Cambridge International AS & A Level

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Mathematics 9709/32

Paper 3 Pure Mathematics 3 **May/June 2021**

Question No (1)

1 Solve the inequality $|2x-1| < 3|x+1|$.

Solution:

$$|2x-1| < 3|x+1|$$

$$squaring$$

$$(2x-1)^2 < 3^2(x+1)^2$$

$$4x^2 - 4x + 1 < 9(x^2 + 2x + 1)$$

$$4x^2 - 4x + 1 < 9x^2 + 18x + 9$$

$$4x^2 - 4x + 1 - 9x^2 - 18x - 9 < 0$$

$$-5x^2 - 22x - 8 < 0$$

$$-(5x^2 + 22x + 8) < 0$$

Algebraic Properties

$$a < 0$$

$$-a > 0$$

$$5x^2 + 22x + 8 > 0$$

$$5x^2 + 22x + 8 > 0$$

$$factorizing$$

$$5x^2 + 20x + 2x + 8 > 0$$

$$5x(x+4) + (x+4) > 0$$

$$(x+4)(5x+2) > 0$$

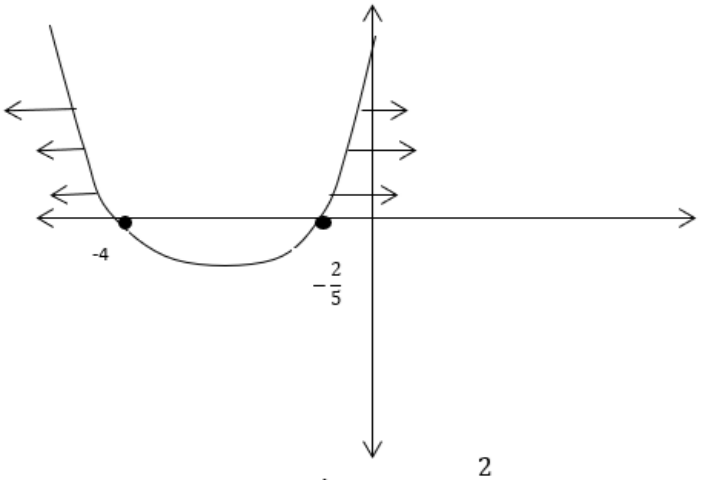
$$critical\ values$$

$$x + 4 = 0, \qquad 5x + 2 = 0$$

$$x = -4, \qquad x = -\frac{2}{5}$$

$$As\ (x+4)(5x+2) > 0$$

We shall consider the graph above the $x-axis$



$x < -4, \quad x > -\frac{2}{5}$