7 MUST KNOW QUESTIONS TO *CONQUER*

LINEAR EQUATIONS

1	Solve the following equations. (a) $\frac{2x}{3} = -54$, (b) $6(x-1) - 2(x+2) = 12$.	 [2] [2]
2	Solve the following equations. (a) $4x + 7 = 2x - 9$ (b) $3(2y+1) = 2(1-y)$ (c) $\frac{1}{2z+1} = \frac{4}{3z-6}$	 [1] [2] [3]
3	Mary is *x* years old and James is 8 years older than her. Their mother is 3 times as old as Mary and their father is twice as old as James. (a) Write down expressions, in terms of *x*, for (i) Jame's age, (ii) their father's age (b) Given that the sum of the ages of the four members of the family is 129, find Mary's age.	 [1] [1] [2]
4	Solve each of the following equations. (a) $\frac{7-2x}{3} - 4x = -1$ (b) $\frac{2}{4-x} - \frac{5}{2x+3} = 0$	 [2] [2]

5	(a) It is given that $x = 2$ is the solution of the equation $10 - 3px = 6p - 4x$. Find the value of p. (b) Solve the equation $\frac{x-2}{4} = 1 - \frac{2x+5}{3}$.	[2] [3]
6	In a restaurant, the number of people who ordered Western food is 3 times the number of people who ordered Chinese food. Let the number of people who ordered Chinese food be x. (a) Write an expression for the number people who ordered Western food. (b) 20 people who ordered Western food now switched their order to Chinese food. Express, in terms of x, (i) the number of people who ordered Western food after the switch, (ii) the number of people who ordered Chinese food after the switch. (c) The number of people who ordered Western food and Chinese food are now the same. Form an equation in x to represent this information. (d) Solve the equation in **(c)** for x and thus find the number of people who ordered Chinese food after the switch. Ans: (a) $3x$ (bi) $3x - 20$ (ii) $x + 20$ (c) $x + 20 = 3x - 20$ (d) 40	[1] [1] [1] [2]
7	(a) Express $\frac{5(x-2)}{4} - \frac{(1-2x)}{3}$ as a fraction with a single denominator. Hence, solve $\frac{5(x-2)}{4} - \frac{(1-2x)}{3} = 2$. (b) Given that $a = 0.3$, $b = -2$ and $c = 1\frac{4}{5}$, evaluate $\frac{8c}{a-b^2}$. Ans: (a) $x = 2\frac{12}{23}$ (b) $x = -3\frac{33}{37}$	[4] [2]

Answer Key

1	Solutions: (a) $\frac{2x}{3} = -54$ $2x = -162$ $x = -81$ (b) $6(x-1) - 2(x+2) = 12$ $4x - 10 = 12$ $4x = 22$ $x = 5\frac{1}{2}$ or 5.5 Ans: (a) $x = -81$ (b) $x = 5.5/5\frac{1}{2}$	
2	Solutions: (b) $3(2y+1) = 2(1-y)$ $6y + 3 = 2 - 2y$ $8y = -1$ $y = -\frac{1}{8}$ (c) $\frac{1}{2z+1} = \frac{4}{3z-6}$ $3z - 6 = 4(2z+1)$ $3z - 6 = 8z + 4$ $5z = -10$ $z = -2$ Ans: (a) $x = -8$ (b) $y = -\frac{1}{8}$ (c) $z = -2$	
3	Solutions: (b) $x + x + 8 + 3x + 2x + 16 = -129$ $7x + 24 = 129$ $x = 15$ Ans: (a) $(x+8)$ years old (aii) $2x + 16$ years old (b) Mary's age is 15 years old.	
4	Solutions: (a) $\frac{7-2x}{3} - 4x = -1$ $\frac{7-2x}{3} = -1 + 4x$ $7 - 2x = 3(-1 + 4x)$ $7 - 2x = -3 + 12x$ $10 = 14x$ $x = \frac{5}{7}$ (b) $\frac{2}{4-x} - \frac{5}{2x+3} = 0$ $\frac{2}{4-x} = \frac{5}{2x+3}$ $2(2x+3) = 5(4-x)$ $4x + 6 = 20 - 5x$ $9x = 14$ $x = 1\frac{5}{9}$ Ans: (a) $x = \frac{5}{7}$, (b) $x = 1\frac{5}{9}$	

5 Solutions:

(a) Sub $x = 2$ into equation,

$10 - 3(2)p = 6p - 4(2)$

$12p = 18$

$p = \frac{3}{2}$ or $1\frac{1}{2}$ or 1.5

(b) $\frac{x-2}{4} = 1 - \frac{2x+5}{3}$

$\frac{x-2}{4} = \frac{2x+5}{3} = 1$

$\frac{3(x-2)}{12} + \frac{4(2x+5)}{12} = 1$

$3x - 6 + 8x + 20 = 12$

$11x = -2$

$x = -\frac{2}{11}$

Ans: (a) $1\frac{1}{2}$, (b) $-\frac{2}{11}$

6 Solutions:

(d) $x + 20 = 3x - 20$

$2x = 40$

$x = 20$

$x + 20 = 40$

Ans: (a) $3x$ (bi) $3x - 20$ (ii) $x + 20$ (c) $x + 20 = 3x - 20$ (d) 40

7 Solutions:

(a) $\frac{5(x-2)}{4} - \frac{1-2x}{3}$

$= \frac{15(x-2)-4(1-2x)}{15}$

$= \frac{15x-30-4+8x}{12}$

$= \frac{23x-34}{12}$

$= \frac{5(x-2)}{4} - \frac{1-2x}{3} = 2$

$= \frac{23x-34}{12} = 2$

$= 23x - 34 = 24$

$x = 2\frac{12}{23}$

(b) $\frac{8\left(1\frac{4}{5}\right)}{(0.3)-(-2)^2} = 2$

$= -3\frac{33}{37}$

Ans: (a) $x = 2\frac{12}{23}$ (b) $x = -3\frac{33}{37}$