3. (a) The P.O. Savings Bank raised its interest rates this year as follows:

Amount of Deposit	Old Rate	New Rate
	%	%
Up to £500	2½	3
£500 to £1,000	2	3
£1,000 to £5,000	1½	2½

(i.e., a man who has £1,300 in the Bank would get under the old rate 2½ per cent on the first £500, 2 per cent on the next £500, and 1½ per cent on the remaining £300.)

Find the increase in interest received under the new rates over a period of six months by a man who has a total deposit of £1,100.

(7 marks)

(b) A tradesman marks his goods at 40 per cent above cost, but allows a cash discount of 10 per cent on the marked prices. What is his net gain per cent on a cash sale?

(3 marks)

(c) 100 lb. of wheat yields 70 lb. of flour, and there is 100 lb. of flour in 130 lb. of bread. How much wheat, to the nearest lb., is used in making 100 lb. of bread?

(4 marks)

4. (a) The volume of a sphere is given by the formula, $V = \frac{4}{3}\pi r^3$. Use logarithms to find, correct to 3 significant figures, the value of V when $r = 1{\cdot}07$ in.

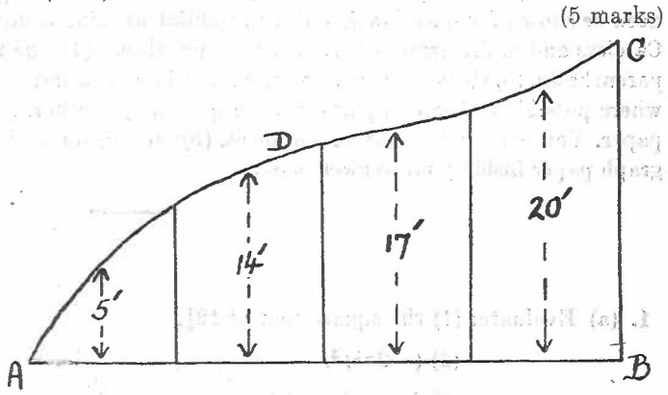
(6 marks)

(b) Simplify: $\dfrac{1}{a(a-b)} + \dfrac{3}{ab} + \dfrac{1}{b(b-a)}$

(5 marks)

(c) **Either—**

By means of the Mid-ordinate Rule or otherwise, calculate the area of the irregular figure ABCD. All ordinates and mid-ordinates shown are evenly spaced. The length of AB is 50 ft.



(4 marks)

Or—

A class of fifteen pupils in a mathematics examination gained the following marks (in ascending order): 23, 36, 37, 42, 42, 47, 49, 51, 51, 51, 53, 54, 59, 67, 73.

Find the Mean, Median, and the Quartile Deviation.

(4 marks)

5. (a) Find the sum of three consecutive odd numbers of which the least is $(x-1)$.

(2 marks)

(b) Factorise: (1) $x\,(y-4) - (y-4.)$
(2) $1 - 8a^3$.

(3 marks)

(c) If $f\,(x) \equiv x^2 - 4$, solve the equation $f\,(x-2) = 0$.

(4 marks)

(d) For what value of c is $(x+2)$ a factor of $x^3 + cx + 16$?

(3 marks)

(e) If $x + \dfrac{1}{x} = 2y$, express $x^2 + \dfrac{1}{x^2}$ in terms of y.

(4 marks)

6. (a) For a run of 60 miles a train can save 10 minutes if its usual average speed is increased by 4 m.p.h. Find its usual speed.

(8 marks)

(b) From the formula $t = 2\pi\sqrt{\dfrac{l}{g}}$ find an expression for l in terms of t and g. (i.e., make l the subject of the formula).

(3 marks)

(c) A man cycles at 12 m.p.h.; how many minutes does he take to go $0{\cdot}8n$ miles?

(3 marks)

7. (a) Draw the graph of $y = x^2 - x - 2$ for values of x from -3 to $+4$.

Use your graph to answer the following:

For what values of x is the expression $x^2 - x - 2$
(1) negative, (2) equal to 0, (3) equal to 4.

Hence solve the equation: $x^2 - x - 6 = 0$.

(8 marks)

(b) Draw (1) the line $x - 3y + 7 = 0$.
(2) the line through the point $(-1, 7)$ with gradient -5. Find the equation of this line.

(5 marks)

(c) By means of your graph, or algebraically, solve the equations: $3y - x = 7$.
$3x + y = 4$. (2 marks)

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