x e^{x^2+1} dx$

12. $\int e^x \sqrt{e^x + 4} dx$



In exercises 5–30, evaluate the indicated integral.

13. $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$

14. $\int \frac{\cos(1/x)}{x^2} dx$



In exercises 5–30, evaluate the indicated integral.

15. $\int \frac{\sqrt{\ln x}}{x} dx$

16. $\int \sec^2 x \sqrt{\tan x} dx$



In exercises 5–30, evaluate the indicated integral.

17. $\int \frac{1}{\sqrt{u} (\sqrt{u} + 1)} du$

18. $\int \frac{v}{v^2 + 4} dv$



In exercises 5–30, evaluate the indicated integral.

19. $\int \frac{4}{x(\ln x + 1)^2} dx$

20. $\int \tan 2x dx$



In exercises 5–30, evaluate the indicated integral.

21. $\int \frac{(\sin^{-1} x)^3}{\sqrt{1-x^2}} dx$

22. $\int x^2 \sec^2 x^3 dx$



In exercises 5–30, evaluate the indicated integral.

23. (a) $\int \frac{x}{\sqrt{1-x^4}} dx$

(b) $\int \frac{x^3}{\sqrt{1-x^4}} dx$



In exercises 5–30, evaluate the indicated integral.

24. (a) $\int \frac{x^2}{1+x^6} dx$

(b) $\int \frac{x^5}{1+x^6} dx$



In exercises 5–30, evaluate the indicated integral.

25. (a) $\int \frac{1+x}{1+x^2} dx$

(b) $\int \frac{1+x}{1-x^2} dx$



In exercises 5–30, evaluate the indicated integral.

26. (a) $\int \frac{3\sqrt{x}}{1+x^3} dx$

(b) $\int \frac{x\sqrt{x}}{1+x^5} dx$



In exercises 5–30, evaluate the indicated integral.

27. $\int \frac{2t + 3}{t + 7} dt$

28. $\int \frac{t^2}{\sqrt[3]{t + 3}} dt$



In exercises 5–30, evaluate the indicated integral.

29. $\int \frac{1}{\sqrt{1 + \sqrt{x}}} dx$

30. $\int \frac{1}{x\sqrt{x^4 - 1}} dx$



In exercises 31–40, evaluate the definite integral.

31. $\int_0^2 x \sqrt{x^2 + 1} \, dx$

32. $\int_1^3 x \sin(\pi x^2) \, dx$



In exercises 31–40, evaluate the definite integral.

33. $\int_{-1}^1 \frac{t}{(t^2 + 1)^2} dt$

34. $\int_0^2 t^2 e^{t^3} dt$



In exercises 31–40, evaluate the definite integral.

35. $\int_0^2 \frac{e^x}{1 + e^{2x}} dx$

36. $\int_0^2 \frac{e^x}{1 + e^x} dx$



In exercises 31–40, evaluate the definite integral.

37. $\int_{\pi/4}^{\pi/2} \cot x \, dx$

38. $\int_1^e \frac{\ln x}{x} \, dx$



In exercises 31–40, evaluate the definite integral.

39. $\int_1^4 \frac{x-1}{\sqrt{x}} dx$

40. $\int_0^1 \frac{x}{\sqrt{x^2+1}} dx$





TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

End of Writing Part



Any Questions/Doubts?
Post them in the Comments!

JUSTIN DSOUZA



YouTube



TikTok



BEST MATH
JUSTIN DSOUZA



Instagram

All the Best!



JUSTIN DSOUZA



www.youtube.com/@bestmathuae



YouTube



TikTok



Instagram

Thank you



JUSTIN DSOUZA

Please visit

www.bestmath.in



www.youtube.com/@bestmathuae



YouTube