

# សំណួរពហុជ្រើសរើសសម្រាប់ប្រឡងធម្មាសទី២

## មុខវិជ្ជា Mathematics for Engineering II

I. ចូរកតម្លើយនៃដេរីវេរបស់អនុគមន៍ខាងក្រោម៖

1)  $f(x) = 2 \cos(x) - 6 \sec(x) + 3$

A)  $f'(x) = -2 \sin(x) - 6 \sec(x) \tan(x)$

B)  $f'(x) = -2 \sin(x) - 6 \csc(x)$

C)  $f'(x) = -2 \sin(x) - 6 \tan(x)$

D) មិនមាន

2)  $g(z) = 10 \tan(z) - 2 \cot(z)$

A)  $g'(z) = 10 \csc^2(z) + 2 \sec^2(z)$

B)  $g'(z) = 10 \cot(z) - 2 \tan(z)$

C)  $g'(z) = 10 \sec^2(z) + 2 \csc^2(z)$

D) មិនមាន

3)  $f(w) = \tan(w) \sec(w)$

A)  $f'(w) = \sec^2(w) + \sec^2(w) \tan(w)$

B)  $f'(w) = \sec^3(w) + \sec(w) \tan^2(w)$

C)  $f'(w) = \csc^3(w) + \csc(w) \tan^2(w)$

D) មិនមាន

4)  $h(t) = t^3 - t^2 \sin(t)$

A)  $h'(t) = 3t^2 - 2t \cos(t) - t^2 \cos(t)$

B)  $h'(t) = 3t^2 - 2t \cos(t) - t \cos(t)$

C)  $h'(t) = 3t^2 - 2t \sin(t) - t^2 \cos(t)$

D) មិនមាន

5)  $y = 6 + 4\sqrt{x} \csc(x)$

A)  $y' = 2x^{-\frac{1}{2}} \csc(x) - 4\sqrt{x} \csc(x) \cot(x)$

B)  $y' = \frac{1}{2}x^{-\frac{1}{2}} \csc(x) - 4\sqrt{x} \csc(x) \tan(x)$

C)  $y' = 6 + 4\sqrt{x} \csc(x) \cot(x)$

D) មិនមាន

6)  $Z(v) = \frac{v + \tan(v)}{1 + \csc(v)}$

A)  $Z'(v) = \frac{1 + \cot(v)}{(1 + \csc(v))^2}$

B) មិនមាន

C)  $Z'(v) = \frac{(1 + \sec^2(v))(1 + \csc(v)) + (v + \tan(v))}{(1 + \csc(v))^2}$

D)  $Z'(v) = \frac{(1 + \sec^2(v))(1 + \csc(v)) + \csc(v) \cot(v)(v + \tan(v))}{(1 + \csc(v))^2}$

II. ចូរកតម្លើយនៃដេរីវេរបស់អនុគមន៍ implicit ខាងក្រោម៖

7)  $7y^2 + \sin(3x) = 12 - y^4$

A)  $y' = \frac{-3 \cos(3x)}{14y + 4y^3}$

B)  $y' = \frac{-\cos(3x)}{12 - y^2}$

C)  $y' = \frac{-3 \cos(3x)}{y + y^3}$

D) មិនមានទេ

8)  $\tan(x^2y^4) = 3x + y^2$

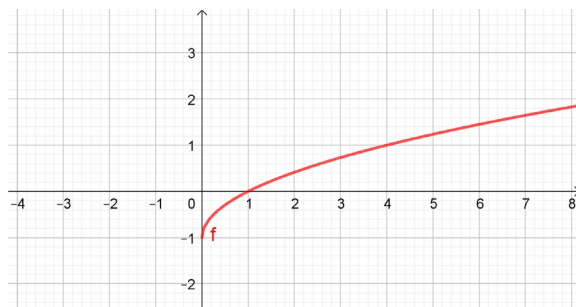
A)  $y' = \frac{3 - 2xy^4 \sec^2(x^2y^4)}{4x^2y^3 \sec^2(x^2y^4) - 2y}$

B)  $y' = \frac{-2xy^4 \sec^2(x^2y^4)}{4x^2y^3 \sec^2(x^2y^4) - 2y}$

C)  $y' = \frac{3 - 2xy^4 \sec^2(x^2y^4)}{-2y}$

D) មិនមានទេ

III. Use the graph to determine the function's domain and range.



9)

A) D:  $[0, \infty)$

B) D:  $[-\infty, \infty)$

C) D:  $[0, \infty)$

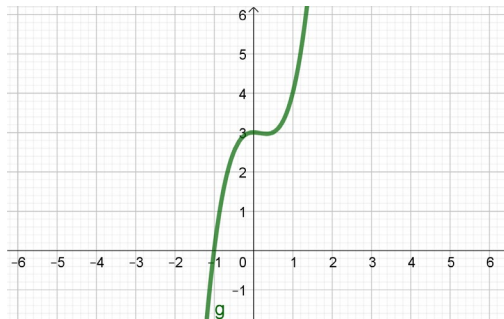
D) D:  $[0, \infty)$

R:  $(-\infty, \infty)$

R:  $(-1, \infty)$

R:  $(-1, \infty)$

R:  $[0, \infty)$



10)

A) D:  $(2, 0)$

B) D:  $(-2, 0)$

C) D:  $(-\infty, \infty)$

D) D:  $(-2, -2)$

R:  $(0, 8)$

R:  $(-\infty, \infty)$

R:  $(-\infty, \infty)$

R:  $(-2, 6)$

11) Give the domain and range of the relation:  $\{(11, -3), (2, -2), (2, 0), (6, 2), (18, 4)\}$

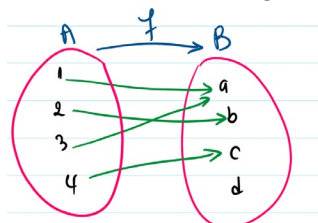
A) domain:  $\{-3, -2, 2, 4\}$ ; range:  $\{11, 6, 2, 18\}$

B) domain:  $\{11, 6, 2, 18\}$ ; range:  $\{-3, -2, 2, 4\}$

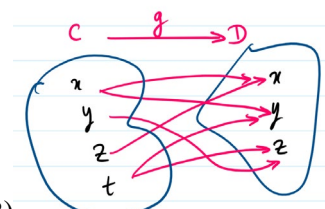
C) domain:  $\{-3, -2, 0, 2, 4\}$ ; range:  $\{11, 6, 2, 18\}$

D) domain:  $\{11, 6, 2, 18\}$ ; range:  $\{-3, -2, 0, 2, 4\}$

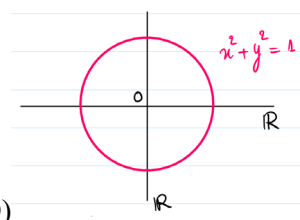
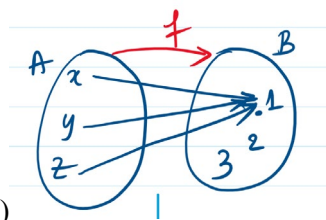
12) Which of the following diagram is a function?



A)



B)



IV. Determine whether the given function is even, odd, or neither

13)  $f(x) = 5x^2 + x^4$

A) Odd

B) Even

C) Neither

14)  $f(x) = -5x^5 + x^3$

A) Even

B) Odd

C) Neither

15)  $f(x) = x^4 - x^3$

A) Odd

B) Neither

C) Even

V. Evaluate the piecewise function at the given value of the independent variable.

16)  $f(x) = \begin{cases} 3x + 1 & \text{if } x < -1 \\ -2x - 5 & \text{if } x \geq -1 \end{cases}; f(2)$

A) -9

B) -8

C) -3

D) 1

17)  $f(x) = \begin{cases} -x - 4 & \text{if } x < 3 \\ x^2 - 7 & \text{if } 3 \leq x \leq 10 \\ \frac{120}{x} + 5 & \text{if } x > 10 \end{cases}; f(4)$

A) -9

B) -8

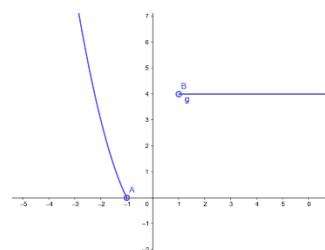
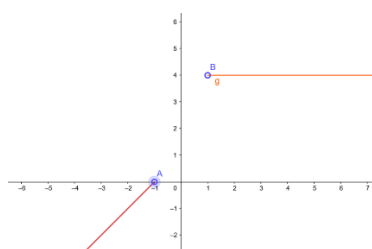
C) -3

D) 1

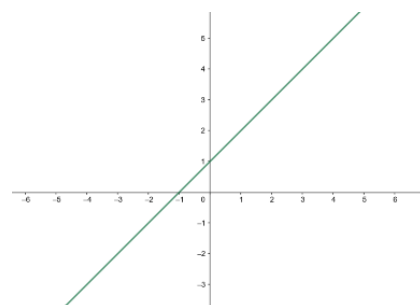
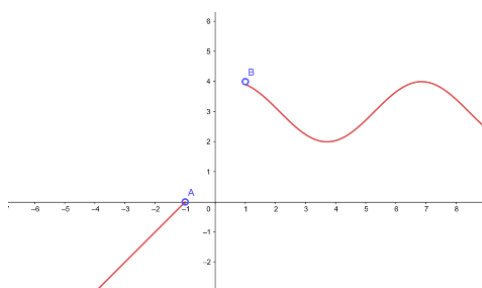
VI. Which one is the graph of the function?

18)  $f(x) = \begin{cases} x + 1 & \text{if } x < -1 \\ 4 & \text{if } x > -1 \end{cases}$

A)

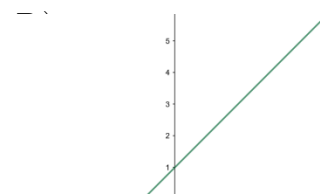
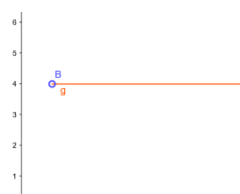


C)

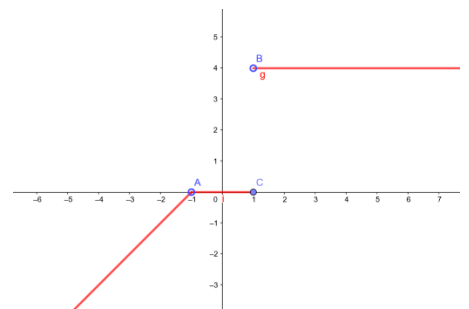
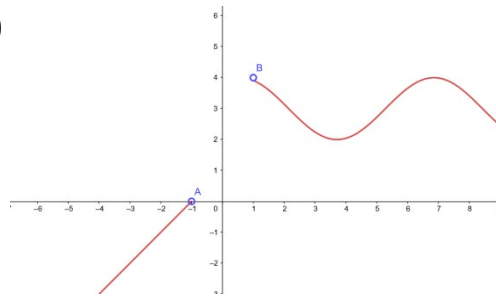


19)  $f(x) = \begin{cases} x + 1 & \text{if } x < -1 \\ 4 & \text{if } x > -1 \\ 0 & \text{if } -1 \leq x \leq 1 \end{cases}$

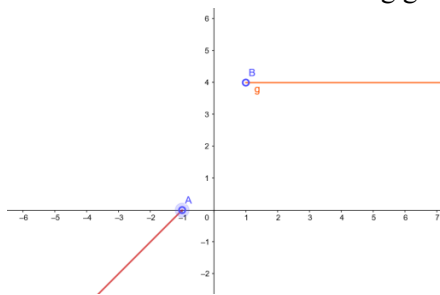
A)



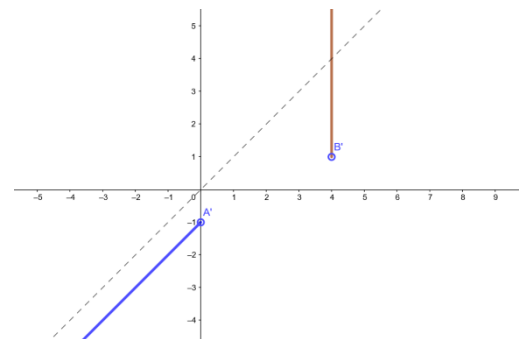
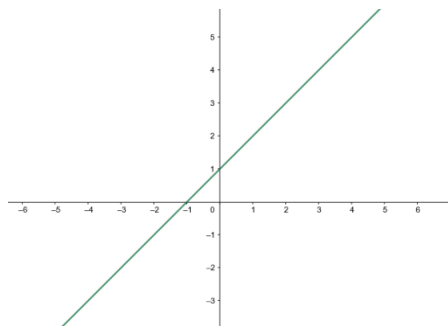
C)



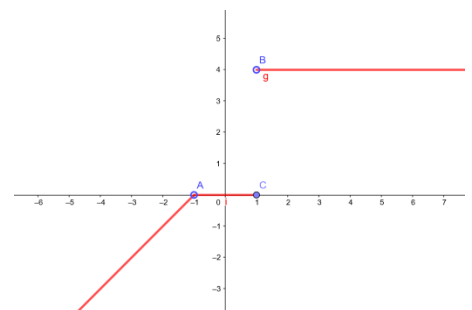
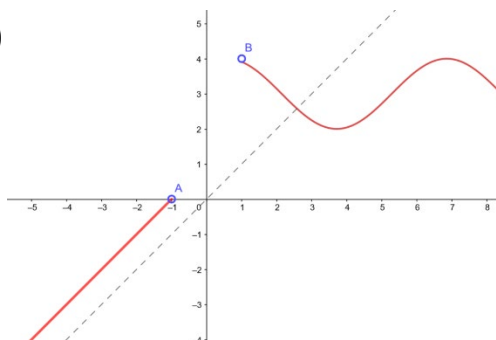
VII. Which one is the inverse of the following graph of the function?  
20)



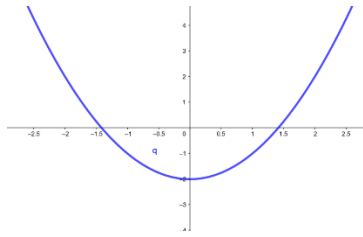
A)



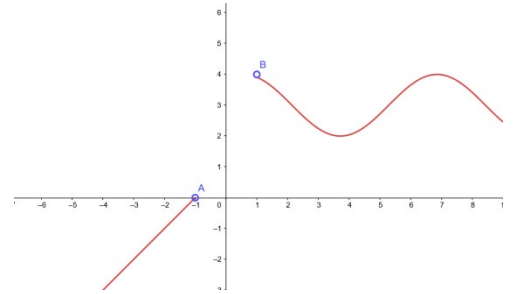
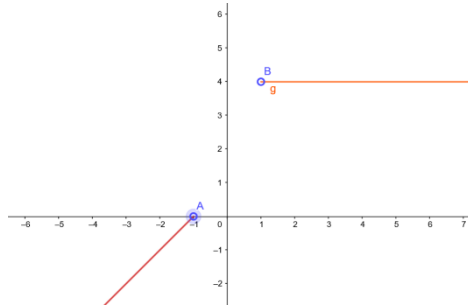
C)



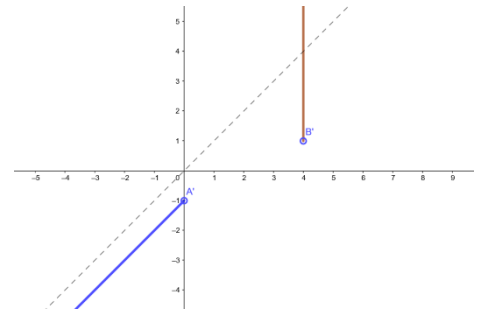
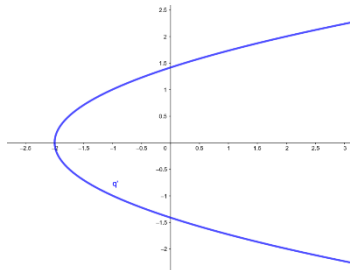
21)



A)



C)



VIII. ចូរអនុគមន៍បណ្តាក់ ក្នុងករណីនីមួយៗខាងក្រោម

22)  $f(x) = 2x^2$  និង  $g(x) = \frac{1}{x-1}$  ។ គណនា  $f \circ g$  ?

A)  $2 \frac{1}{(x-1)^2}$  B)  $-8$  C)  $2(x-1)^2$  D)  $\frac{(x-1)^2}{2}$

23)  $f(x) = x^2$  និង  $g(x) = \frac{1}{\sec x - 1}$  ។ គណនា  $g \circ f$  ?

A)  $(\sec^2 x - 1)^{-1}$  B)  $\sin\left(\frac{1}{(\sec x - 1)^2}\right)$  C)  $2 \frac{1}{(x-1)^2}$  D)  $(\sec x^2 - 1)^{-1}$

24)  $m(x) = \text{sech}(x^2)$  និង  $n(x) = \sin(x) - \frac{x^2}{3}$  ។ គណនា  $n \circ m$  ?

A)  $\sin^2(\sec x - 1)$  B)  $\sin(\text{sech}(x^2)) - \frac{\text{sech}^2(x^2)}{3}$  C)  $2 \frac{1}{(x-1)^2}$  D)  $\frac{(x-1)^2}{2}$

IX. ចូរគណនាតម្លៃអនុគមន៍នីមួយៗខាងក្រោម

25)  $\sin(\cos^{-1} x) = ?$

A)  $\sqrt{x^2 - 1}$  B)  $x^2 - 1$  C)  $2(x-1)^2$  D)  $\sqrt{1 - x^2}$

26)  $\cos(\sin^{-1} x) = ?$

- A)  $\sqrt{x^2 - 1}$       B)  $\sqrt{1 - x^2}$       C)  $2(x - 1)^2$       D)  $x^2 - 1$

27)  $\tan(2 \tan^{-1} x) = ?$

- A)  $\frac{2x}{1 - x^2}$       B)  $2(x - 1)^2$       C)  $\frac{2}{1 - x^2}$       D)  $x^2 - 1$

28)  $\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{2}\right) = ?$

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

X. Use the given conditions to write an equation for the line in the indicated form

29) Passing through (4, 3) and parallel to the line whose equation is  $y = 2x - 6$ ; point-slope form is

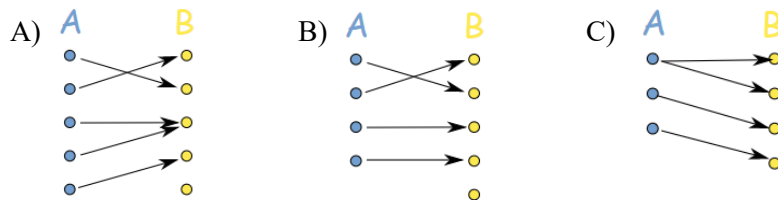
- A)  $y - 3 = x - 4$       B)  $y - 4 = 2(x - 3)$       C)  $y = 2x$       D)  $y - 3 = 2(x - 4)$

30) Passing through (5, 3) and perpendicular to the line whose equation is  $y = 2x + 7$ ; point-slope form is

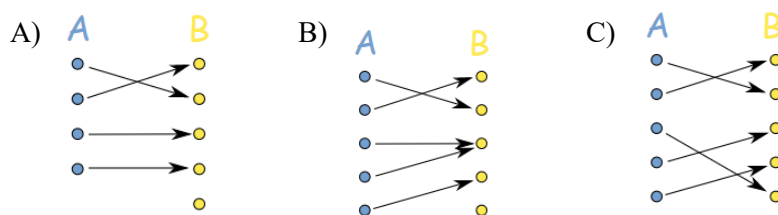
- A)  $y = -2x - 11$       B)  $y - 5 = \frac{1}{2}(x - 3)$       C)  $y - 3 = \frac{1}{2}(x - 5)$       D)

$y - 3 = \frac{1}{2}(x + 5)$

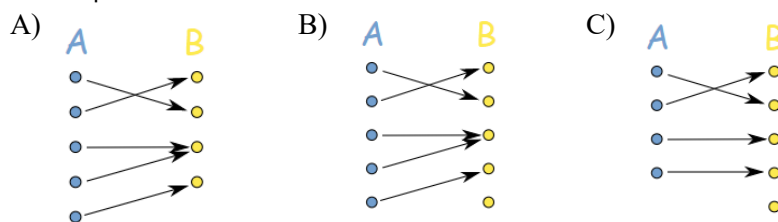
31) ក្នុងដ្យាក្រាមខាងក្រោម តើមួយណាជាអនុគមន៍ប្រកាន់?



32) ក្នុងដ្យាក្រាមខាងក្រោម តើមួយណាជាអនុគមន៍ពេញ?



33) ក្នុងដ្យាក្រាមខាងក្រោម តើមួយណាជាអនុគមន៍មួយទល់មួយ?



XI. ចូរបញ្ជាក់លក្ខណៈរបស់អនុគមន៍ខាងក្រោម៖

34)  $f(x) = x^2 - 3$

- A) ពេញ      B) ប្រកាន់      C) មួយទល់មួយ      D) មិនដឹង

35)  $f(x) = \frac{x^3 + 7}{x^2 - 2}$

- A) ប្រកាន់                      B) ពេញ                      C) មួយទល់មួយ                      D) មិនដឹង

36)  $f(x) = \frac{1}{x^2 - 2}$

- A) មិនដឹង                      B) ប្រកាន់                      C) មួយទល់មួយ                      D) ពេញ

37)  $f(x) = \frac{x^3 - 2}{x^2}$

- A) មួយទល់មួយ                      B) ប្រកាន់                      C) ពេញ                      D) មិនដឹង

38)  $f(x) = \sin(x), -\pi < x < \pi$

- A) មួយទល់មួយ                      B) ពេញ                      C) ប្រកាន់                      D) មិនដឹង

XII. ចូរបញ្ជាក់ចន្លោះម៉ូណូតូនរបស់អនុគមន៍ខាងក្រោម៖

39)  $f(x) = \frac{1}{x - 1}$

- A) ចុះលើ  $\mathbb{R} \setminus \{1\}$                       B) កើនលើ  $\mathbb{R}$                       C) ថេរលើ  $\mathbb{R} \setminus \{1\}$                       D) មិនដឹង

40)  $f(x) = \sin(x), -\pi < x < \pi$

- A) ចុះលើ  $\mathbb{R}$                       B) កើនលើ  $-\pi < x < \pi$                       C) ថេរលើ  $-\pi < x < \pi$                       D) មិនដឹង

41)  $g(x) = -x^3 - 2x^2 + x, -2 < x < 0$

- A) ចុះលើ  $-2 < x < 0$                       B) កើនលើ  $\mathbb{R}$                       C) ថេរលើ  $\mathbb{R}$                       D) មិនដឹង

42)  $f(x) = -3, 0 < x < +\infty$

- A) ចុះលើ  $-\infty < x < 0$                       B) កើនលើ  $\mathbb{R}$                       C) ថេរលើ  $(0, +\infty)$                       D) មិនដឹង

XIII. តើមួយណាជាចម្រាសរបស់អនុគមន៍ខាងក្រោម៖

43)  $f(x) = \sinh(x)$

- A)  $f^{-1}(x) = \ln(x + \sqrt{x^2 + 1})$                       B)  $f^{-1}(x) = \ln(x + \sqrt{x^2 - 1})$                       C)  $f^{-1}(x) = \ln\left(\frac{1+x}{1-x}\right)$

44)  $h(x) = \tanh(x)$

- A)  $h^{-1}(x) = \frac{1}{2} \ln\left(\frac{1+x}{1-x}\right), -1 < x < 1$                       B)  $h^{-1}(x) = \frac{1}{2} \ln(x^2 - 1)$                       C)  $h^{-1}(x) = \ln\left(\frac{1+x}{1-x}\right)$

XIV. តើមួយណាជាកន្សោមតម្លៃនៃអនុគមន៍ខាងក្រោម៖

45)  $f(x) = 2^x$

- A)  $\frac{f(x+3)}{f(x-1)} = f(4)$                       B)  $\frac{f(x+3)}{(x-1)} = f(4)$                       C)  $\frac{(x+3)}{f(x-1)} = f(4)$                       D) គ្មានចម្លើយ

46)  $f(x) = \frac{1}{x}$

- A)  $-f(3) = f\left(\frac{3}{-2}\right)$                       B)  $f(1) - f(3) = f\left(\frac{3}{2}\right)$                       C)  $f(-2) = f\left(\frac{ab}{-b-a}\right)$                       D) គ្មាន

ចម្លើយ

47)  $g(x) = \frac{x-1}{x+1}$

- A)  $f\left(-\frac{1}{x}\right) = -\frac{1}{x}$                       B)  $f(x) - f(3) = f\left(\frac{x}{3}\right)$                       C)  $f(x-2) = -x$                       D) គ្មានចម្លើយ

XV. តើអនុគមន៍ខាងក្រោម ជាប់ត្រង់តម្លៃណា?

$$48) f(x) = \begin{cases} \frac{\sin x}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$$

- A)  $x = \frac{\pi}{4}$       B)  $x = 0$       C)  $x = \frac{1}{2}$       D)  $x = -1$

$$49) f(x) = x - |x|$$

- A)  $x = \frac{1}{2}$       B)  $x = 0$       C)  $x = 1$       D)  $x = -1$

$$50) f(x) = \begin{cases} \frac{x-6}{x-3}, & x < 0 \\ 2, & x = 0 \\ \sqrt{4+x^2}, & x > 0 \end{cases}$$

- A)  $x = \frac{1}{2}$       B)  $x = -1$       C)  $x = 1$       D)  $x = 0$

XVI. តើអនុគមន៍ខាងក្រោមមិនជាប់ត្រង់តម្លៃ  $x_0$  ឬទេ?

$$51) f(x) = \begin{cases} -2x + 4, & x > 1 \\ x + 1, & x < 1 \\ -1, & x = 1 \end{cases}$$

- A) ជាប់ត្រង់  $x_0 = 1$       B) មិនជាប់ត្រង់  $x_0 = 1$       C) គ្មានយោបល់

$$52) f(x) = \begin{cases} x + 1, & x \geq 2 \\ 2x - 1, & 1 < x < 2 \\ x - 1, & x \leq 1 \end{cases}$$

- A) មិនជាប់ត្រង់  $x_0 = 1$       B) ជាប់ត្រង់  $x_0 = 1$       C) គ្មានយោបល់

XVII. គណនាលីមីតខាងក្រោម៖

$$53) \lim_{t \rightarrow -1} \frac{t+1}{|t+1|}$$

- A)  $-1$       B)  $1$       C)  $0$       D) គ្មាន

$$54) \lim_{z \rightarrow 4} \frac{\sqrt{z} - 2}{z - 4}$$

- A)  $\frac{1}{4}$       B)  $+\infty$       C)  $0$       D) គ្មាន

$$55) \lim_{x \rightarrow -3} \frac{\sqrt{2x+22} - 4}{x+3}$$

- A) គ្មាន      B)  $+\infty$       C)  $\frac{1}{4}$       D)  $1$

$$56) \lim_{x \rightarrow 0} \frac{x}{3 - \sqrt{x+9}}$$

- A)  $-6$       B)  $1$       C)  $\frac{1}{4}$       D)  $+\infty$



XVIII. គេអោយអនុគមន៍  $f(x) = \begin{cases} 7-4x & x < 1 \\ x^2+2 & x \geq 1 \end{cases}$  គណនាលីមីតខាងក្រោម៖

57)  $\lim_{x \rightarrow -6} f(x)$

- A)  $-6$                       B)  $1$                       C)  $31$                       D)  $+\infty$

58)  $\lim_{x \rightarrow 1} f(x)$

- A)  $-6$                       B)  $3$                       C)  $31$                       D)  $+\infty$

XIX. តើមួយណាជានិយមន័យនៃដើរវិវេកសំរាប់អនុគមន៍ខាងក្រោម៖

59)  $f(t) = \frac{t}{1+t}$

- $$\text{A) } g'(t) = \lim_{h \rightarrow 0} \frac{1}{h} \left( \frac{t+h}{t+h+1} - \frac{t}{t+1} \right)$$

$$\text{B) } g'(t) = \lim_{h \rightarrow 0} h \left( \frac{t+h}{t+h+1} - \frac{t}{t+1} \right)$$

C)  $g'(t) = \frac{1}{(1+t)^2}$

- D) មិនមានទេ

60)  $R(z) = \sqrt{5z - 8}$

$$A) \quad R'(z) = \frac{1}{h} \lim_{h \rightarrow 0} \sqrt{5(z+h)-8} - \sqrt{5z-8}$$

$$\text{B) } R'(z) = -\frac{5}{2(5z-8)^2}$$

C)  $R'(z) = \lim_{h \rightarrow 0} \frac{\sqrt{5(z+h)-8} - \sqrt{5z-8}}{h}$

- D) មិនមានទេ

61)  $f(x) = 2x^2 + 35$

A)  $f'(x) = 4x$

$$\text{B) } f'(x) = \lim_{h \rightarrow 0} \frac{2(x+h)^2 + 35 - (2x^2 + 35)}{h}$$

- C) មិនមានទេ

$$\text{D) } f'(x) = \frac{1}{h} \lim_{h \rightarrow 0} 2(x+h)^2 + 35 - (2x^2 + 35)$$

62)  $R(z) = \frac{5}{z}$

A)  $R'(z) = -\frac{5}{z^2}$

B)  $R'(z) = \lim_{h \rightarrow 0} \left( \frac{5}{z+h} - \frac{5}{z} \right)$

C)  $R'(z) = \frac{1}{h} \lim_{h \rightarrow 0} \left( \frac{5}{z+h} - \frac{5}{z} \right)$

- D) មិនមានទេ

XX. ចូររកចម្លើយនៃដេរីវេលំដាប់  $n$  របស់អនុគមន៍ខាងក្រោម៖

63)  $y = \frac{1}{x}$

$$A) \quad y^{(n)} = \frac{(-1)^n n!}{x^{(n+1)}}$$

$$\text{B) } y^{(n)} = \frac{(-1)^n n!}{x^{(n)}}$$

$$\text{C) } y^{(n)} = \frac{n!}{x^{(n+1)}}$$

- D) មិនមានទេ

64)  $y = xe^{2x}$

A)  $y^{(n)} = 2^n (x + n)e^{2x}$

B)  $y^{(n)} = e^{2x} + 2xe^{2x}$

C)  $y^{(n)} = 2^{n-1}e^{2x}(2x + n)$

- D) មិនមានទេ

65)  $f(x) = x^n$

A)  $f^{(n)}(x) = n!x^{n-(n-1)}$

C)  $f^{(n)}(x) = n!x$

B) មិនមានទេ

D)  $f^{(n)}(x) = n!$

XXI. ចូរកតម្លើយនៃជើងដែលដាច់ 2 របស់អនុគមន៍ខាងក្រោម៖

66)  $y = \csc(x)$

A)  $y'' = -\csc(x) + 2\csc^3(x)$

C)  $y'' = \sec(x) + 2\csc^3(x)$

B) មិនមានទេ

D)  $y'' = -\sec(x)$

67)  $f(x) = \sinh(x)$

A)  $f''(x) = \sinh(x)$

C)  $f''(x) = \cosh(x)$

B) មិនមានទេ

D)  $f''(x) = -\sinh(x)$

68)  $g(x) = \frac{1}{1-x}$

A)  $g''(x) = \frac{2}{(1-x)^3}$

C)  $g''(x) = \frac{-2}{(1-x)^3}$

B)  $g''(x) = \frac{2}{(1-x)^4}$

D) មិនមានទេ

XXII. ចូរកតម្លើយនៃជើងដែលដាច់ 3 របស់អនុគមន៍ខាងក្រោម៖

69)  $y = x^3$

A)  $y''' = 1$

C)  $y''' = -6$

B)  $y''' = 6$

D) មិនមានទេ

70)  $y = \frac{1}{1-x}$

A)  $y''' = \frac{6}{(1-x)^4}$

C)  $y''' = -6(1-x)^{-4}$

B)  $y''' = \frac{1}{(1-x)^6}$

D) មិនមានទេ

71)  $y = \sec(x)$

A)  $y''' = \sec(x)$

C) មិនមានទេ

B)  $y''' = \frac{\sin^3(x) + 5\sin(x)}{\cos^4(x)}$

D)  $y''' = \frac{\sin^3(x) + 5\sin(x)}{\cos(x)}$