

ДОМАШНА РАБОТА №3

1) Пресметнете границата:

$$1.1. \lim_{x \rightarrow 5} \frac{\sqrt{x-1}-2}{x-5};$$

$$1.2. \lim_{x \rightarrow 3} \frac{\sqrt{x+1}-2}{x-3};$$

$$1.3. \lim_{x \rightarrow 3} \frac{3-\sqrt{x+6}}{x-3};$$

$$1.4. \lim_{x \rightarrow 4} \frac{3-\sqrt{x+5}}{x-4};$$

$$1.5. \lim_{x \rightarrow 4} \frac{x-4}{\sqrt{8-x}-2};$$

$$1.6. \lim_{x \rightarrow 2} \frac{x-2}{\sqrt{x+2}-2};$$

$$1.7. \lim_{x \rightarrow 0} \frac{\sqrt{x^2+1}-1}{\sqrt{x^2+4}-2};$$

$$1.8. \lim_{x \rightarrow 0} \frac{\sqrt{x^2+4}-2}{\sqrt{x^2+16}-4};$$

$$1.9. \lim_{x \rightarrow 0} \frac{\sqrt{x^2+1}-x}{\sqrt{x^2+9}-x};$$

$$1.10. \lim_{x \rightarrow 2} \frac{\sqrt{x+2}-\sqrt{6-x}}{x-2}.$$

2) Пресметнете границата:

$$2.1. \lim_{x \rightarrow 1} \frac{3x^2-2x-1}{x^3+3x-4};$$

$$2.2. \lim_{x \rightarrow 1} \frac{x^4-5x^2+4}{2x^2-x-1};$$

$$2.3. \lim_{x \rightarrow -1} \frac{x^2+7x+6}{x^3-x};$$

$$2.4. \lim_{x \rightarrow -1} \frac{x^2-3x-4}{x^3+1};$$

$$2.5. \lim_{x \rightarrow 2} \frac{x^2+2x-8}{x^3-2x^2};$$

$$2.6. \lim_{x \rightarrow 3} \frac{x^2-x-12}{x^3-9x};$$

$$2.7. \lim_{x \rightarrow -2} \frac{x^2+5x+6}{x^3+8};$$

$$2.8. \lim_{x \rightarrow 3} \frac{x^2+x-6}{x^3-3x^2+x-3};$$

$$2.9. \lim_{x \rightarrow 1} \frac{x^2-2x+1}{x^3+4x^2-5};$$

$$2.10. \lim_{x \rightarrow -1} \frac{x^4-1}{5x^3+6x^2-1}.$$

3) Пресметнете границата:

$$3.1. \lim_{x \rightarrow 0} \frac{\sin 2x - 3 \operatorname{tg} x}{x^2 + \operatorname{arctg} 4x};$$

$$3.2. \lim_{x \rightarrow 0} \frac{\sin 4x - \operatorname{arctg} 2x}{x^3 + \operatorname{tg} 2x};$$

$$3.3. \lim_{x \rightarrow 0} \frac{e^{2x} - \cos 3x - 6x}{\operatorname{arcsin} 4x};$$

$$3.4. \lim_{x \rightarrow 0} \frac{e^{3x} + 2 \cos 2x - 3}{x^3 + \operatorname{arcsin} 2x};$$

$$3.5. \lim_{x \rightarrow 0} \frac{\sin 4x - \sin 6x}{x - \operatorname{arctg} 2x};$$

$$3.6. \lim_{x \rightarrow 0} \frac{\cos 6x - \cos 3x - 6x}{\sin 2x - \sin 4x};$$

$$3.7. \lim_{x \rightarrow 0} \frac{\operatorname{tg} 6x - \operatorname{tg} 3x}{\operatorname{arctg} 3x - \operatorname{arctg} 2x};$$

$$3.8. \lim_{x \rightarrow 0} \frac{e^{-2x} + e^{3x} - 2 \cos 2x}{\operatorname{arcsin} 2x - \sin 4x};$$

$$3.9. \lim_{x \rightarrow 0} \frac{e^{-3x} + \cos 4x - 2}{e^{5x} - x - 1};$$

$$3.10. \lim_{x \rightarrow 0} \frac{3e^{-x} + 2 \cos 2x - 5}{e^{5x} - \sin 3x - 1}.$$

4) Пресметнете границата:

$$4.1. \lim_{x \rightarrow 1} \frac{\sin(x^2 + x - 2)}{x^3 - x};$$

$$4.2. \lim_{x \rightarrow 2} \frac{\sin(x^2 - 3x + 2)}{x^2 - 4};$$

$$4.3. \lim_{x \rightarrow -3} \frac{\operatorname{tg}(x^2 + 2x - 3)}{x^2 + 3x};$$

$$4.4. \lim_{x \rightarrow -1} \frac{\operatorname{tg}(x^3 - 3x - 2)}{x^2 + 5x + 4};$$

$$4.5. \lim_{x \rightarrow 1} \frac{\sin(x^3 - 5x + 4)}{\sin(x^2 - 1)};$$

$$4.6. \lim_{x \rightarrow 1} \frac{\sin(x^3 - 1)}{\sin(x^2 - 4x + 3)};$$

$$4.7. \lim_{x \rightarrow 4} \frac{\operatorname{arctg}(x - 4)}{x^2 - 4x};$$

$$4.8. \lim_{x \rightarrow 1} \frac{\operatorname{arctg}(x^2 - 1)}{2x^2 - x - 1};$$

$$4.9. \lim_{x \rightarrow -1} \frac{\arcsin(x + 1)}{x^3 + 1};$$

$$4.10. \lim_{x \rightarrow -2} \frac{\arcsin(x^2 + 2x)}{x^3 - 4x}.$$

5) Пресметнете границата:

$$5.1. \lim_{x \rightarrow 0} \frac{\sin 2x - \ln(1 + 2x)}{4x^2};$$

$$5.2. \lim_{x \rightarrow 0} \frac{\ln(1 + 3x) - \sin 3x}{3x^2};$$

$$5.3. \lim_{x \rightarrow 0} \frac{e^x + e^{-x} - 2}{8x^2};$$

$$5.4. \lim_{x \rightarrow 0} \frac{e^{-3x} + 3x - 1}{e^{6x} - 6x - 1};$$

$$5.5. \lim_{x \rightarrow 0} \frac{2e^{2x} - \sin 4x - 2}{1 - \cos 2x};$$

$$5.6. \lim_{x \rightarrow 0} \frac{e^{2x} - \cos 2x - 2x}{1 - \cos 4x};$$

$$5.7. \lim_{x \rightarrow 1} \frac{1 + \cos(\pi x)}{x^2 - 2x + 1};$$

$$5.8. \lim_{x \rightarrow 0} \frac{3x - \sin 3x}{x^3};$$

$$5.9. \lim_{x \rightarrow 2} \frac{1 - \cos(\pi x)}{x^2 - 4x + 4};$$

$$5.10. \lim_{x \rightarrow 0} \frac{e^{3x} - e^{-3x} - 6x}{x^3}.$$

6) Пресметнете границата:

$$6.1. \lim_{x \rightarrow 0} \frac{x \sin 5x}{3x^2 - \sin x + x};$$

$$6.2. \lim_{x \rightarrow 0} \frac{x \cos x - \sin x}{4x^2};$$

$$6.3. \lim_{x \rightarrow 0} \frac{x - \sin x}{x \sin x};$$

$$6.4. \lim_{x \rightarrow 0} \frac{x - \operatorname{tg} x}{x \sin x};$$

$$6.5. \lim_{x \rightarrow 0} \frac{xe^x - \sin x}{x^3 + 4x^2};$$

$$6.6. \lim_{x \rightarrow 1} \frac{x - 1 - \ln x}{(x - 1) \ln x};$$

$$6.7. \lim_{x \rightarrow 0} \frac{x \sin x}{4x^2 - \sin 2x + 2x};$$

$$6.8. \lim_{x \rightarrow 0} \frac{x - \sin x}{x \operatorname{tg} x};$$

$$6.9. \lim_{x \rightarrow 0} \frac{x - \operatorname{tg} x}{x \operatorname{tg} x};$$

$$6.10. \lim_{x \rightarrow 0} \frac{2xe^x - \sin 2x}{x^4 + 2x^2}.$$

7) Пресметнете границата:

$$7.1. \lim_{x \rightarrow 0} \frac{x^2 e^{-x}}{e^{-x} + x - \cos 4x};$$

$$7.2. \lim_{x \rightarrow 0} \frac{(x^3 + x^2) \cos 2x}{e^{2x} + e^{-2x} - 2};$$

$$7.3.; \lim_{x \rightarrow 0} \frac{x^2 e^{-x^2}}{3e^{-x} + \sin 3x - 3}$$

$$7.4. \lim_{x \rightarrow 0} \frac{x^2 \cos 6x}{8x^2 - 2 \sin x + 2x};$$

$$7.5. \lim_{x \rightarrow 1} \frac{\pi - 4 \operatorname{arctg} x}{x^2 \ln x};$$

$$7.6. \lim_{x \rightarrow 1} \frac{4 \operatorname{arctg} x - \pi}{x^2 \sin(\pi x)};$$

$$7.7. \lim_{x \rightarrow 3} \frac{(x^2 - 9)e^{3-x}}{\sqrt{5x+1} - 4};$$

$$7.8. \lim_{x \rightarrow 2} \frac{\sqrt{4x+1} - 3}{(x^2 - 3) \sin(\pi x)};$$

$$7.9. \lim_{x \rightarrow 4} \frac{\sqrt{2x+1} - 3}{(x-3) \sin(x-4)};$$

$$7.10. \lim_{x \rightarrow 1} \frac{(x^2 - x)e^{x-1}}{\sqrt{2x-1} - x}.$$

8) Пресметнете границата:

$$8.1. \lim_{x \rightarrow 0} \frac{e^{-4x} + 4x - 1}{\sin^2 2x};$$

$$8.2. \lim_{x \rightarrow 0} \frac{1 - \cos 8x - x^4}{\operatorname{tg}^2 2x};$$

$$8.3.; \lim_{x \rightarrow 0} \frac{e^{6x} - \sin 6x - 1}{\operatorname{tg}^2 3x}$$

$$8.4. \lim_{x \rightarrow 0} \frac{e^{4x} + e^{-4x} - 2}{\sin^2 4x};$$

$$8.5. \lim_{x \rightarrow 0} \frac{e^x + e^{-x} - 2}{\operatorname{tg}^2 4x};$$

$$8.6. \lim_{x \rightarrow 0} \frac{10x^2 - 3 \sin x + 3x}{\sin^2 3x};$$

$$8.7. \lim_{x \rightarrow 0} \frac{6e^{-x} + \sin 6x - 6}{\operatorname{arctg}^2 2x};$$

$$8.8. \lim_{x \rightarrow 0} \frac{1 + x^2 - \cos 6x}{\operatorname{arctg}^2 3x};$$

$$8.9. \lim_{x \rightarrow 0} \frac{x^3 + \cos 2x - 1}{\arcsin^2 2x};$$

$$8.10. \lim_{x \rightarrow 0} \frac{e^{-x} + x - \cos 5x}{\arcsin^2 x}.$$

9) Пресметнете границата:

$$9.1. \lim_{x \rightarrow 0} \left(\frac{1}{x} - \frac{1}{\sin x} \right);$$

$$9.2. \lim_{x \rightarrow 0} \left(\frac{1}{x} - \frac{1}{\operatorname{tg} x} \right);$$

$$9.3. \lim_{x \rightarrow 1} \left(\frac{1}{x-1} - \frac{1}{\ln x} \right);$$

$$9.4. \lim_{x \rightarrow 0} \left(\frac{1}{x} - \frac{1}{\ln(x+1)} \right);$$

$$9.5. \lim_{x \rightarrow 0} \left(\frac{1}{x^2} - \frac{1}{\sin x} \right);$$

$$9.6. \lim_{x \rightarrow 0} \left(\frac{1}{x} - \frac{1}{e^x - 1} \right);$$

$$9.7. \lim_{x \rightarrow 0} \left(\frac{1}{\operatorname{arctg} x} - \frac{1}{x} \right);$$

$$9.8. \lim_{x \rightarrow 0} \left(\operatorname{cotg} x - \frac{1}{x} \right);$$

$$9.9. \lim_{x \rightarrow \frac{\pi}{2}} \left(\frac{1}{\operatorname{cotg} x} - \frac{\pi}{2 \cos x} \right);$$

$$9.10. \lim_{x \rightarrow 0} \left(\frac{1}{\sin^2 x} - \frac{1}{x^2} \right).$$