

Álgebra de límites

I. Considerando que $\lim_{x \rightarrow 2} f(x) = -8$, $\lim_{x \rightarrow 2} g(x) = 4$, $\lim_{x \rightarrow 2} h(x) = 0$ y que $\lim_{x \rightarrow 2} \phi(x)$ no existe, determinar:

1. $\lim_{x \rightarrow 2} [g(x) - f(x)].$

s d 1

2. $\lim_{x \rightarrow 2} [f(x) \cdot g(x)].$

s d 2

3. $\lim_{x \rightarrow 2} [f(x) + \phi(x)].$

s d 3

4. $\lim_{x \rightarrow 2} \frac{g(x)}{f(x)}.$

s d 4

5. $\lim_{x \rightarrow 2} [f^2(x) - g^3(x)].$

s d 5

6. $\lim_{x \rightarrow 2} \frac{f(x)h(x)}{g(x)}.$

s d 6

7. $\lim_{x \rightarrow 2} \frac{g(x)}{h(x)}.$

s d 7

8. $\lim_{x \rightarrow 2} [\sqrt{g(x)} + \sqrt[3]{f(x)}].$

s d 8

9. $\lim_{x \rightarrow 2} \left[\frac{f(x)}{g(x)} \right]^5.$

s d 9

10. $\lim_{x \rightarrow 2} [h(x)\sqrt{f(x)}].$

s d 10

II. Calcular los límites siguientes:

1. $\lim_{x \rightarrow 4} (-x^2 - 9x - 8).$

s d 1

2. $\lim_{x \rightarrow -2} \sqrt{x^4 - 2x + 1}.$

s d 2

3. $\lim_{x \rightarrow \frac{1}{2}} \frac{x^2 - 3x + 1}{-x^2 + 8x - 3}.$

s d 3

4. $\lim_{x \rightarrow 1} \left(\sqrt{x} + \frac{1}{\sqrt{x}} \right)^5.$

s d 4

5. $\lim_{x \rightarrow 6} [(x + 4)^3(x - 5)^2].$

s d 5

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

s d 7

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

s d 8

8. $\lim_{x \rightarrow \frac{2}{3}} (3 - 4x + 5x^2).$

s d 9

9. $\lim_{x \rightarrow 0} (3x^2 - 2)^5.$

s d 10

10. $\lim_{x \rightarrow -3} (6 - x^2)^4.$

s d 11

11. $\lim_{x \rightarrow 0} \frac{3x^2 - 4x + 5}{6x^2 - 7x + 8}.$

s d 12

12. $\lim_{x \rightarrow -2} \frac{3x + 2}{x^2 + 4}.$

s d 13

$$13. \lim_{x \rightarrow -1} \frac{x^3 + 1}{x^2 + 1}.$$

s d 15

$$14. \lim_{x \rightarrow -\frac{1}{2}} \frac{(2x - 1)^3}{(4x^2 + 1)^5}.$$

s d 16

III. Calcular los límites siguientes:

$$1. \lim_{x \rightarrow -1} \frac{x^2 - 1}{x^2 + 3x + 2}.$$

s d 17

$$12. \lim_{h \rightarrow 0} \frac{\sqrt[3]{x+h} - \sqrt[3]{x}}{h}.$$

s d 35

$$2. \lim_{x \rightarrow 2} \frac{x^2 - 4x + 4}{x^2 - 2x}.$$

s d 18

$$13. \lim_{x \rightarrow 3} \frac{\sqrt{x^2 - 2x + 6} - \sqrt{x^2 + 2x - 6}}{x^2 - 4x + 3}.$$

s d

$$3. \lim_{x \rightarrow 5} \frac{x^2 - 7x + 10}{x^2 - 25}.$$

s d 19

$$14. \lim_{x \rightarrow 8} \frac{x - 8}{\sqrt[3]{x} - 2}.$$

s d 37

$$4. \lim_{x \rightarrow 2} \frac{x^3 - 8}{6x^2 - 3x^3}.$$

s d 20

$$15. \lim_{x \rightarrow 1} \frac{\sqrt{x} - 1}{x - 1}.$$

s d 38

$$5. \lim_{x \rightarrow a} \frac{x^2 - (a+1)x + a}{x^3 - a^3}.$$

s d 21

$$16. \lim_{x \rightarrow 64} \frac{\sqrt{x} - 8}{\sqrt[3]{x} - 4}.$$

s d 39

$$6. \lim_{x \rightarrow 1} \frac{x^4 - 3x^2 + 2}{x^4 + 2x^2 - 3}.$$

s d 22

$$17. \lim_{x \rightarrow 1} \frac{\sqrt[3]{x} - 1}{\sqrt[4]{x} - 1}.$$

s d 40

$$7. \lim_{x \rightarrow 1} \frac{x^4 - 1}{x^3 - 1}.$$

s d 23

$$18. \lim_{x \rightarrow 1} \frac{\sqrt{3x+1} - 2x}{x^2 + 2x - 3}.$$

s d 67

$$8. \lim_{x \rightarrow 2} \frac{\sqrt{x} - \sqrt{2}}{x - 2}.$$

s d 31

$$19. \lim_{x \rightarrow 0} \frac{x^3 - 3x^2 - 5x}{x^2 - 7x}.$$

s d 75

$$9. \lim_{x \rightarrow 0} \frac{\sqrt{1+x} - \sqrt{1-x}}{x}.$$

s d 32

$$20. \lim_{x \rightarrow 2} \frac{\sqrt{x+2} - \sqrt{6-x}}{x - 2}.$$

s d 83

$$10. \lim_{x \rightarrow 7} \frac{2 - \sqrt{x-3}}{x^2 - 49}.$$

s d 33

$$21. \lim_{x \rightarrow 1} \left(\frac{1}{x-1} - \frac{3}{x^3-1} \right).$$

s d

$$11. \lim_{x \rightarrow 4} \frac{3 - \sqrt{5+x}}{1 - \sqrt{5-x}}.$$

s d 34

$$22. \lim_{x \rightarrow 2} \frac{2x - \sqrt{-12x+40}}{3x^2 + x - 14}.$$

s d 85

$$23. \lim_{h \rightarrow 0} \frac{\sqrt{h+1} - 1}{h}.$$

s **d** 87

$$24. \lim_{x \rightarrow 3} \frac{\sqrt{x+1} - 2}{x-3}.$$

s **d** 89

$$25. \lim_{x \rightarrow 2} \left(\frac{1}{x-2} - \frac{12}{x^3-8} \right).$$

s **d** 91

$$26. \lim_{x \rightarrow 2} \frac{2x^3 - 16}{-3x^2 + 8x - 4}.$$

s **d** 94

$$27. \lim_{x \rightarrow 0} \frac{\sqrt{2+x} - \sqrt{2}}{x}.$$

s **d** 100

$$28. \lim_{x \rightarrow \frac{2}{3}} \frac{\sqrt{9x+19} - 6x - 1}{6x^2 - 19x + 10}.$$

s **d** 101

$$29. \lim_{x \rightarrow 1} \frac{4 - \sqrt{x+15}}{x^2 - 1}.$$

s **d** 105

$$30. \lim_{x \rightarrow -2} \frac{x^3 + 8}{x^2 + 5x + 6}.$$

s **d** 106

$$31. \lim_{x \rightarrow -3} \frac{2x^2 + 5x - 3}{x^2 - 2x - 15}.$$

s **d** 109

$$32. \lim_{h \rightarrow 0} \frac{\sqrt{x+h} - \sqrt{x}}{h}.$$

s **d** 110

$$33. \lim_{x \rightarrow 1} \frac{x^2 - x}{x^2 - 1}.$$

s **d** 118

$$34. \lim_{x \rightarrow 1} \frac{3x^2 + 4x - 7}{x^2 - 1}.$$

s **d** 119

$$35. \lim_{x \rightarrow 0} \frac{\sqrt{x+1} - 1}{-\sqrt{x+4} + 2}.$$

s **d** 120

$$36. \lim_{x \rightarrow 1} \frac{x^3 - 2x^2 + 2x - 1}{x - 1}.$$

s **d** 125

$$37. \lim_{x \rightarrow 0} \left(\frac{4}{x} - 3 \right) x.$$

s **d** 134

$$38. \lim_{x \rightarrow 0} \frac{x^3}{\sqrt{x^2 + 25} - 5}.$$

s **d** 145

39. Considere la función $f(x) = \frac{\sqrt{13-x^2} - x - 1}{x^2 - 5x + 6}$.

a. Viendo la tabla de imágenes de f , calcule $\lim_{x \rightarrow 2} f(x)$ con dos cifras decimales exactas:

x	$f(x)$
1.997	1.66096
1.998	1.66286
1.999	1.66476
2	Indeterminado
2.001	1.66858
2.002	1.67049
2.003	1.67241

b. Calcule exactamente $\lim_{x \rightarrow 2} f(x)$ usando la expresión algebraica de la función.
¿Cuál es la tercera cifra decimal exacta del valor del límite?