

Question	1	2	3	4	5	6	7	8	Total	
Marks										
Max Marks	2	4	5	4	5	3	5	4	32	%

TRY IN **EXAM CONDITIONS FIRST** (35 MINUTES), THEN USE THE MARK SCHEME TO SCORE AND *HELP* CORRECT YOUR WORK.

ONCE YOU'VE SELF-ASSESSED YOUR UNDERSTANDING, MAKE USE OF SUBJECT SUPPORT TO HELP YOU COMPLETELY UNDERSTAND ALL QUESTIONS.

1. Express $\frac{2}{3-x} + \frac{3}{1+x}$ as a single fraction in its simplest form.

(2 marks)

2. Express $3x^2 - 5x + 1$ in the form $a(x + b)^2 + c$

(4 marks)

3. Solve the equation

$$x^6 + 26x^3 - 27 = 0$$

(5 marks)

4. Solve the equation

$$2^{2x+5} - 7(2^x) = 0$$

giving your answer to 2 decimal places.

(Solutions based entirely on graphical or numerical methods are not acceptable.)

(4 marks)

5. Solve the equation

$$2y^{\frac{1}{2}} - 7y^{\frac{1}{4}} + 3 = 0$$

(5 marks)

6. The line l_1 has equation $3x + 5y - 2 = 0$.

The line l_2 is perpendicular to l_1 and passes through the point (3,1).

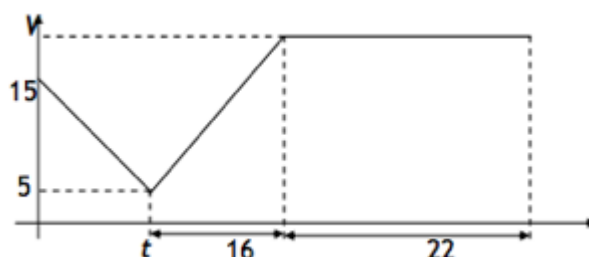
Find the equation of l_2 in the form $y = mx + c$, where m and c are constants.

(3 marks)

7. A car moves along a horizontal straight road, passing two points A and B . At A the speed of the car is 15 ms^{-1} . When the driver passes A , he sees a warning sign W ahead of him, 120 m away. He immediately applies the brakes and the car decelerates with uniform deceleration, reaching W with speed 5 ms^{-1} .

At W , the driver sees that the road is clear. He then immediately accelerates the car with uniform acceleration for 16 s to reach a speed of $V \text{ ms}^{-1}$ ($V > 15$). He then maintains the car at a constant speed of $V \text{ ms}^{-1}$. Moving at this constant speed, the car passes B after a further 22 s .

A speed-time graph to illustrate the motion of the car as it moves from A to B is sketched below.



The distance from A to B is 1 km .

Find the value of V .

(5 marks)

8.

(a)



A particle P is moving along a straight line with constant acceleration. Initially the particle is at O . After 9 s , P is at a point A , where $OA = 18 \text{ m}$ (see diagram) and the velocity of P at A is 8 ms^{-1} in the direction OA .

The initial speed of P is 4 ms^{-1} .

Find the acceleration of P .

(2 marks)

- (b) A particle accelerates uniformly whilst moving on a straight line from A to B . A and B are 240 m apart. The particle takes 18 seconds to travel from A to B . At B , the velocity of the particle is 6 ms^{-1} .

Find the velocity of the particle at A .

(1 mark)

- (c) A particle is moving along a straight line with constant deceleration 2.5 ms^{-2} . At $t = 0$, the velocity of the particle is 8 ms^{-1} .

Find the time taken for the velocity of the particle to become 3 ms^{-1} .

(1 mark)