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(1) (a) Show that the equation $\frac{1}{x}+\frac{1}{x+1}=\frac{7}{12}$ can be written as $\frac{2x+1}{x(x+1)}=\frac{7}{12}$
(b) Now show that the equation can be written as $7x^2-17x-12=0$
(c) Use the quadratic equation (or factorise) to find the **two** solutions to the equation $\frac{1}{x}+\frac{1}{x+1}=\frac{7}{12}$

(2) (a) Show that the equation $\frac{1}{x+1}+\frac{2}{x+3}=\frac{17}{35}$ can be written as:
$17x^2-37x-124=0$
(b) Use the quadratic equation for $17x^2-37x-124=0$ to show that the two solutions of the equation $\frac{1}{x+1}+\frac{2}{x+3}=\frac{17}{35}$ are $x=4$ and $x=\frac{-31}{17}$

(3) Solve each equation below giving answers to 3SF where appropriate/possible.
(a) $\frac{4}{x+6}-\frac{3}{x}=\frac{5}{2}$ (b) $\frac{3}{x-1}+\frac{4}{x+2}=-\frac{39}{14}$ (c) $\frac{x}{4}+\frac{2}{x+7}=1\frac{5}{12}$

(d) $\frac{5}{2x+1}=\frac{3}{x-3}-\frac{22}{9}$ (e) $\frac{4}{3x-1}=\frac{7}{4x+1}+1\frac{1}{3}$ (f) $\frac{1}{x-1}-\frac{1}{x}+\frac{1}{x+1}=0$

(4) Fred cycles for 20 miles with an average speed of s miles per hour. He then immediately cycles a further 30 miles. His average speed for the 30 miles was 5 miles per hour faster than his speed for the first 20 miles.
Given that Fred took 2 hours and 50 minutes for the 50 miles:
(a) Show that $17s^2-215s-600=0$
(b) Hence find Fred's average speed for each section of the ride.

(5) Karen has two different plastic blocks. One has a mass of $500g$ and the other $600g$. The density of the $500g$ block is $5g/cm^3$ less than the density of the $600g$ block. Given that the combined volume of the two blocks is $49cm^3$, find the density of each block.

(6) A number and twice its reciprocal sum to $\frac{177}{56}$. Find the number given that it's greater than two.

(7) Bob writes out the sequence $\frac{1}{2}+\frac{3}{4}+\frac{5}{6}+\frac{7}{8}$....
Find the two consecutive terms in the sequence that sum to $\frac{505}{264}$

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