

QQQ – Further Pure 1 – Chapter 4 – Inequalities (Version 1)

Total Marks: 22

(22 = Platinum, 20 = Gold, 18 = Silver, 15 = Bronze)

1.

- (a) Use algebra to determine the values of x for which

$$\frac{5x}{x-2} \geq 12$$

(4)

- (b) Hence, given that x is an integer, deduce the value of x .

(1)

(Total 5 marks)

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2.

In this question you must show all stages of your working.

Solutions relying entirely on calculator technology are not acceptable.

- (a) Sketch the graph of the curve with equation

$$y = \frac{1}{x^2}$$

(2)

- (b) Solve, using algebra, the inequality

$$3 - 2x^2 > \frac{1}{x^2}$$

(5)

(Total 7 marks)

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3. A physics student is studying the movement of particles in an electric field. In one experiment, the distances in micrometres of two moving particles, A and B , from a fixed point O are modelled by

$$d_A = |5t - 31|$$

$$d_B = |3t^2 - 25t + 8|$$

respectively, where t is the time in seconds after motion begins.

- (a)** Use algebra to find the range of time for which particle A is further away from O than particle B is from O . **(8)**

It was recorded that the distance of particle B from O was less than the distance of particle A from O for approximately 4 seconds.

- (b)** Use this information to assess the validity of the model. **(2)**

(Total 10 marks)