

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

[4]

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

[3]

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

[3]

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

[3]

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

[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 $\sin(5\pi/3) - \sec(4\pi/3)$. Express your answer as a single simplified fraction.

[3]

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

[3]

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

[4]

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

[3]

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

[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) $\lim_{x \rightarrow -1} \frac{x - 1}{x\sqrt{x^2 + 8}}$

[2]

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

[2]

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

[3]

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

[3]