| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Total |
|----------|---|---|---|---|---|---|---|---|---|-------|
| Marks    |   |   |   |   |   |   |   |   |   |       |
| Max Marks | 6 | 6 | 7 | 4 | 4 | 3 | 5 | 6 | 5 | 46 |

**Complete the following questions under exam conditions.**

**Time allowed: 50 minutes**

**Question 1**

(a)

Solve the inequality $2 - x < 1 + 3(x - 2)$. [3]

(b)

Solve the following.

$$-6 < 2x - 1 < 7$$ [3]

**Question 2**

(i) Solve these simultaneous equations.

$$3x + 4y = 18$$
$$7x - 3y = 5$$ [4]

(ii) Draw a rough sketch of the lines to demonstrate graphically the solution to part **(i)**. [2]

**Question 3**

(i) Simplify the equation $\dfrac{x+a}{x} + \dfrac{x-2}{4} = 0$, leaving your answer in the form $(x+p)^2 = q$

where $p$ is an integer and $q$ is given in terms of the constant $a$. [3]

(ii) Hence write down the range of values of $a$ for which the equation has real roots. [2]

(iii) Using your answer to part **(i)**, solve the equation when $a = -1$, giving your answers **exactly**. [2]

**Question 4**

A car, P, accelerates from rest from a point O.

P accelerates uniformly at $2\,\text{ms}^{-2}$.

(i) Write down the formula for the displacement, $s$ metres, of P at time $t$ seconds after leaving O. [1]

(ii) Using appropriate units, find the time taken for P to reach a speed of $90\,\text{km}\,\text{h}^{-1}$. [3]

**Question 5**

Find the equation of the line which is perpendicular to the line with equation $2x + 3y = 4$ and which passes through the point $(3, -1)$. [4]

**Question 6**

The coordinates of A and B are (1, 5) and (−3, 7) respectively.

(i) Calculate the **exact** length of AB. [2]

(ii) Find the coordinates of the midpoint of AB. [1]

**Question 7**

(i) Solve algebraically the simultaneous equations $y = 3 + 5x - x^2$ and $y = x + 7$. [4]

(ii) Interpret your answer geometrically. [1]

**Question 8**

Four points have coordinates A(−5, −1), B(0, 4), C(7, 3) and D(2, −2).

(i) Using gradients of lines, prove that ABCD is a parallelogram. [2]

(ii) Using lengths of lines, prove further that ABCD is a rhombus. [2]
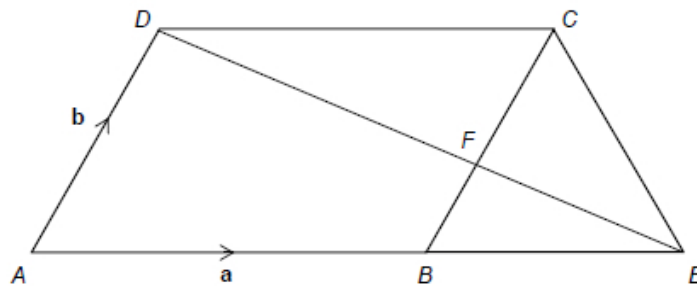
(iii) Prove that ABCD is not a square. [2]

**Question 9**

*ABCD* is a parallelogram.

*ABE* is a straight line and $AB : BE = 3 : 2$.

*BC* and *ED* intersect at *F*.

$\overrightarrow{AB} = \mathbf{a}$ and $\overrightarrow{AD} = \mathbf{b}$.

Not drawn accurately



(a) Work out $\overrightarrow{ED}$ in terms of **a** and **b**.

Give your answer in its simplest form.

(3)

(b) Deduce $\overrightarrow{EF}$ in terms of **a** and **b**.

(2)

(5 marks)