

Use the following functions for #'s 7 - 18:

$$f(x) = x^2 - 7$$

$$g(x) = x - 5$$

$$h(x) = x^2 - 25$$

13. $\lim_{x \rightarrow -1} f(x) + h(x)$

$$\begin{aligned} &x^2 - 7 + x^2 - 25 \\ &2x^2 - 32 \\ &2 - 32 \\ &\boxed{-30} \end{aligned}$$

14. $3 \lim_{x \rightarrow 8} g(x)$

$$\begin{aligned} &3(x-5) \\ &3(8-5) \\ &3(3) \\ &\boxed{9} \end{aligned}$$

15. $\lim_{x \rightarrow 4} f(x) - h(x) + g(x)$

$$\begin{aligned} &x^2 - 7 - x^2 + 25 + x - 5 \\ &x + 13 \\ &4 + 13 \\ &\boxed{17} \end{aligned}$$

16. $\lim_{x \rightarrow 4} f(x)$ $x^2 - 7 = 16 - 7 = 9$
 $\lim_{x \rightarrow -2} (g \circ h)(x)$ $x^2 - 30 = 4 - 30 = -26$

$$\frac{-9}{26}$$

17. $\lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$

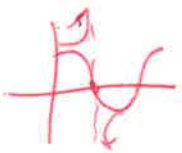
$$\begin{aligned} &\frac{x^2 + 2ah + h^2 - 7 - x^2 + 7}{h} \\ &2a + h \\ &\boxed{2a} \end{aligned}$$

18. $\lim_{m \rightarrow 0} \frac{h(a+m) - h(a)}{m}$

$$\begin{aligned} &\frac{x^2 + 2am + m^2 - 25 - x^2 + 25}{m} \\ &2a + m \\ &\boxed{2a} \end{aligned}$$

19. $\lim_{\theta \rightarrow \frac{\pi}{2}} (\sec \theta)$ $\sec \frac{\pi}{2}$

$\boxed{\text{DNE}}$

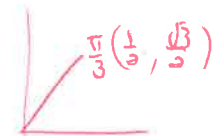


20. $\lim_{\theta \rightarrow \frac{7\pi}{4}} (\sin \theta)$ $\sin \frac{7\pi}{4} = \frac{-\sqrt{2}}{2}$

$$\boxed{\frac{-\sqrt{2}}{2}}$$

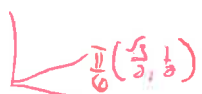
21. $\lim_{\theta \rightarrow \frac{4\pi}{3}} (\cot \theta)$ $\cot \frac{4\pi}{3} = \frac{1}{\frac{\sqrt{3}}{2}} = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

$$\boxed{\frac{2\sqrt{3}}{3}}$$



22. $\lim_{\theta \rightarrow \frac{5\pi}{6}} (\cos \theta)$ $\cos \frac{5\pi}{6} = \frac{-\sqrt{3}}{2}$

$$\boxed{\frac{-\sqrt{3}}{2}}$$



23. $\lim_{\theta \rightarrow \frac{3\pi}{2}} (\csc \theta)$ $\csc \frac{3\pi}{2} = -1$



24. $\lim_{\theta \rightarrow \pi} (\tan \theta)$ $\tan \pi = 0$



Limits Worksheet #1

Find each limit.

1. $\lim_{x \rightarrow 0} \left(\frac{\sqrt{5+x} - \sqrt{5}}{x} \right)$ $\frac{(\sqrt{5+x} + \sqrt{5})}{(\sqrt{5+x} + \sqrt{5})}$

$\lim_{x \rightarrow 0} \frac{\cancel{5+x} - \cancel{5}}{x(\sqrt{5+x} + \sqrt{5})} = \lim_{x \rightarrow 0} \frac{1}{\sqrt{5+x} + \sqrt{5}} = \frac{1}{2\sqrt{5}}$
 $= \boxed{\frac{\sqrt{5}}{10}}$

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

$\lim_{x \rightarrow 2} \frac{\cancel{16} - \cancel{18+x}}{(x-2)(4 + \sqrt{18-x})} = \lim_{x \rightarrow 2} \frac{1}{4 + \sqrt{18-x}}$
 $= \boxed{\frac{1}{8}}$

3. $\lim_{x \rightarrow 7} |x - 12|$

$\boxed{5}$

4. $\lim_{x \rightarrow 0} \left(\frac{\frac{1}{x+1} - 1}{x} \right)$ $\frac{1 - \cancel{x+1}}{x+1}$

$\lim_{x \rightarrow 0} \frac{-x}{x+1} \cdot \frac{1}{x} = \lim_{x \rightarrow 0} \frac{-1}{x+1} = \boxed{-1}$

5. $\lim_{x \rightarrow 0} \left(\frac{\frac{1}{2+x} - \frac{1}{2}}{x} \right)$ $\frac{2 - \cancel{2+x}}{2(2+x)}$

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

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

$\boxed{3}$

Use the following functions for #'s 7 - 18:

$f(x) = x^2 - 7$

$g(x) = x - 5$

$h(x) = x^2 - 25$

7. $\lim_{x \rightarrow 4} f(x)$

$\lim_{x \rightarrow 4} x^2 - 7$
 $\boxed{9}$

8. $\lim_{x \rightarrow -3} h(x)$

$\lim_{x \rightarrow -3} x^2 - 25$
 $\boxed{-16}$

9. $\lim_{x \rightarrow 2} g(x)$

$\lim_{x \rightarrow 2} x - 5$
 $\boxed{-3}$

10. $\lim_{x \rightarrow 5} (f \circ g)(x)$

$(x-5)^2 - 7$
 $x^2 - 10x + 25 - 7$

$\lim_{x \rightarrow 5} x^2 - 10x + 18$
 $25 - 50 + 18$
 $\boxed{-17}$

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

$\frac{x^2 - 25}{x - 5} = x + 5$

$\boxed{7}$

12. $\lim_{x \rightarrow 6} (g \circ h)(x)$

$x^2 - 30$

$36 - 30$

$\boxed{6}$