GCSE to A-Level Transition – worksheet to hand in at the start of Year 12

Please print out this worksheet and write your solutions in the space provided next to each question, or write your solutions on plain paper, clearly identifying each question number.

Please **write full solutions** including all necessary working; do not just write down the answer. We are as interested in your methodology as your ability to get the correct answer to these questions.

Q1 Solve the following quadratic equations

$a)$ $x^2 = 2(7x - 20)$ $b)$ $7x = x^2 + 10$ $c)$ $\frac{x^2}{2} + 2x - 6 = 0$

Q2 Factorise the following expressions

$a)$ $3\pi a^2 + 4\pi ab + 2\pi a$ $b)$ $x^2 - 2xz + z^2$ $c)$ $2p^2 - 98q^2$

Q3 Expand and simplify the following expressions

$a)$ $(p - 1)(p - 2q)^2$ $b)$ $(s^2 + s + 2)(2s^2 - 2s + 4)$

Q4 Express $\left(5^{\frac{1}{4}}\right)^2 \times \left(5^{\frac{2}{3}}\right)^{-\frac{3}{4}} \div (5^{-1})^{-2}$ as 5^k where k is an integer

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Q5 Rationalise the denominator of the following

$a)$ $\dfrac{\sqrt{3}}{\sqrt{20}}$ $b)$ $\dfrac{\sqrt{10}}{4+\sqrt{40}}$ $c)$ $\dfrac{2+2\sqrt{2}}{2-2\sqrt{2}}$

Q6 Solve the following equations

$a)$ $\dfrac{b-7}{3}+\dfrac{b+1}{5}=-1$ $b)$ $\dfrac{q(q+7)}{7}-q=4-q^2$

Q7 Make the variable in brackets the subject of each of the following formulae

$a)\quad y=\dfrac{2x^2-3}{x^2-1}\qquad (x)$

$b)\quad s=\dfrac{\sqrt{t+u}}{u}\qquad (t)$

Q8 Complete the square for each of the following quadratics

$a)\quad 2x^2-3x=10$

$b)\quad -x^2-3x-1$

$c)\quad \dfrac{1}{2}x^2+3x+7$

Q9 Simplify these expressions

$a)\quad \dfrac{x^3+2x^2+x}{x^2-3x-4}$

$b)\quad \dfrac{10x}{x^2-9}\div\dfrac{2x+14}{x-3}$

$c)\quad \dfrac{1}{x+1}-\dfrac{1}{x(x+1)}+\dfrac{1}{x}$

Q10 Solve the following simultaneous equations

$a)$ $y = 4x + 4$ and $y = x^2 + 3x - 8$

$b)$ $x^2 + xy - 10 = 0$ and $y + 2x = -7$