



8 ESSENTIAL QUESTIONS TO MASTER

BASIC ALGEBRA

1	Simplify the following: (a) $6(x + 2y) + 2(3x - 4y)$ (b) $\frac{4p-2q}{3} - \frac{5p-3q}{6}$	[2] [2]
2	Factorise the following completely: (a) $-3ab - 27bc$ (b) $30d^2e - 40de + 50cde$	[1] [1]
3	Simplify the following expression: $6 - 2[5 - (4 - 3x)]$	[3]
4	Factorise the following expression completely: (a) $45mn - 30mm$ (b) $-12ax + 16ay - 4a$ (c) $6u(3v - 2) - 3(9v - 6)$	[1] [1] [2]
5	Write an algebraic expression, in its simplest form, for each of the following statements. Divide $3x$ by $6y$. Add 20 to the product of p and q . Subtract $5d + 4$ from the sum of $4d$ and 5.	[3]
6	(a)(i) Given that $a = 4, b = 2, c = 3$, find the value of $ac^2 - 4b^2$ (ii) Given that $d = \frac{1}{2}, e = \frac{3}{4}, f = \frac{2}{5}$, find the value of $\frac{de-5f}{def}$. (b) Express $\frac{3(x+4)}{6} - \frac{2(x-3)}{5}$ as a single fraction in its simplest form.	[1] [1] [1]
7	Express $(\frac{y-2}{5} - \frac{y+4}{7} + 1)$ as a single fraction in its lowest term.	[3]
8	(a) Subtract the sum of $(3y - x)$ and $(2x + 4y)$ from the sum of $(8x - 2y)$ and $(2(3x + 4))$. (b) If $(a = p + q + r)$, simplify $[(a - p) + (a - q) + (a - r)]^2$.	[2] [2]

Answer Key:

1	(a) Simplify $6(x + 2y) + 2(3x - 4y)$ Distribute the coefficients in each term: $6(x + 2y) = 6x + 12y$ $2(3x - 4y) = 6x - 8y$ Add the like terms: $6x + 12y + 6x - 8y = (6x + 6x) + (12y - 8y) = 12x + 4y$	
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	(b) Simplify $\frac{4p-2q}{3} - \frac{5p-3q}{6}$ Find a common denominator for the fractions: The common denominator is 6. Rewrite: $\frac{4p-2q}{3} = \frac{2(4p-2q)}{6} = \frac{8p-4q}{6}$ Subtract: $\frac{8p-4q}{6} - \frac{5p-3q}{6} = \frac{(8p-4q)-(5p-3q)}{6}$ Simplify the numerator: $8p - 4q - 5p + 3q = (8p - 5p) + (-4q + 3q) = 3p - q$ Hence: $\frac{3p-q}{6}$	
2	(a) $-3b(a + 9c)$ (b) $10de(3d - 4 + 5c)$	
3	Start with the inner parentheses: $4 - 3x$ $5 - (4 - 3x) = 5 - 4 + 3x = 1 + 3x$ Apply the distribution of -2 across $1 + 3x$: $-2[1 + 3x] = -2 - 6x$ Combine with the outer expression: $6 - (-2 - 6x) = 6 + 2 + 6x$ Hence: $8 + 6x$	
4	(a) $5m(9n - 6m)$ (b) $-4a(3x - 4y + 1)$ (c) $3(6uv - 9v)$	
5	For the first statement, "Divide $3x$ by $6y$", the expression is: $\frac{3x}{6y} = \frac{x}{2y}$ For the second statement, "Add 20 to the product of p and q", the expression is: $pq + 20$. For the third statement, "Subtract $5d + 4$ from the sum of $4d$ and 5", the expression is: $(4d + 5) - (5d + 4) = -d + 1$.	
6	(ai) Substitute the given values: $ac^2 - 4b^2$ Calculate c^2 and multiply by a, then calculate $4b^2$ and subtract from the first result. Answer: 20 (aii) Substitute the given values of d, e and f into the expression $\frac{de-5f}{def}$ Calculate de and $5f$, then find the numerator $de-5f$. Calculate def for the denominator and divide to find the fraction. Answer: $\frac{4}{3}$ (b) Find a common denominator for the fractions. $\frac{3(x+4)}{6}$ & $\frac{2(x-3)}{5}$ Answer:	



	$\frac{13x + 38}{30}$	
7	Find a common denominator for the fractions $(\frac{y-2}{5})$ and $(\frac{y+4}{7})$. The least common multiple of 5 and 7 is 35. Rewrite each fraction with common denominator: $\frac{y-2}{5} = \frac{7(y-2)}{35} = \frac{7y-14}{35}$ $\frac{y+4}{7} = \frac{5(y+4)}{35} = \frac{5y+20}{35}$ $\frac{7y-14}{35} - \frac{5y+20}{35} = \frac{(7y-14) - (5y+20)}{35} = \frac{7y-14-5y-20}{35}$ $= \frac{2y-34}{35}$ $1 = \frac{35}{35}$ $\frac{2y-34}{35} + \frac{35}{35} = \frac{2y-34+35}{35} = \frac{2y+1}{35}$ Thus, the expression simplifies to $(\frac{2y+1}{35})$.	
8	a) $(3y - x) + (2x + 4y) = -x + 2x + 3y + 4y = x + 7y$ $2(3x + 4) = 6x + 8$ $(8x - 2y) + (6x + 8) = 8x + 6x - 2y + 8 = 14x - 2y + 8$ $(14x - 2y + 8) - (x + 7y) = 14x - x - 2y - 7y + 8 = 13x - 9y + 8$ b) $(a - p) + (a - q) + (a - r) = a + a + a - p - q - r = 3a - (p + q + r)$ $3a - (p + q + r) = 3(p + q + r) - (p + q + r) = 3p + 3q + 3r - p - q - r$ $= 2p + 2q + 2r$ $2p + 2q + 2r = 2(p + q + r)$ $[2(p + q + r)]^2 = 2^2(p + q + r)^2 = 4(p + q + r)^2$ $4(p + q + r)^2 = 4a^2$	