

Mathematics (Fast Track) A Level – Preparatory Work 2022

1. Pick from the box an example of each of the following, (you may use old notes, books or the internet)

- (a) an expression, (b) an equation (c) a constant
(d) a variable, (e) a term, (f) a coefficient
(g) an index (h) an identity

$y = mx + c$	$3x^2 + 2x = 10$	$6x^2$	$a^2 - b^2 \equiv (a-b)(a+b)$
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2. Solve the equations:

(a) $3(2x+5) - (x+8) = 6(3-x)$ (b) $\frac{1}{2}(5x+3) - \frac{1}{4}(7-2x) = 5$

3. Find the values of x and y that simultaneously satisfy:

(a) $3x + 2y = 4$
 $x - 2y = 36$ (b) $7x + y = 25$
 $x^2 + y^2 = 25$

For the equations in part (a), explain how you could have found the solution graphically.

4. Factorise the following:

(a) $5x^2y - 2x$ (b) $3y(x+2) + 6(x+2)^2$

5. Factorise fully the following:

(a) $x^2 + 5x + 6$ (b) $x^2 - 5x + 6$ (c) $x^2 - 5x - 6$
(d) $x^2 + 5x - 6$ (e) $3x^2 - 7x - 6$ (f) $4x^2 - 9$ (g) $6x^2 - 15x + 6$

6. (a) Make h the subject of $\frac{2}{Rt} = mgh + k^2h$.

(b) Make h the subject of $2\pi h = 6x^2 + 2xh$.

(c) Make h the subject of $yh = \frac{10\pi\varepsilon}{h}$.

(d) Make h the subject of $y = 1 + \sqrt{3h+1}$.

7. In 10 years' time James will be four times older than he was 11 years ago.

(a) Write this information in the form of an equation involving James' present age, y years.

(b) How old is James now?

8. Write each of the following expressions as a single fraction in its simplest form:

(a) $\frac{a}{b^2} \times \frac{a^2}{b}$ (b) $2uv^2 \div \frac{u}{v}$ (c) $\frac{1}{4x} + \frac{1}{6x}$

9. Simplify the following fractions:

(a) $\frac{2(x-2)^3}{(x-2)(x+4)}$ (b) $\frac{3y-9}{y^2-9}$ (c) $\frac{6ab+30b^2}{3(2a+5b)}$