

## D Summer IGCSE Revision 7

### 1. Factorise

(a)  $6ax^3 - 21ax^2 + 9ax$ .

$$3ax(2x-1)(x-3)$$

(b)  $3x^3y - 3xy^3$ .

$$3xy(x-y)(x+y)$$

(c)  $2ax^3y - 2x^2y^2$ .

$$2x^2y(ax-y)$$

### 2. Solve

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

$$x = 3 \text{ or } x = \frac{7}{5}$$

(b)  $3\pi x^2 = 7\pi x + 6\pi$ .

$$x = 3 \text{ or } x = -\frac{2}{3}$$

(c)  $\frac{x}{3} - \frac{2x-1}{4} = 3 - x + \frac{x-1}{2}$ .

$$x = \frac{27}{4}$$

3. Simplify  $\frac{x+2}{\frac{3}{x-1} - \frac{1}{x+1}}$ .

$$\frac{x^2-1}{2}$$

4. Given  $f(x) = \frac{3x}{2x-1}$  and  $g(x) = \frac{1}{x+2}$ .

(a) Find  $f^{-1}x$ .

$$f^{-1} = \frac{x}{2x-3}$$

(b) Solve  $\frac{2}{3} = g(x)$ .

$$x = -\frac{1}{2}$$

(c) Find  $fg(-\frac{1}{2})$ .

$$fg(-\frac{1}{2}) = 6$$

(d) Find  $gf(x)$  (fully simplified).

$$gf(x) = \frac{2x-1}{7x-2}$$

5. What are the three inequalities which define the inside of the triangle with vertices (2, 1), (2, -1), (6, -1).

$$x > 2, y > -1, x + 2y < 4$$

6. Find the equation of the tangent to the curve  $y = x^3 - 3x^2 + x - 2$  when  $x = 2$ . Find also where this tangent intersects the  $x$ -axis.

$$y = x - 6, (6, 0)$$

7. Find the coordinates of the point(s) on the curve  $y = -\frac{1}{x} - 3x$  with gradient 1.

$$(\frac{1}{2}, -\frac{7}{2}), (-\frac{1}{2}, \frac{7}{2})$$