

CALCULUS BC  
WORKSHEET ON L'HOPITAL'S RULE

Work the following on **notebook paper**.

On problems 1 – 3, find the limit by:

- (a) using techniques from Chapter 1  
(b) using L'Hopital's Rule.

$$1. \lim_{x \rightarrow 3} \frac{2x-6}{x^2-9}$$

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

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

Evaluate by using L'Hopital's Rule, if possible.

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

$$13. \lim_{x \rightarrow \infty} \frac{(\ln x)^3}{x}$$

$$5. \lim_{x \rightarrow 0} \frac{\sqrt{4-x^2}-2}{x}$$

$$14. \lim_{x \rightarrow 0^+} (-x \ln x)$$

$$6. \lim_{x \rightarrow 0} \frac{e^x - (1-x)}{x}$$

$$15. \lim_{x \rightarrow \infty} \left( x \sin \frac{1}{x} \right)$$

$$7. \lim_{x \rightarrow 0} \frac{\sin(2x)}{\sin(3x)}$$

$$16. \lim_{x \rightarrow \infty} x^{1/x}$$

$$8. \lim_{x \rightarrow 0} \frac{\arcsin x}{x}$$

$$17. \lim_{x \rightarrow 0^+} (1+x)^{1/x}$$

$$9. \lim_{x \rightarrow \infty} \frac{3x^2-2x+1}{2x^2+3}$$

$$18. \lim_{x \rightarrow 2^+} \left( \frac{8}{x^2-4} - \frac{x}{x-2} \right)$$

$$10. \lim_{x \rightarrow \infty} \frac{x^2+2x+1}{x-1}$$

$$19. \lim_{x \rightarrow 1^+} \left( \frac{3}{\ln x} - \frac{2}{x-1} \right)$$

$$11. \lim_{x \rightarrow \infty} \frac{x}{\sqrt{x^2+1}}$$

$$20. \lim_{x \rightarrow \infty} \frac{x^2}{e^{5x}}$$

$$12. \lim_{x \rightarrow \infty} \frac{\ln x}{x}$$

$$21. \lim_{x \rightarrow 0} \frac{e^{2x}-1}{e^x}$$