SCAN ME

crashMATHS

C1 PAPERS

PRACTICE PAPER A

crashmathsworksheets

75 MARKS / 1 HOUR 30 MINUTES

1 Find

$$\int (12x^{\frac{3}{4}} - 6(x + \frac{1}{x^2}) - 2)\, dx$$

giving each term in its simplest form. **(4)**

Question 1 continued

TOTAL 4 MARKS

2 Express $\frac{4+2\sqrt{7}}{5-2\sqrt{7}}$ in the form $a+b\sqrt{7}$ **(5)**

Question 2 continued

TOTAL 5 MARKS

3 The curve $y = f(x)$ is defined such that $y = x^2(x-3)$.

(a) In the space below, sketch the curve $y = f(x)$. **(3)**

On each sketch, you should clearly indicate the coordinates of any points where the curve crosses or meets the coordinate axis.

(b) Work out the gradient of the curve when $x = -1$. **(4)**

The tangent to the curve when $x = -1$ has equation $ax + by + c = 0$

(c) Calculate the values of a, b and c. **(3)**

Question 3 continued

Question 3 continued

Question 3 continued

TOTAL 10 MARKS

4 Solve

$$(3^{2x}) - 90(3^{x}) + 729 = 0$$

(5)

Question 4 continued

TOTAL 5 MARKS

5 A sequence of numbers, $a_1, a_2, a_3 \ldots$ is defined by

$$a_1 = 2, a_2 = 6$$

$$a_{n+2} = 10a_{n+1} - a_n + x$$

where x is a positive constant.

(a) Find $\sum_{r=1}^{4} a_r$ in terms of x. **(4)**

Given that $\sum_{r=1}^{4} a_r = 676$,

(b) Find the value of x. **(2)**

Question 5 continued

Question 5 continued

Question 5 continued

TOTAL 6 MARKS

6 Differentiate, with respect to x

(i) $\frac{2}{3}(x-2x)(x-3)$ **(4)**

(ii) $\frac{x^3-100x}{x^3-10x^2}$ **(5)**

Question 6 continued

TOTAL 9 MARKS

7 John works in a water company and one of his jobs is to manage the level of water within a particular tank.

The height of water , d m, must be such that $d_1 < d < d_2$.

Given the conditions that

$$d^2 - 200d + 7500 < 0$$

$$2(d - 200) > d - 325$$

Work out the value of d_1 and d_2. **(7)**

Question 7 continued

TOTAL 7 MARKS

8 The line l_1 has equation $y+8=2(x-4)$.

The l_1 crosses the x axis at the point A and the y axis at the point B.

Another line l_2 is perpendicular to l_1 and passes through the midpoint of AB.

The line l_2 crosses the x axis at the point C.

Find the distance BC. **(8)**

Question 8 continued

Question 8 continued

Question 8 continued

TOTAL 8 MARKS

9 A curve is defined by

$$\frac{x+2y-4}{5}=\frac{x(2x+5)}{3}.$$

Show that the curve has two distinct real roots. **(6)**

Question 9 continued

TOTAL 6 MARKS

10 A curve has equation $y = x^3 + ax^2 - 5x + b$ and passes through the point (5, -2).

Given that $\frac{dy}{dx} = 3x^2 + 10x - 5$,

Work out the values of a and b. **(7)**

Question 10 continued

TOTAL 7 MARKS

11 Alice decides to donate a small proportion of her savings to charity each week. She saves £150 each week. In the first week, Alice donates £1.05, in the second week, she donates £1.15, in the third week, she donates £1.25, and so on, such that her donations follow an arithmetic progression.

Given that Alice donates 2.5% of her earnings in the n th week, calculate the total amount she donates over the n week period. **(8)**

Question 11 continued

Question 11 continued

Question 11 continued

END OF PAPER

TOTAL 8 MARKS

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