Key

Unit I Worksheet 2 - Finding Limits Algebraically

Find the limit algebraically (if it exists). Be sure to use correct notation.

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

-2^2+2-2

$-4+2-2=-4$

2. $\lim_{x\to 1}\cos(\pi x) = \cos(\pi\cdot 1) = -1$

3. $\lim_{x\to 4}\frac{\sqrt{x}-2}{x-4}\cdot\frac{(\sqrt{x}+2)}{(\sqrt{x}+2)} = \frac{\cancel{(x-4)}}{\cancel{(x-4)}(\sqrt{x}+2)}$

$= \frac{1}{\sqrt{x}+2}$

$\lim_{x\to 4}\frac{1}{\sqrt{x}+2} = \frac{1}{\sqrt{4}+2} = \frac{1}{4}$

4. $\lim_{x\to 0}\frac{\sqrt{x+3}-\sqrt{3}}{x}\cdot\frac{\sqrt{x+3}+\sqrt{3}}{\sqrt{x+3}+\sqrt{3}}$

$= \frac{x\cancel{+3}\cancel{-3}}{x(\sqrt{x+3}+\sqrt{3})} = \frac{1}{\sqrt{x+3}+\sqrt{3}}$

$\lim_{x\to 0}\frac{1}{\sqrt{x+3}+\sqrt{3}} = \frac{1}{2\sqrt{3}}$

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

$\lim_{x\to -2}(x^2-2x+4) =$

$(-2)^2-2(-2)+4 =$

$4+4+4=12$

6. $\lim_{x\to 4}\frac{x^2-4x}{x^2-3x-4} = \frac{x\cancel{(x-4)}}{\cancel{(x-4)}(x+1)}$

$\lim_{x\to 4}\frac{x}{x+1} = \frac{4}{5}$

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

$\lim_{x\to -1}(2x-3) = -5$

8. $\lim_{x\to 2}\frac{x^2-4}{x^2-5x+6}$

$\frac{(x+2)\cancel{(x-2)}}{\cancel{(x-2)}(x-3)}$

$\lim_{x\to 2}\frac{x+2}{x-3} = \frac{4}{-1} = -4$

9. $\lim_{x\to 0}\left(\frac{\frac{1}{2+x}-\frac{1}{2}}{x}\right)\frac{2(2+x)}{2(2+x)}$

$\frac{2-(2+x)}{2x(2+x)} = \frac{-x}{2x(2+x)}$

$= \frac{-1}{2(2+x)}$ $\lim_{x\to 0}\frac{-1}{2(2+x)} = \frac{-1}{4}$

10. $\lim_{\Delta x\to 0}\frac{2(x+\Delta x)-2x}{\Delta x}$

$\frac{\cancel{2x}+2\Delta x\cancel{-2x}}{\Delta x}$

$= \frac{2\cancel{\Delta x}}{\cancel{\Delta x}} = 2$

$\lim_{\Delta x\to 0} 1 = 2$ $\Longrightarrow$

Scanned by CamScanner