Limits of Functions

Exercises

1.
Let

$$\lim_{x\to 2}(4x-7)=1.$$

Find δ such that $|(4x-7)-1|<0.007$.

2.
Let

$$\lim_{x\to 1}\frac{1}{x^2}=1.$$

Find δ such that $\left|\left(\frac{1}{x^2}\right)-1\right|<0.001$.

3.
Prove that

$$\lim_{x\to 1}\left(x^3+5x^2\right)=6$$

4.
Prove

$$\lim_{x\to 2}(3x+1)=7.$$

5.
Prove

$$\lim_{x\to 2}\frac{x^2-4}{x-2}=4.$$

6.
Prove

$$\lim_{x\to +\infty}\left(1+\frac{1}{x}\right)=1.$$

7.
Find the limits of

(i) $\lim_{x\to 0}\frac{\sqrt{x+a}-\sqrt{a}}{x}$, $a>0$,

(ii) $\lim_{x\to 1}\frac{1-x^3}{2-\sqrt{x^2+3}}$.

8.
Prove that

$$\lim_{x \to 1} \frac{1}{(1-x)^2} = +\infty \ .$$

9.
Prove that

$$\lim_{x \to 0} \left(-\frac{1}{x} \right) = +\infty \ .$$

10.
Find

1. $\lim\limits_{x \to \pm\infty} (4x^5 - 18x^4 + 7x^4 - x + 56)$
2. $\lim\limits_{x \to +\infty} \dfrac{3x^3 - 5x + 2}{4x^2 - x + 6}$

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