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Note:

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convert it into an indeterm

$f(x)g(x) = \frac{f(x)}{\frac{1}{g(x)}}$ or $f(x$

Example 7 Find $\lim_{x\to}$

Since $\lim_{x\to 0^+} x = 0$ and

must first convert this proc

Using l'Hôpital's Rule, we h

Example 8 Find $\lim_{x\to}$

Since $\lim_{x\to\infty} x = \infty$ and

can easily convert it into th

l'Hôpital's Rule, we have:

$$\lim_{x\to\infty} x \tan$$

Example 9 Find $\lim_{x\to}$

It is not difficult to see that

into the quotient $\lim_{x\to\infty} \frac{x}{e}$

we obtain:

$$\lim_{x\to\infty} x^3 e^{}$$

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Example 13 Find $\lim_{x\to 1}\Big($

Since $\lim_{x\to 1}\frac{x}{x-1} = \infty$ and l

must first convert this using a

$$\lim_{x\to 1}\left(\frac{x}{x-1} - \frac{1}{\ln\right.$$

Since $\lim_{x\to 1}(x\ln x - x + 1)$

of type $\frac{0}{0}$. We can therefore a

$$\lim_{x\to 1}\left(\frac{x}{x-1} - \frac{1}{\ln x}\right) =$$

Since the limits of both the nu

$$\lim_{x\to 1}\left(\frac{x}{x-1\right.$$

SOLU

1. $\lim_{x \to}$

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2. $\lim_{x \to}$

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3. $\lim_{x \to}$

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4. $\lim_{x \to}$

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5. $\lim_{x \to}$

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6. $\lim_{x \to}$

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13.

14.

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16.

21. $\lim_{x\to\infty} \frac{\ln(x-10)}{\ln(4x+1)}$ $\left(\text{type } \frac{\infty}{\infty}\right)$

$= \lim_{x\to\infty} \frac{\left[\frac{1}{x-10}\right]}{\left[\frac{4}{4x+1}\right]}$

$= \lim_{x\to\infty} \frac{4x+1}{4x-40}$ $\left(\text{type } \frac{\infty}{\infty}\right)$

$= \lim_{x\to\infty} \frac{4}{4} = \frac{4}{4} = 1$

22. $\lim_{x\to 0^+} \frac{\sqrt{x}}{\ln(x+1)}$ $\left(\text{type } \frac{0}{0}\right)$

$= \lim_{x\to 0^+} \frac{\left[\frac{1}{2\sqrt{x}}\right]}{\left[\frac{1}{x+1}\right]}$

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

23. $\lim_{x\to\infty} \frac{e^{4x}}{e^{3x}+x}$ $\left(\text{type } \frac{\infty}{\infty}\right)$

$= \lim_{x\to\infty} \frac{4e^{4x}}{3e^{3x}+1}$ $\left(\text{type } \frac{\infty}{\infty}\right)$

$= \lim_{x\to\infty} \frac{16e^{4x}}{9e^{3x}} = \lim_{x\to\infty} \frac{16e^{x}}{9} = \infty$

24. $\lim_{x\to 0} \frac{e^{2x}-1}{e^{5x}-1}$ $\left(\text{type } \frac{0}{0}\right)$

$= \lim_{x\to 0} \frac{2e^{2x}}{5e^{5x}} = \lim_{x\to 0} \frac{2}{5e^{3x}} = \frac{2}{5}$

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27. lim

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28. lim

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29. $\lim_{x\to 0^+}\left(\frac{1}{x}\right.$

$= \lim_{x\to 0^+}$

$= \lim_{x\to 0^+}$

$= \lim_{x\to 0^+}$

$= \lim_{x\to 0^+}$

$= \lim_{x\to 0^+}$

30. $\lim_{x\to\infty}\left(\sqrt{x}\right.$

$= \lim_{x\to\infty} \sqrt{}$