7. $\lim_{x\to 0} \dfrac{e^x - 1}{\sin x}$ is an indeterminate form of type $\frac{0}{0}$, so we'll apply l'Hospital's Rule.

$$\lim_{x\to 0} \frac{e^x - 1}{\sin x} \overset{\text{H}}{=} \lim_{x\to 0} \frac{e^x}{\cos x} = \frac{1}{1} = 1$$

8. $\lim_{x\to 0} \dfrac{x + \tan x}{\sin x} \overset{\text{H}}{=} \lim_{x\to 0} \dfrac{1 + \sec^2 x}{\cos x} = \dfrac{1 + 1^2}{1} = 2$

9. This limit has the form $\frac{0}{0}$. $\lim_{x\to 0} \dfrac{\tan px}{\tan qx} \overset{\text{H}}{=} \lim_{x\to 0} \dfrac{p \sec^2 px}{q \sec^2 qx} = \dfrac{p(1)^2}{q(1)^2} = \dfrac{p}{q}$

10. $\lim_{x\to \pi} \dfrac{\tan x}{x} = \dfrac{\tan \pi}{\pi} = \dfrac{0}{\pi} = 0$

11. $\lim_{x\to 0^+} [(\ln x)/x] = -\infty$ since $\ln x \to -\infty$ as $x \to 0^+$ and dividing by small values of x just increases the magnitude of the quotient $(\ln x)/x$. L'Hospital's Rule does not apply.

12. $\lim_{x\to \infty} \dfrac{\ln \ln x}{x} \overset{\text{H}}{=} \lim_{x\to \infty} \dfrac{\frac{1}{\ln x} \cdot \frac{1}{x}}{1} = \lim_{x\to \infty} \dfrac{1}{x \ln x} = 0$

13. This limit has the form $\frac{0}{0}$. $\lim_{t\to 0} \dfrac{5^t - 3^t}{t} \overset{\text{H}}{=} \lim_{t\to 0} \dfrac{5^t \ln 5 - 3^t \ln 3}{1} = \ln 5 - \ln 3 = \ln \frac{5}{3}$

14. $\lim_{x\to \infty} \dfrac{e^x}{x^3} \overset{\text{H}}{=} \lim_{x\to \infty} \dfrac{e^x}{3x^2} \overset{\text{H}}{=} \lim_{x\to \infty} \dfrac{e^x}{6x} \overset{\text{H}}{=} \lim_{x\to \infty} \dfrac{e^x}{6} = \infty$

15. This limit has the form $\frac{0}{0}$. $\lim_{x\to 0} \dfrac{e^x - 1 - x}{x^2} \overset{\text{H}}{=} \lim_{x\to 0} \dfrac{e^x - 1}{2x} \overset{\text{H}}{=} \lim_{x\to 0} \dfrac{e^x}{2} = \dfrac{1}{2}$

16. $\lim_{x\to 0} \dfrac{\cos mx - \cos nx}{x^2} \overset{\text{H}}{=} \lim_{x\to 0} \dfrac{-m \sin mx + n \sin nx}{2x} \overset{\text{H}}{=} \lim_{x\to 0} \dfrac{-m^2 \cos mx + n^2 \cos nx}{2} = \frac{1}{2}(n^2 - m^2)$

17. This limit has the form $\frac{0}{0}$. $\lim_{x\to 0} \dfrac{\sin^{-1} x}{x} \overset{\text{H}}{=} \lim_{x\to 0} \dfrac{1/\sqrt{1 - x^2}}{1} = \lim_{x\to 0} \dfrac{1}{\sqrt{1 - x^2}} = \dfrac{1}{1} = 1$

18. $\lim_{x\to 0} \dfrac{x}{\tan^{-1}(4x)} \overset{\text{H}}{=} \lim_{x\to 0} \dfrac{1}{\frac{1}{1 + (4x)^2} \cdot 4} = \lim_{x\to 0} \dfrac{1 + 16x^2}{4} = \dfrac{1}{4}$