Question 1: Write as a single simplified fraction: $\dfrac{x}{x^2-1} - \dfrac{5}{2x^2+x-3}$

[4]

Question 2: Solve for x: $\dfrac{x^3+3x^2-5x}{x^2+9} = 0$

[3]

Question 3: Simplify: $\left(\dfrac{x^3}{\sqrt{xy}}\right)\left(\dfrac{2y^{2/3}}{(2xy)^3}\right)$

[3]

Question 4: Expand and simplify: $(t - 5)^2 - 2(t + 3)(8t - 1)$

[3]

Question 5: Rationalize and simplify: $\dfrac{\sqrt{2 + h} + \sqrt{2 - h}}{h}$

[4]

Question 6: A certain line L has twice the slope of the line $2x + 3y = 7$ and the two lines intersect at $x = 2$. Determine an equation for the line L. (For your final answer use any form of the equation of a line you wish.)

[3]

Question 7: Determine $\sin\left(5\pi/3\right) - \sec\left(4\pi/3\right)$. Express your answer as a single simplified fraction.

[3]

Question 8: If $\tan\left(\theta\right) = -2$ where $3\pi/2 < \theta < 2\pi$ then determine $\csc\left(\theta\right)$.

[3]

Question 9: Find all values of x in the interval $[0, 2\pi]$ for which $2\tan(x) = \sin\left(x\right)$.

[4]

Question 10: Determine the domain of $f(x) = \dfrac{x}{3 - \sqrt{x-2}}$.

[3]

Question 11: Evaluate and simplify the difference quotient $\dfrac{f(a+h) - f(a)}{h}$ where $f(x) = \dfrac{1}{x}$.

[4]

Question 12: A sphere (or ball) of radius r has volume $V = 4\pi r^3/3$ and surface area $S = 4\pi r^2$. Express the surface area as a function of the volume.

[3]

Question 13: Evaluate the following limits, if they exist:

(a) $\displaystyle \lim_{x \to -1} \frac{x-1}{x\sqrt{x^2+8}}$

[2]

(b) $\displaystyle \lim_{x \to 2} \frac{x^2-4}{x^2+4x-12}$

[2]

(c) $\displaystyle \lim_{h \to 0} \frac{\dfrac{1}{(3+h)^2} - \dfrac{1}{9}}{h}$

[3]

(d) $\displaystyle \lim_{x \to 2} \frac{x-2}{\sqrt{x} - \sqrt{4-x}}$

[3]