

IGCSE Revision Worksheet 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. $(\frac{1}{2}, -\frac{7}{2}), (-\frac{1}{2}, \frac{7}{2})$