[1] $\dfrac{2p^2+3p+1}{p^2};\ p \neq 0$

[2] $\dfrac{x^2-8x+15}{2x^3 \pm x^2};\ x \neq \dfrac{1}{2}, 0, \pm\dfrac{3}{2}, \pm\dfrac{5}{2}$

[3] $\pm 2 + 3\sqrt{2}$

[4] $x = 0$ or $x = \pm\dfrac{9}{2}$

[5] $p = 2$ or $p = 3$

[6] $\sin\left(\dfrac{5\pi}{12}\right) = \dfrac{\sqrt{6}+\sqrt{2}}{4}$

[7] $\sin\left(\dfrac{5\pi}{12}\right) = \dfrac{\sqrt{2+\sqrt{3}}}{2}$

[8] $\cos\left(\dfrac{11\pi}{12}\right) = \dfrac{\pm\left(\sqrt{2}+\sqrt{6}\right)}{4}$

[9] The number seems to be rational. The digits *3* and *1* seem to keep repeating, so the number is an infinite repeating decimal that can be expressed as a ratio of integers. For example, the ratio $\dfrac{34{,}200{,}769}{990{,}000}$ is equivalent to the given number.

[10] The number is irrational; it cannot be expressed as a ratio of integers because it is neither an infinite repeating decimal nor a terminating decimal.

[11] all real numbers except $\dfrac{1}{2}$ and $\pm\dfrac{4}{3}$

[12] $h(x) = \dfrac{3x^2 + 2x}{4x + 1}$

[13] $\lim\limits_{x \to \pm\infty} h(x) = 0;\ \lim\limits_{x \to \infty} h(x) = 0$

[14] $\lim\limits_{x \to \pm\infty} k(x) = 4;\ \lim\limits_{x \to \infty} k(x) = 4$

[15] $k = 3$

$\tan x + \cot x$	$\sec x \csc x$
$\dfrac{\sin x}{\cos x} + \dfrac{\cos x}{\sin x}$	$\dfrac{1}{\cos x} \sum \dfrac{1}{\sin x}$
$\dfrac{\sin^2 x + \cos^2 x}{\sin x \cos x}$	$\dfrac{1}{\sin x \cos x}$
$\dfrac{1}{\sin x \cos x}$	

[16] domain: all real numbers except $x = k\dfrac{\pi}{2}$, where k is an integer

$$\sec x + \cot x \csc x = \frac{1}{\cos x} + \frac{\cos x}{\sin x} \bullet \frac{1}{\sin x} = \frac{\sin^2 x + \cos^2 x}{\cos x \sin^2 x} = \frac{1}{\cos x \sin^2 x} =$$
$$\frac{1}{\cos x} \bullet \frac{1}{\sin^2 x} = \sec x \csc^2 x$$

[17] domain: all real numbers except $x = k\dfrac{\pi}{2}$, where k is an integer

[18] $\dfrac{3p^2 - 16p + 19}{(p-1)(p-3)(p-4)}$

[19] $\dfrac{1449}{r + 43} + \dfrac{1449}{r - 43} = \dfrac{2898}{437}$

[20] $r = \pm 0.11$ or $r = 2.31$, meaning that relative to still air she traveled at 2.31 mph (since ± 0.11 mph does not make sense).

[21] ∞

[22] $\pm\infty$

[23] ∞

[24] The equation is not an identity; the graphs do not coincide.