

Kumpulan Soal Limit Trigonometri (Tingkat SMA)

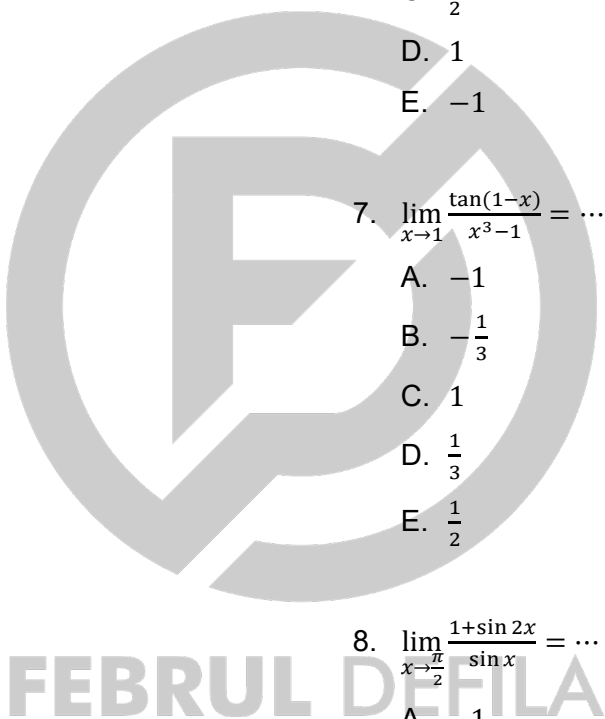
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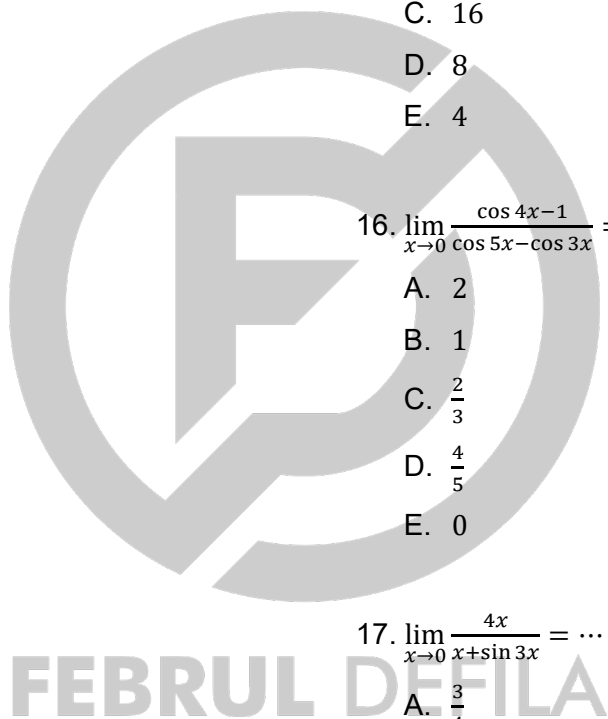
**SMA NEGERI 3 SUMATERA BARAT
2022**

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1. $\lim_{x \rightarrow \frac{\pi}{4}} \sin x = \dots$
 - A. $\sqrt{2}$
 - B. $\sqrt{3}$
 - C. $\sqrt{5}$
 - D. $\frac{1}{2}\sqrt{2}$
 - E. $\frac{1}{2}\sqrt{3}$
2. $\lim_{x \rightarrow \pi} \sin \frac{\pi}{2} = \dots$
 - A. $-\frac{1}{2}$
 - B. 0
 - C. $\frac{1}{2}$
 - D. 1
 - E. ∞
3. $\lim_{x \rightarrow \frac{\pi}{2}} (\sin x + \cos x) = \dots$
 - A. -1
 - B. $-\frac{1}{2}$
 - C. 0
 - D. $\frac{1}{2}$
 - E. 1
4. $\lim_{x \rightarrow \frac{\pi}{4}} (\tan^2 x - \cos^2 x) = \dots$
 - A. $-\frac{1}{2}$
 - B. $\frac{1}{4}$
 - C. $\frac{1}{2}$
 - D. $\frac{1}{2}\sqrt{2}$
 - E. 1
5. $\lim_{x \rightarrow 0} \frac{\cot x}{\cot 2x} = \dots$
 - A. 0
 - B. $\frac{1}{2}$
 - C. $\frac{1}{2}\sqrt{2}$
 - D. 1
 - E. 2
6. $\lim_{x \rightarrow 0} \frac{1 - \cos^2 x - \cos x \sin^2 x}{x^4} = \dots$
 - A. 0
 - B. $\frac{1}{4}$
 - C. $\frac{1}{2}$
 - D. 1
 - E. -1
7. $\lim_{x \rightarrow 1} \frac{\tan(1-x)}{x^3-1} = \dots$
 - A. -1
 - B. $-\frac{1}{3}$
 - C. 1
 - D. $\frac{1}{3}$
 - E. $\frac{1}{2}$
8. $\lim_{x \rightarrow \frac{\pi}{2}} \frac{1 + \sin 2x}{\sin x} = \dots$
 - A. -1
 - B. 1
 - C. $\frac{3}{2}$
 - D. 2
 - E. 3
9. $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\cos 2x}{\cos x - \sin x} = \dots$
 - A. $-\sqrt{2}$
 - B. $-\frac{1}{2}\sqrt{2}$
 - C. $\frac{1}{2}\sqrt{2}$

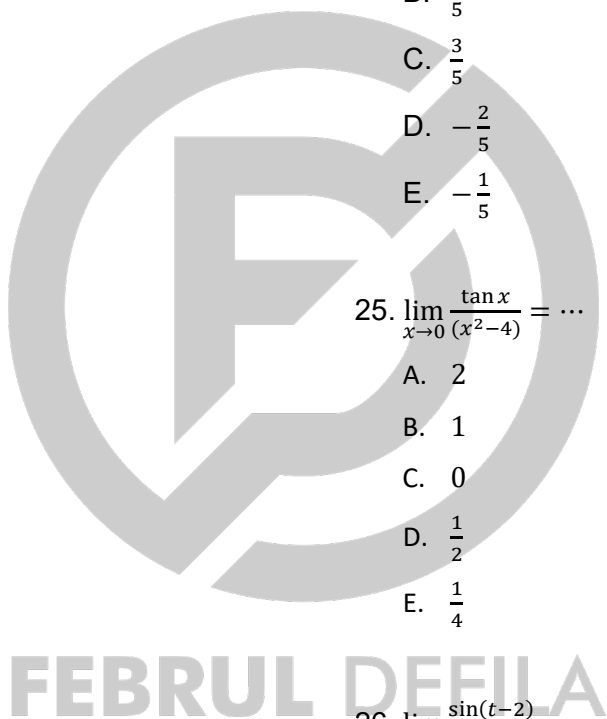


- D. $\sqrt{2}$
 E. $2\sqrt{2}$
10. $\lim_{x \rightarrow 0} \frac{\tan x}{x^2 + 2x} = \dots$
 A. 2
 B. 1
 C. 0
 D. $\frac{1}{2}$
 E. $\frac{1}{4}$
11. $\lim_{x \rightarrow 0} \frac{1 - \cos 2x}{5x^2} = \dots$
 A. 0
 B. $\frac{1}{2}$
 C. $\frac{1}{2}\sqrt{2}$
 D. 1
 E. 2
12. $\lim_{x \rightarrow -3} \frac{x^2 + 6x + 9}{2 - 2 \cos(2x + 6)} = \dots$
 A. 3
 B. 1
 C. $\frac{1}{2}$
 D. $\frac{1}{3}$
 E. $\frac{1}{4}$
13. $\lim_{x \rightarrow 0} \frac{\cos 4x - 1}{x \tan 2x} = \dots$
 A. -4
 B. -2
 C. -1
 D. 2
 E. 4
14. $\lim_{x \rightarrow 0} \frac{\sin 7x - \sin 5x}{8x \cos 6x} = \dots$
- A. $\frac{1}{24}$
 B. $\frac{1}{16}$
 C. $\frac{1}{8}$
 D. $\frac{1}{4}$
 E. $\frac{1}{2}$
15. $\lim_{x \rightarrow 0} \frac{\tan 2x \sin^2 8x}{x^2 \sin 4x} = \dots$
 A. 32
 B. 24
 C. 16
 D. 8
 E. 4
16. $\lim_{x \rightarrow 0} \frac{\cos 4x - 1}{\cos 5x - \cos 3x} = \dots$
 A. 2
 B. 1
 C. $\frac{2}{3}$
 D. $\frac{4}{5}$
 E. 0
17. $\lim_{x \rightarrow 0} \frac{4x}{x + \sin 3x} = \dots$
 A. $\frac{3}{4}$
 B. 1
 C. $\frac{4}{3}$
 D. 3
 E. 4
18. $\lim_{x \rightarrow 1} \frac{(x^3 - 1)^{\frac{1}{2}} \tan(x - 1)}{(x^2 - 1)^{\frac{1}{2}} \sin(x - 1)} = \dots$
 A. 0
 B. 1
 C. $\frac{3}{2}$



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- D. $\frac{1}{2}\sqrt{6}$
 E. 6
19. $\lim_{x \rightarrow 0} \frac{\tan(3x-\pi) \cos 2x}{\sin(3x-\pi)} = \dots$
 A. $-\frac{1}{2}$
 B. $\frac{1}{2}$
 C. $\frac{1}{2}\sqrt{2}$
 D. $\frac{1}{2}\sqrt{3}$
 E. $\frac{3}{2}$
20. $\lim_{x \rightarrow \frac{\pi}{3}} \frac{\cos x - \sin \frac{\pi}{6}}{\frac{\pi-x}{6} - \frac{x}{2}} = \dots$
 A. $\frac{1}{2}\sqrt{3}$
 B. $\frac{1}{3}\sqrt{3}$
 C. $\sqrt{3}$
 D. $-2\sqrt{3}$
 E. $-3\sqrt{3}$
21. $\lim_{x \rightarrow 1} \frac{(x^2-1) \sin 2(x-1)}{-2 \sin^2(x-1)} = \dots$
 A. -2
 B. -1
 C. $-\frac{1}{2}$
 D. $-\frac{1}{4}$
 E. 0
22. $\lim_{x \rightarrow \pi} \frac{x^2 \sin 2x}{x-\pi} = \dots$
 A. $-\pi^2$
 B. -2π
 C. 0
 D. $2\pi^2$
 E. $4\pi^2$
23. $\lim_{x \rightarrow \pi} \frac{\sin(\pi x - \pi)}{(x-1) \cos(\pi x - \pi)} = \dots$
 A. 0
 B. π
 C. 1
 D. $\frac{1}{2}\pi$
 E. 4
24. $\lim_{x \rightarrow 0} \frac{2 \sin x \cos x}{\tan 5x} = \dots$
 A. $\frac{1}{5}$
 B. $\frac{2}{5}$
 C. $\frac{3}{5}$
 D. $-\frac{2}{5}$
 E. $-\frac{1}{5}$
25. $\lim_{x \rightarrow 0} \frac{\tan x}{(x^2-4)} = \dots$
 A. 2
 B. 1
 C. 0
 D. $\frac{1}{2}$
 E. $\frac{1}{4}$
26. $\lim_{t \rightarrow 2} \frac{\sin(t-2)}{t^2-4} = \dots$
 A. $-\frac{1}{4}$
 B. $-\frac{1}{2}$
 C. 0
 D. $\frac{1}{2}$
 E. $\frac{1}{4}$
27. $\lim_{x \rightarrow 5} \frac{(4x-10) \sin(x-5)}{x^2-25} = \dots$
 A. -3
 B. -1



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- C. 1
- D. 2
- E. 4

28. Nilai $\lim_{x \rightarrow 0} \frac{1 - \cos x}{\sin^2 x}$ adalah ...

- A. 0
- B. $\frac{1}{4}$
- C. $\frac{1}{2}$
- D. 1
- E. ∞

29. Nilai dari $\lim_{x \rightarrow 0} \frac{\sin \frac{a}{b} x}{\tan cx}$ adalah ...

- A. $\frac{ac}{b}$
- B. $\frac{qb}{c}$
- C. $\frac{bc}{a}$
- D. $\frac{a}{bc}$
- E. $\frac{b}{ac}$

30. $\lim_{x \rightarrow \frac{\pi}{2}} \frac{1 - \tan 2x}{2 \tan x} = \dots$

- A. 0
- B. 2
- C. $\frac{2}{3}$
- D. $\frac{3}{2}$
- E. ∞

31. $\lim_{x \rightarrow 1} \frac{x-1}{3x-3+\tan(x-1)} = \dots$

- A. 1
- B. $\frac{1}{2}$
- C. $\frac{1}{3}$
- D. $\frac{1}{4}$
- E. 0

32. $\lim_{x \rightarrow 0} \frac{\tan^2 3x}{1 - \cos 2x} = \dots$

- A. $\frac{9}{2}$
- B. $\frac{5}{2}$
- C. $\frac{1}{2}\sqrt{2}$
- D. $-\frac{5}{2}$
- E. $-\frac{9}{2}$

33. $\lim_{x \rightarrow 0} \frac{\sin x + \sin 3x}{x \cos x} = \dots$

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

34. $\lim_{x \rightarrow 0} \frac{\tan x - \sin x}{x^3} = \dots$

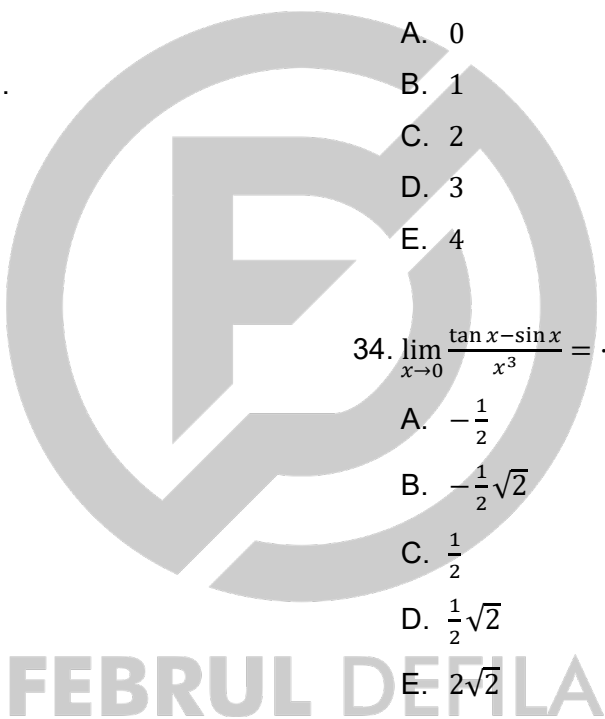
- A. $-\frac{1}{2}$
- B. $-\frac{1}{2}\sqrt{2}$
- C. $\frac{1}{2}$
- D. $\frac{1}{2}\sqrt{2}$
- E. $2\sqrt{2}$

35. $\lim_{x \rightarrow 0} \frac{x \sin 2x}{1 - \cos x} = \dots$

- A. -4
- B. -2
- C. 0
- D. 2
- E. 4

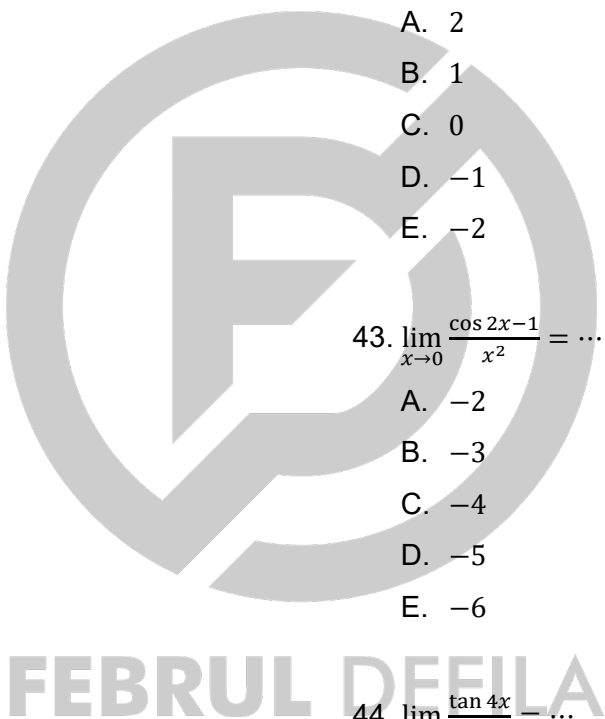
36. $\lim_{x \rightarrow 0} \frac{(x^2-1) \sin 6x}{2x+3x^2+x^3} = \dots$

- A. 5



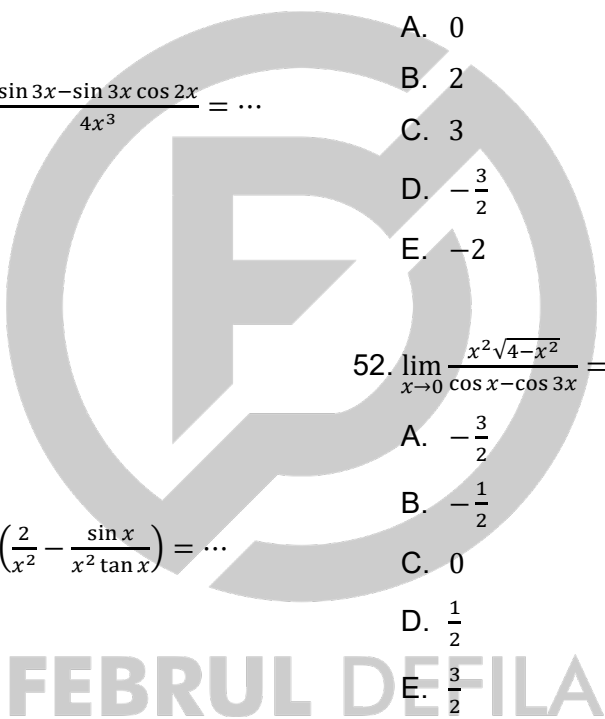
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- B. 3
C. 2
D. -2
E. -3
37. Misalkan diketahui $a - b = \cos x$ dan $\sqrt{2ab} = \sin x$. Nilai $\lim_{x \rightarrow 0} (a^2 + b^2) = \dots$
A. -2
B. -1
C. 0
D. 1
E. 2
38. $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\tan x \sin 4x}{(x - \frac{\pi}{4}) \cos x} = \dots$
A. $-4\sqrt{2}$
B. $-2\sqrt{2}$
C. $\sqrt{2}$
D. $2\sqrt{2}$
E. $4\sqrt{2}$
39. $\lim_{x \rightarrow 0} \frac{\sin x}{\sin 2x} = \dots$
A. $\frac{1}{2}$
B. $\frac{1}{3}$
C. $\frac{1}{4}$
D. $\frac{1}{5}$
E. $\frac{1}{6}$
40. $\lim_{x \rightarrow 0} \frac{\tan^2 5x}{x^2} = \dots$
A. 10
B. 15
C. 17
D. 20
- E. 25
41. $\lim_{x \rightarrow 0} \frac{x^2 + \sin x \tan x}{1 - \cos 2x} = \dots$
A. 0
B. $\frac{1}{2}$
C. 1
D. 2
E. 4
42. $\lim_{x \rightarrow 0} \frac{\sin x}{\sqrt{1-x}-1} = \dots$
A. 2
B. 1
C. 0
D. -1
E. -2
43. $\lim_{x \rightarrow 0} \frac{\cos 2x - 1}{x^2} = \dots$
A. -2
B. -3
C. -4
D. -5
E. -6
44. $\lim_{x \rightarrow 0} \frac{\tan 4x}{\sin 3x} = \dots$
A. 2
B. 3
C. 4
D. $\frac{3}{4}$
E. $\frac{4}{3}$
45. $\lim_{x \rightarrow 0} \frac{1 - \cos x}{\tan^2 2x} = \dots$
A. $\frac{1}{8}$
B. $\frac{1}{4}$



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- C. $\frac{1}{2}$
 D. 1
 E. 2
46. $\lim_{x \rightarrow 0} \frac{x\sqrt{1-x} \tan 2x}{\cos^2\left(\frac{\pi}{2}-x\right)} = \dots$
 A. 2
 B. $\frac{1}{2}$
 C. 0
 D. $-\frac{1}{2}$
 E. -2
47. Jika $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$, maka $\lim_{x \rightarrow 0} \frac{\sin 3x - \sin 3x \cos 2x}{4x^3} = \dots$
 A. $\frac{1}{2}$
 B. $\frac{2}{3}$
 C. $\frac{3}{4}$
 D. $\frac{3}{2}$
 E. 3
48. Jika $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$, maka $\lim_{x \rightarrow 0} \left(\frac{2}{x^2} - \frac{\sin x}{x^2 \tan x} \right) = \dots$
 A. -2
 B. -1
 C. 0
 D. 1
 E. 2
49. $\lim_{x \rightarrow 0} \frac{\sin 8x + \sin 2x}{4x \cos 3x} = \dots$
 A. 1
 B. $1\frac{1}{4}$
 C. $2\frac{1}{2}$
 D. $3\frac{3}{4}$
 E. 5
50. $\lim_{x \rightarrow 0} \frac{x \sin 3x}{1 - \cos 4x} = \dots$
 A. $\frac{3}{8}$
 B. $\frac{2}{4}$
 C. $\frac{3}{2}$
 D. $-\frac{1}{4}$
 E. $-\frac{3}{8}$
51. $\lim_{x \rightarrow 0} \frac{\cos 3x - \cos x}{1 - \cos 2x} = \dots$
 A. 0
 B. 2
 C. 3
 D. $-\frac{3}{2}$
 E. -2
52. $\lim_{x \rightarrow 0} \frac{x^2 \sqrt{4-x^2}}{\cos x - \cos 3x} = \dots$
 A. $-\frac{3}{2}$
 B. $-\frac{1}{2}$
 C. 0
 D. $\frac{1}{2}$
 E. $\frac{3}{2}$
53. $\lim_{x \rightarrow 3} \frac{\sin(x-3)}{2x-6} = \dots$
 A. $\frac{1}{2}$
 B. $\frac{2}{3}$
 C. $\frac{3}{4}$
 D. $\frac{4}{5}$
 E. $\frac{5}{6}$



54. $\lim_{x \rightarrow 3} \frac{(x^2 - 7x + 12) \sin(x-3)}{(x^2 - x - 6)^2} = \dots$

- A. $-\frac{3}{4}$
- B. $-\frac{5}{9}$
- C. $-\frac{7}{13}$
- D. $-\frac{2}{19}$
- E. $-\frac{1}{25}$

- C. 2
- D. 3
- E. ∞

55. $\lim_{x \rightarrow 1} \frac{(3x+1) \sin(x-1)}{x^2 + 2x - 3} = \dots$

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

59. $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\cos x - \sin x}{\cos 2x} = \dots$

- A. $\sqrt{2}$
- B. $\sqrt{3}$
- C. $\sqrt{5}$
- D. $\frac{1}{2}\sqrt{2}$
- E. $\frac{1}{2}\sqrt{3}$

56. $\lim_{x \rightarrow \frac{\pi}{4}} \frac{1 - \cos 2x}{2 \cos x} = \dots$

- A. 0
- B. 1
- C. 2
- D. 3
- E. ∞

60. $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\sec x + 1}{\tan x} = \dots$

- A. 0
- B. 1
- C. 2
- D. 3
- E. ∞

57. $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\sin 2x}{\cos x} = \dots$

- A. 0
- B. 1
- C. 2
- D. 3
- E. ∞

61. $\lim_{x \rightarrow \frac{\pi}{2}} \frac{4(x-\pi) \cos^2 x}{\pi(\pi-2x) \tan(x-\frac{\pi}{2})} = \dots$

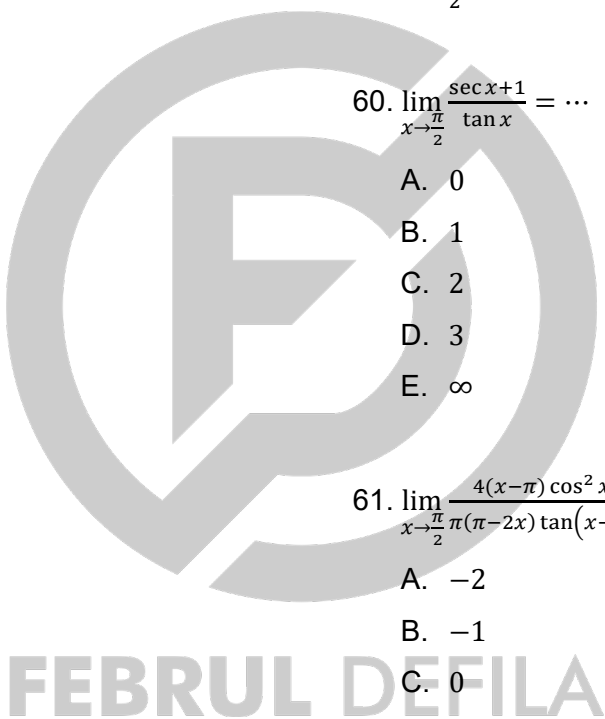
- A. -2
- B. -1
- C. 0
- D. 1
- E. 2

58. $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\cos x}{\frac{\pi}{2} - x} = \dots$

- A. 0
- B. 1

62. $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\cos(\pi-x)}{(2x-\pi) \tan(\frac{\pi}{2}-x)} = \dots$

- A. -1
- B. 1
- C. $-\frac{1}{2}$
- D. $\frac{1}{2}$
- E. 0



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63. $\lim_{x \rightarrow 0} \frac{\sin 6x}{2x} = \dots$

- A. 2
- B. 3
- C. 6
- D. $\frac{1}{2}$
- E. $\frac{1}{6}$

- C. 2
- D. -1
- E. -2

64. $\lim_{x \rightarrow 1} \frac{\tan(3x-3)}{\sin(5x-5)} = \dots$

- A. $\frac{3}{5}$
- B. $\frac{3}{7}$
- C. $\frac{3}{8}$
- D. $\frac{1}{2}$
- E. $\frac{3}{4}$

68. $\lim_{x \rightarrow -\frac{\pi}{3}} \frac{(x+\frac{\pi}{3})}{\tan(x+\frac{\pi}{3})} = \dots$

- A. 0
- B. 1
- C. 2
- D. 3
- E. ∞

65. $\lim_{x \rightarrow \frac{\pi}{2}} \frac{1-\sin x}{x-\frac{\pi}{2}} = \dots$

- A. 0
- B. 1
- C. 2
- D. 3
- E. ∞

69. Diketahui bahwa $a = \lim_{x \rightarrow 0} \frac{\sqrt{1+x+x^2}-1}{x}$, maka nilai

dari $\lim_{x \rightarrow (a-\frac{1}{2})} \frac{\sin 2x + \cos x \sin 2x}{\tan x + 3 \frac{\sin x}{\cos^2 x}} = \dots$

- A. 0
- B. 1
- C. 2
- D. $\frac{1}{2}$
- E. $-\frac{1}{2}$

66. $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\cos 2x}{x-\frac{\pi}{4}} = \dots$

- A. -1
- B. -2
- C. -3
- D. -4
- E. $-\infty$

70. $\lim_{x \rightarrow 1} \frac{\sin(1-\frac{1}{x}) \cos(1-\frac{1}{x})}{(x-1)} = \dots$

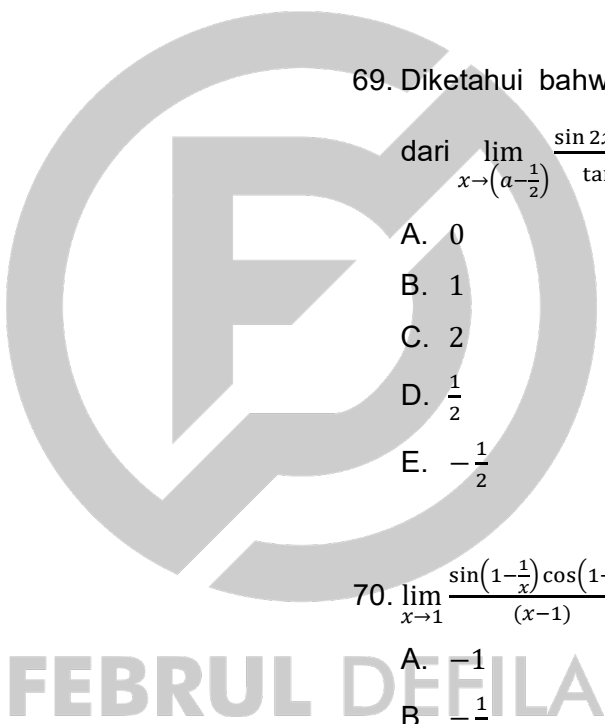
- A. -1
- B. $-\frac{1}{2}$
- C. 0
- D. $\frac{1}{2}$
- E. 1

67. $\lim_{x \rightarrow \pi} \frac{1+\cos x}{\sin 2x} = \dots$

- A. 0
- B. 1

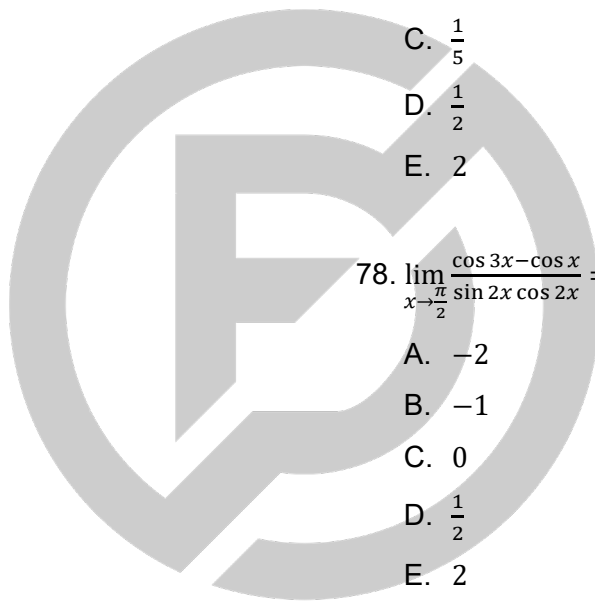
71. $\lim_{x \rightarrow -3} \frac{1-\cos(x+3)}{x^2+6x+9} = \dots$

- A. 2
- B. -2
- C. $\frac{1}{2}$
- D. $-\frac{1}{2}$



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- E. $\frac{1}{3}$
72. $\lim_{x \rightarrow 0} \frac{\sin 4x \tan^2 3x + 6x^3}{2x^2 \sin 3x \cos 2x} = \dots$
- A. 0
B. 3
C. 4
D. 5
E. 7
73. $\lim_{x \rightarrow k} \frac{x-k}{\sin(x-k)+2k-2x} = \dots$
- A. -1
B. 0
C. $\frac{1}{2}$
D. $\frac{1}{3}$
E. 1
74. $\lim_{x \rightarrow 1} \frac{\tan(x-1) \sin(1-\sqrt{x})}{x^2-2x+1} = \dots$
- A. -1
B. $-\frac{1}{2}$
C. 0
D. $\frac{1}{2}$
E. 1
75. $\lim_{x \rightarrow 0} \frac{\sqrt{1+\sin x} - \sqrt{1-\sin x}}{x} = \dots$
- A. 2
B. 1
C. $\frac{1}{2}$
D. $-\frac{1}{2}$
E. -2
76. $\lim_{x \rightarrow 9} \frac{x-9}{\sin(x-2\sqrt{x}-3)} = \dots$
- A. $\frac{3}{2}$
B. $\frac{5}{2}$
C. $\frac{7}{2}$
D. 4
E. $\frac{9}{2}$
77. $\lim_{x \rightarrow a} \frac{1-\sqrt{1-\sin^2(x-a)}}{(x-a) \tan 5(x-a)} = \dots$
- A. $\frac{1}{20}$
B. $\frac{1}{10}$
C. $\frac{1}{5}$
D. $\frac{1}{2}$
E. 2
78. $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\cos 3x - \cos x}{\sin 2x \cos 2x} = \dots$
- A. -2
B. -1
C. 0
D. $\frac{1}{2}$
E. 2
79. $\lim_{x \rightarrow \frac{\pi}{2}} \frac{1-\sin 4x}{\cos^2 4x} = \dots$
- A. $\frac{1}{2}$
B. 0
C. $\frac{1}{6}$
D. $\frac{1}{4}$
E. $\frac{1}{2}$
80. $\lim_{x \rightarrow 0} \frac{\sqrt{1+\tan x} - \sqrt{1+\sin x}}{x^3} = \dots$
- A. -1
B. $-\frac{1}{4}$



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- C. 0
- D. $\frac{1}{4}$
- E. 1

81. $\lim_{x \rightarrow 0} \frac{1 - \cos^3 x}{x \tan x} = \dots$

- A. 0
- B. $\frac{1}{2}$
- C. $\frac{3}{4}$
- D. $\frac{3}{2}$
- E. 3

82. Jika $\lim_{x \rightarrow 2} \frac{g(x)}{\tan(x^2 - 4)} = \frac{4}{3}$, maka nilai dari

$\lim_{x \rightarrow 0} \frac{x^2 - x^2 \cos(x^2 + 6x - 16)}{g(x) \sin(x^2 + x - 6)} = \dots$

- A. 3
- B. 6
- C. 12
- D. 15
- E. 24

83. $\lim_{x \rightarrow 0} \frac{x \tan x}{x \sin x - \cos x + 1} = \dots$

- A. 2
- B. $\frac{3}{2}$
- C. 1
- D. $\frac{2}{3}$
- E. -1

84. $\lim_{x \rightarrow \frac{\pi}{4}} \sin\left(\frac{\pi}{4} - x\right) \tan\left(x + \frac{\pi}{4}\right) = \dots$

- A. 2
- B. 1
- C. 0
- D. -1
- E. -2

85. $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\left(x - \frac{\pi}{4}\right) \sin\left(3x - \frac{3\pi}{4}\right)}{2(1 - \sin 2x)} = \dots$

- A. $\frac{3}{2}$
- B. $\frac{1}{4}$
- C. 0
- D. $-\frac{3}{4}$
- E. $-\frac{3}{2}$

86. $\lim_{x \rightarrow 0} \frac{1 - \cos^2 x}{x^2 \cot\left(x - \frac{\pi}{3}\right)} = \dots$

- A. 1
- B. 0
- C. $-\frac{\sqrt{3}}{3}$
- D. $-\sqrt{2}$
- E. $-\sqrt{3}$

87. $\lim_{x \rightarrow \infty} 5 \tan \frac{1}{x} = \dots$

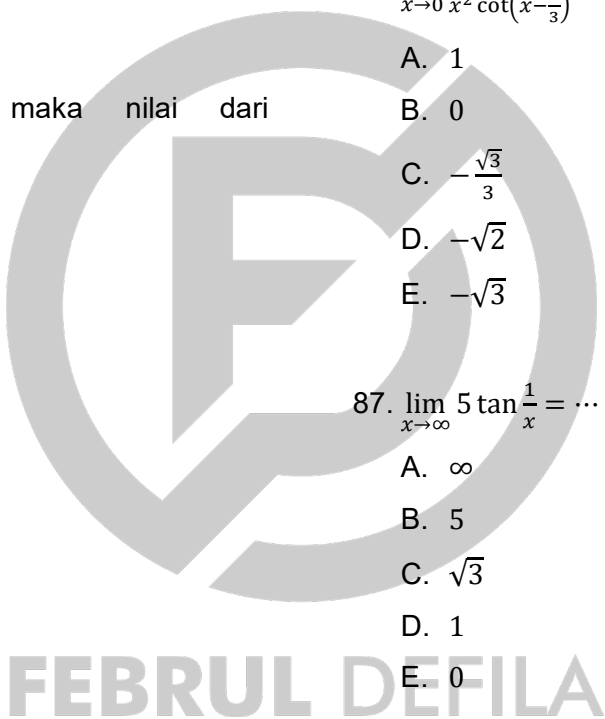
- A. ∞
- B. 5
- C. $\sqrt{3}$
- D. 1
- E. 0

88. $\lim_{x \rightarrow \infty} 4 \sin\left(\frac{1}{x} + \frac{\pi}{3}\right) = \dots$

- A. $2\sqrt{3}$
- B. 2
- C. $\sqrt{3}$
- D. 1
- E. 0

89. $\lim_{x \rightarrow \infty} \cos\left(\frac{1}{x} - \frac{5\pi}{4}\right) - \frac{1}{2} = \dots$

- A. $\frac{1}{2}(\sqrt{2} + 1)$



- B. $\frac{1}{2}(\sqrt{2} - 1)$
- C. $\frac{1}{2}(1 - \sqrt{2})$
- D. $-\frac{1}{2}(\sqrt{2} - 1)$
- E. $-\frac{1}{2}(\sqrt{2} + 1)$

- A. 128
- B. 256
- C. 324
- D. 512
- E. 1.024

90. $\lim_{x \rightarrow \infty} 6 \sin\left(\frac{1}{x} - \frac{11}{6}\pi\right) = \dots$

- A. -6
- B. -3
- C. 0
- D. 3
- E. 6

95. $\lim_{x \rightarrow \infty} t^{-\frac{1}{2}} \sin t = \dots$

- A. $-\infty$
- B. -1
- C. 0
- D. 1
- E. ∞

91. $\lim_{x \rightarrow \infty} 6x \sin\left(\frac{4}{3x}\right) = \dots$

- A. 1
- B. 2
- C. 4
- D. 8
- E. ∞

92. $\lim_{x \rightarrow \infty} x^2 \sin^2\left(\frac{ab}{x}\right) = \dots$

- A. ab
- B. a^2b
- C. ab^2
- D. $(ab)^2$
- E. $\frac{1}{(ab)^2}$

93. $\lim_{x \rightarrow \infty} x^2 \left(1 - \cos\left(\frac{2}{x}\right)\right) = \dots$

- A. 1
- B. 2
- C. 4
- D. 6
- E. 8

94. $\lim_{x \rightarrow \infty} 16x^2 \left(1 - \cos\left(\frac{8}{x}\right)\right) = \dots$



II. Bagian Uraian

1. Tentukan nilai limit berikut.

a. $\lim_{x \rightarrow 4} \frac{\sin(4-2\sqrt{x})}{4-x}$

b. $\lim_{x \rightarrow 1} \frac{1-\cos^2(x-1)}{4(x^2-2x+1)}$

c. $\lim_{x \rightarrow 0} \frac{\tan x - \sin x}{\frac{1}{2}x^3}$

d. $\lim_{x \rightarrow 0} \frac{1-\cos 10x}{x \sin 2x}$

e. $\lim_{x \rightarrow 0} \frac{1-\cos 4x}{x \tan 3x}$

f. $\lim_{x \rightarrow 0} \frac{\sin 5x + \tan 2x}{x}$

g. $\lim_{x \rightarrow 0} \frac{\tan x - \sin x}{x^2 \sin x}$

h. $\lim_{x \rightarrow 0} \frac{x + \sin 3x}{x - \sin 3x}$

i. $\lim_{x \rightarrow 0} \frac{\sqrt{\tan 9x \sin 4x}}{x}$

j. $\lim_{x \rightarrow 1} \frac{x^3 - 3x^2 + 2x}{(x^2 - 4) \tan(x-1)}$

k. $\lim_{x \rightarrow 0} \left(\frac{1}{x \tan x} - \frac{\cos^2 x}{x \sin x} \right)$

l. $\lim_{x \rightarrow 0} \frac{(5x-6-x^2) \sin(x-2)}{(3x^2-7x+2) \tan(x-2)}$

m. $\lim_{x \rightarrow 0} \frac{\cos 5x - \cos 9x}{1 - \sqrt{\cos x}} = \dots$

2. Hitunglah nilai limit berikut.

a. $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin x - \sin \frac{\pi}{4}}{x - \frac{\pi}{4}}$

b. $\lim_{x \rightarrow \pi} \frac{1 + \cos x}{\sin 2x}$

c. $\lim_{x \rightarrow \frac{\pi}{3}} \frac{\sin^2 x - \sin \frac{\pi}{2}}{x - \frac{\pi}{3}}$

d. $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\cos 2x - \cos \frac{\pi}{2}}{x - \frac{\pi}{4}}$

3. Tentukan nilai dari setiap limit berikut.

a. $\lim_{x \rightarrow \infty} 2x^2 \left(1 - \cos \left(\frac{6}{x} \right) \right)$

b. $\lim_{x \rightarrow \infty} \left(\frac{x^2 \sin \frac{1}{x} - x}{1 - |x|} \right)$



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4. Buktikan $\lim_{x \rightarrow 0} \frac{\cos 5x - \cos 9x}{1 - \sqrt{\cos x}} = 112$

5. Buktikan $\lim_{x \rightarrow y} \frac{\tan x - \tan y}{\left(1 - \frac{x}{y}\right)(1 + \tan x \tan y)} = -y$

6. Diketahui $f(x) = \frac{\sin 2x}{x^3}$ dan $g(x) = \frac{\tan 2x}{x^3}$. Hitunglah nilai $\lim_{x \rightarrow 0} (f(x) - g(x))^2$.

7. Misalkan $a = \lim_{x \rightarrow \frac{\pi}{4}} \sqrt{\frac{1 - \tan^2 x}{1 - \tan^4 x}}$ dan $b = \lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin(\pi - 4x) \sin x}{\left(x - \frac{\pi}{4}\right) \cos^2 x}$. Tentukan nilai $a + \frac{1}{8}b$.



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