



**FINAL**  
Examination Paper

(COVER PAGE)

Session : April 2015

Programme : Diploma In Information And Communication Technology (DICTN)

Course : **MAT1103 : Fundamentals Of Mathematics**

Date of Examination : August 7, 2015

Time : 11:00am – 1:00pm Reading Time: \_\_\_\_\_

Duration : 2 Hours

Special Instructions :

Answer any **FOUR (4)** structured-type questions.

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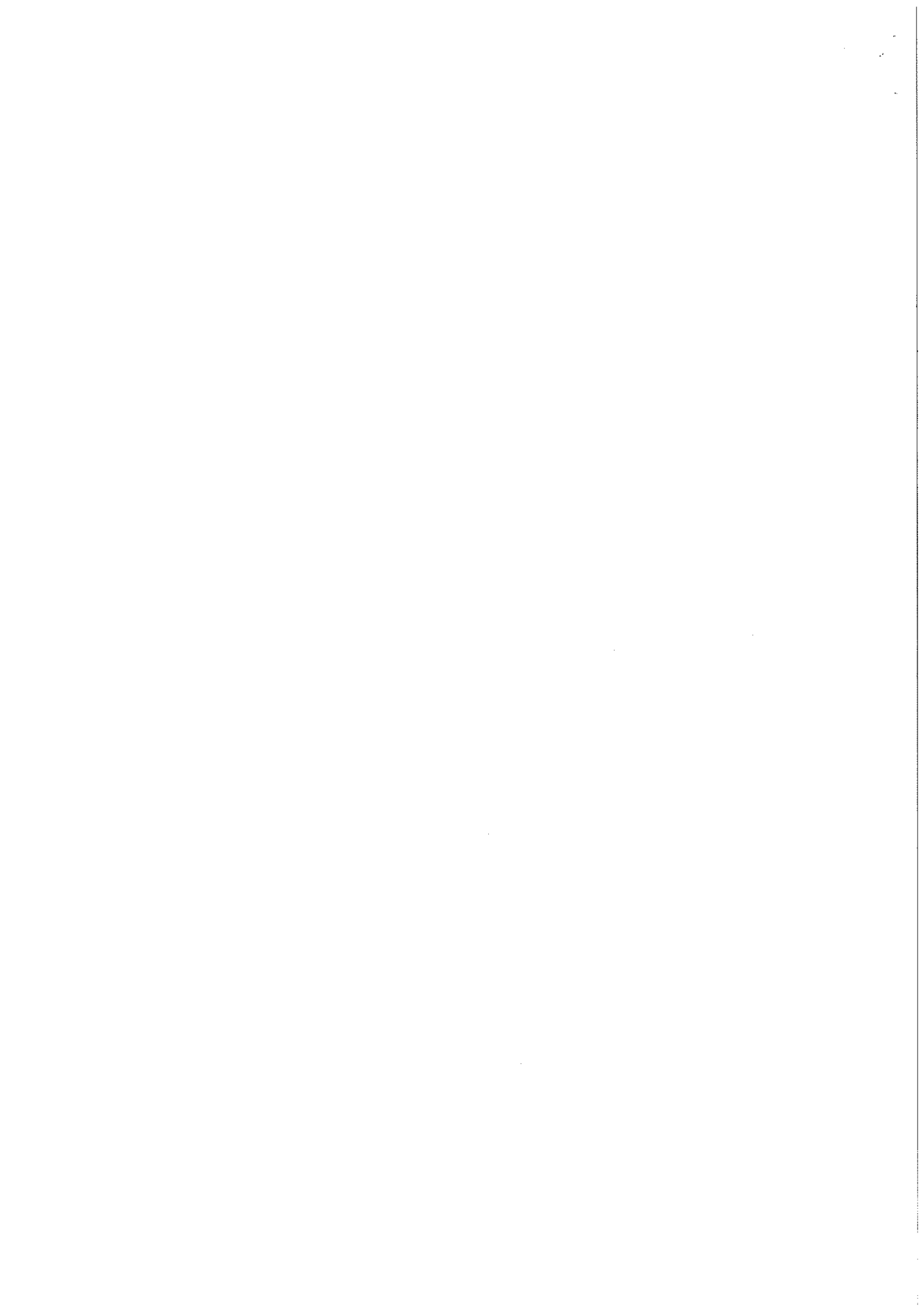
Materials permitted :  
Non-Programmable Calculator

Materials provided :  
Nil

Examiner (s) : Ms. Fang Yen Yen, S.M. Elizabethrani.

Moderator : Dr. Ng Set Foong

This paper consists of 7 printed pages, including the cover page.



## INTI INTERNATIONAL COLLEGE SUBANG

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY (DICTN)  
MAT1103: FUNDAMENTALS OF MATHEMATICS  
FINAL EXAMINATION: APRIL 2015 SESSION

**Instructions:** This paper consists of **SIX (6)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

**Question 1**

- (a) Simplify the expressions below to the simplest form and rewrite using only positive exponents.

(i)  $\frac{xx^{\frac{1}{3}}}{2x^5}$  (3 marks)

(ii)  $\sqrt{32} + \sqrt{200} - \sqrt{27}$  (3 marks)

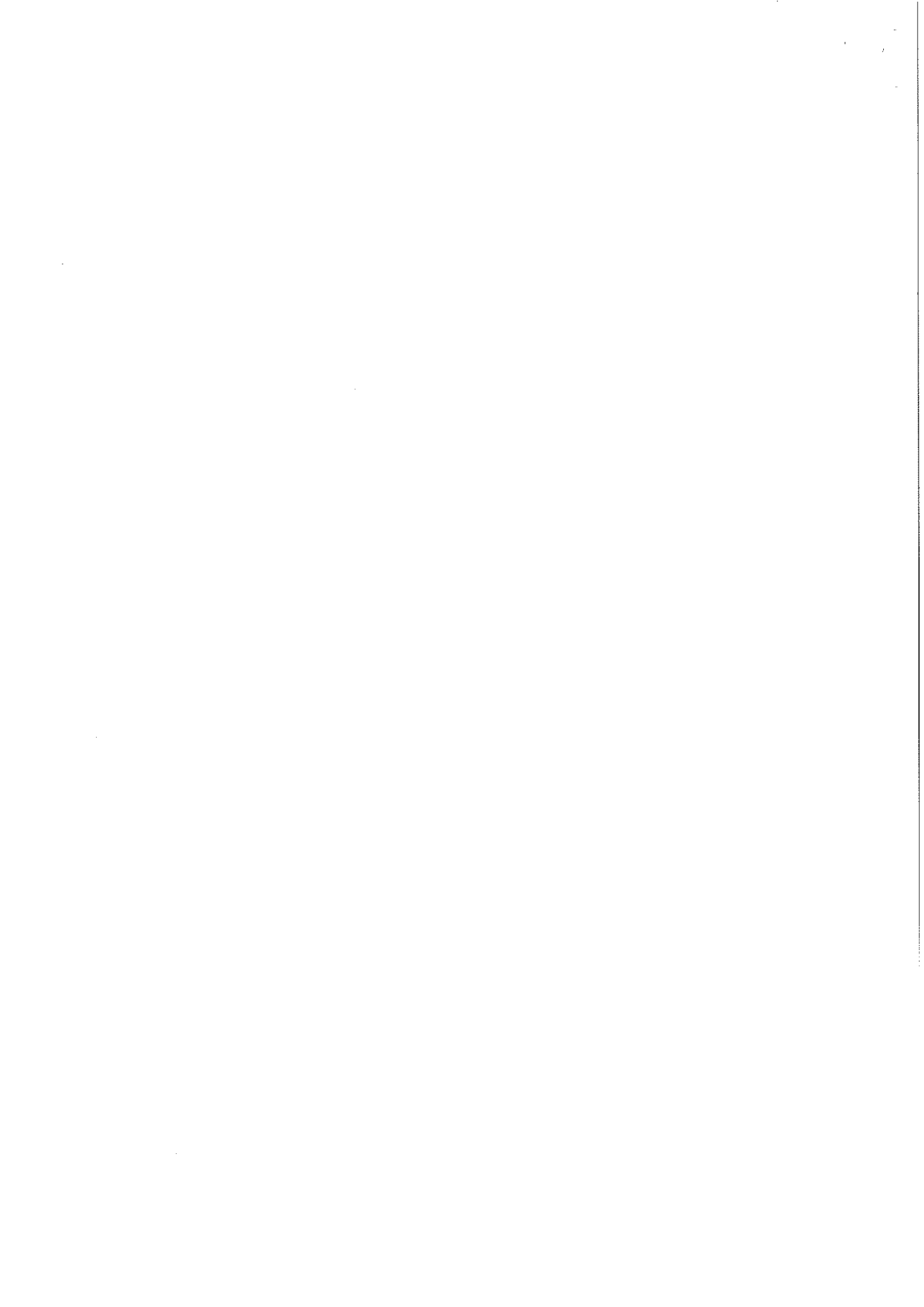
(iii)  $\left(\frac{p^{-1}q^{-1}r^{-3}}{p^{-7}q^{-5}r}\right)^{\frac{1}{2}}$  (5 marks)

(iv)  $\frac{\sqrt{2}}{\sqrt{2}-3}$  (4 marks)

(v)  $\frac{x^2 - 4xy + 4y^2}{3xy - 6y^2}$  (3 marks)

- (b) Find the equation of the line that passes through the point (0, -2) and perpendicular to the line  $3y = 2x + 6$  (5 marks)

(c) Solve  $-2(x - 4) = -6(x + 2) + 3x$  (2 marks)



## Question 2

(a) Solve the inequalities:

(i)  $-4 < 5 - 3x \leq 17$  (3 marks)

(ii)  $|x - 2| = -1$  (2 marks)

(iii)  $|4x + 5| > 3$  (4 marks)

(b) Given a polynomial  $P(x) = 2x^4 - 10x^3 + 17x^2 - 14x - 3$ .

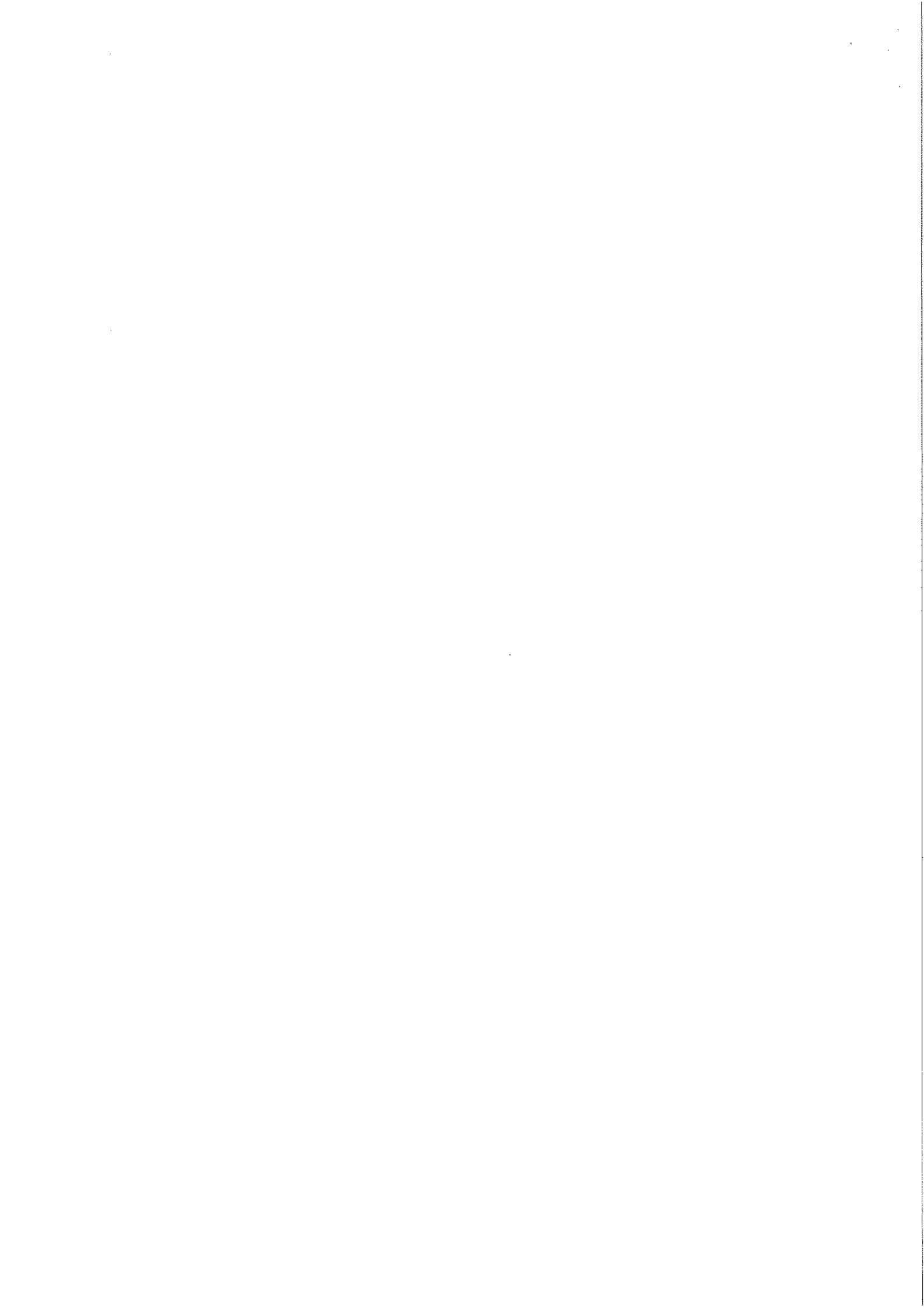
(i) Show that  $(x - 3)$  a factor of  $P(x)$ . (2 marks)

(ii) Find the results if  $P(x)$  is divided by  $(x + 3)$  (5 marks)

(iii) Find the gradient and intercepts for the equation,  $x = -\frac{3}{4}y + 5$  (4 marks)

(c) Find the 5<sup>th</sup> term in the expansion for  $\left(x^2 + \frac{1}{x}\right)^9$  (3 marks)

(d) Solve  $x(x - 9) = 0$ . (2 marks)



**Question 3**

(a) Solve each equation. Check for extraneous solutions.

(i)  $\frac{3}{x} + \frac{5}{x+2} = 2$  (5 marks)

(ii)  $2x = 1 - \sqrt{2-x}$  (5 marks)

(b) Let  $f(x) = \frac{1}{x}$  and  $g(x) = 2-x$ , Find

(i)  $(f+g)(x)$  (1 mark)

(ii)  $(f \cdot g)(x)$  (2 marks)

(iii)  $(g \circ f)(2)$  (3 marks)

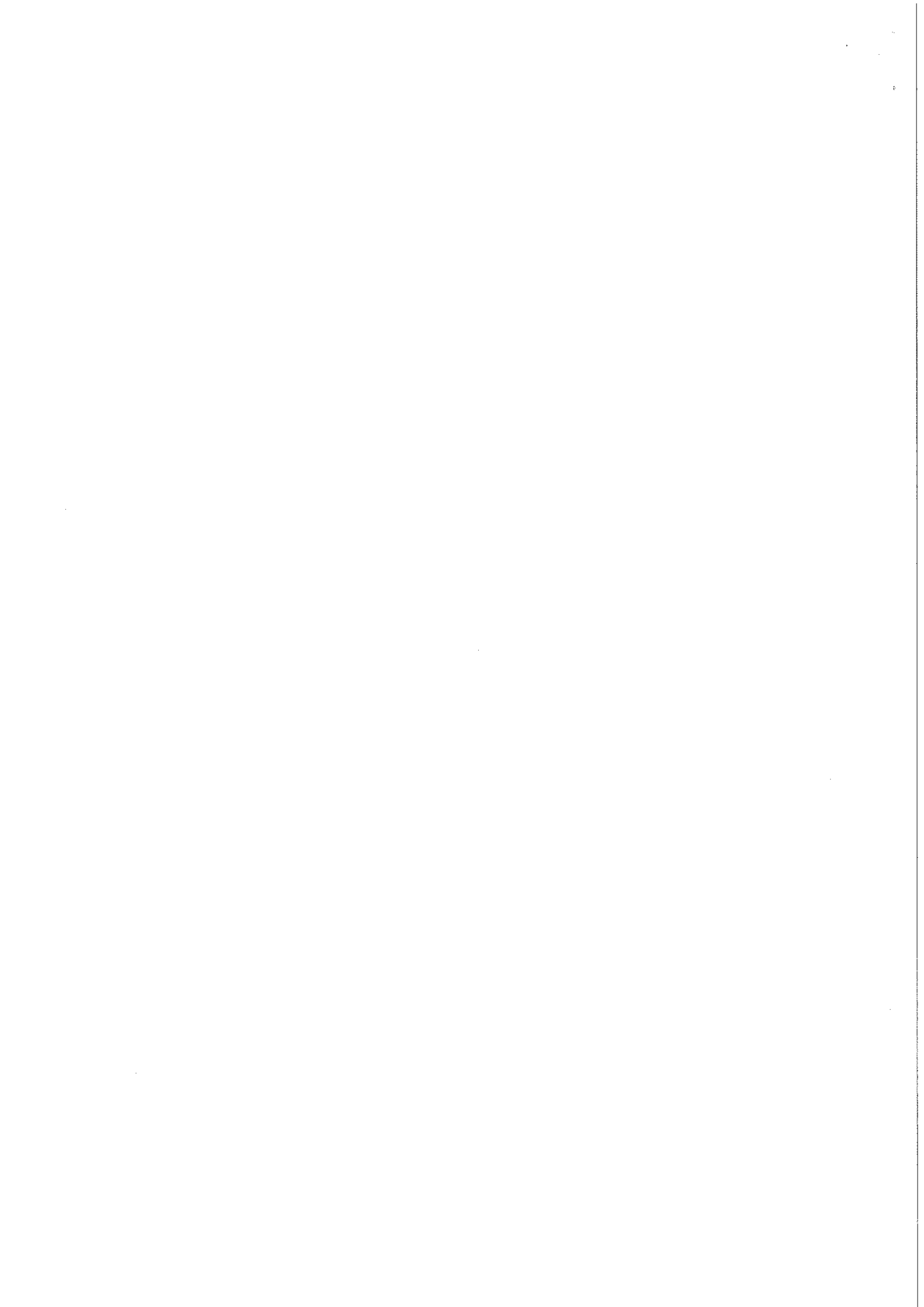
(c) The sum of 3 consecutive integers is 456. What are the integers? (3 marks)

(d) Solve the system of equations. (6 marks)

$$2x - y - 2z = -3$$

$$x + 3y + z = -1$$

$$5x - 4y + 3z = 10$$

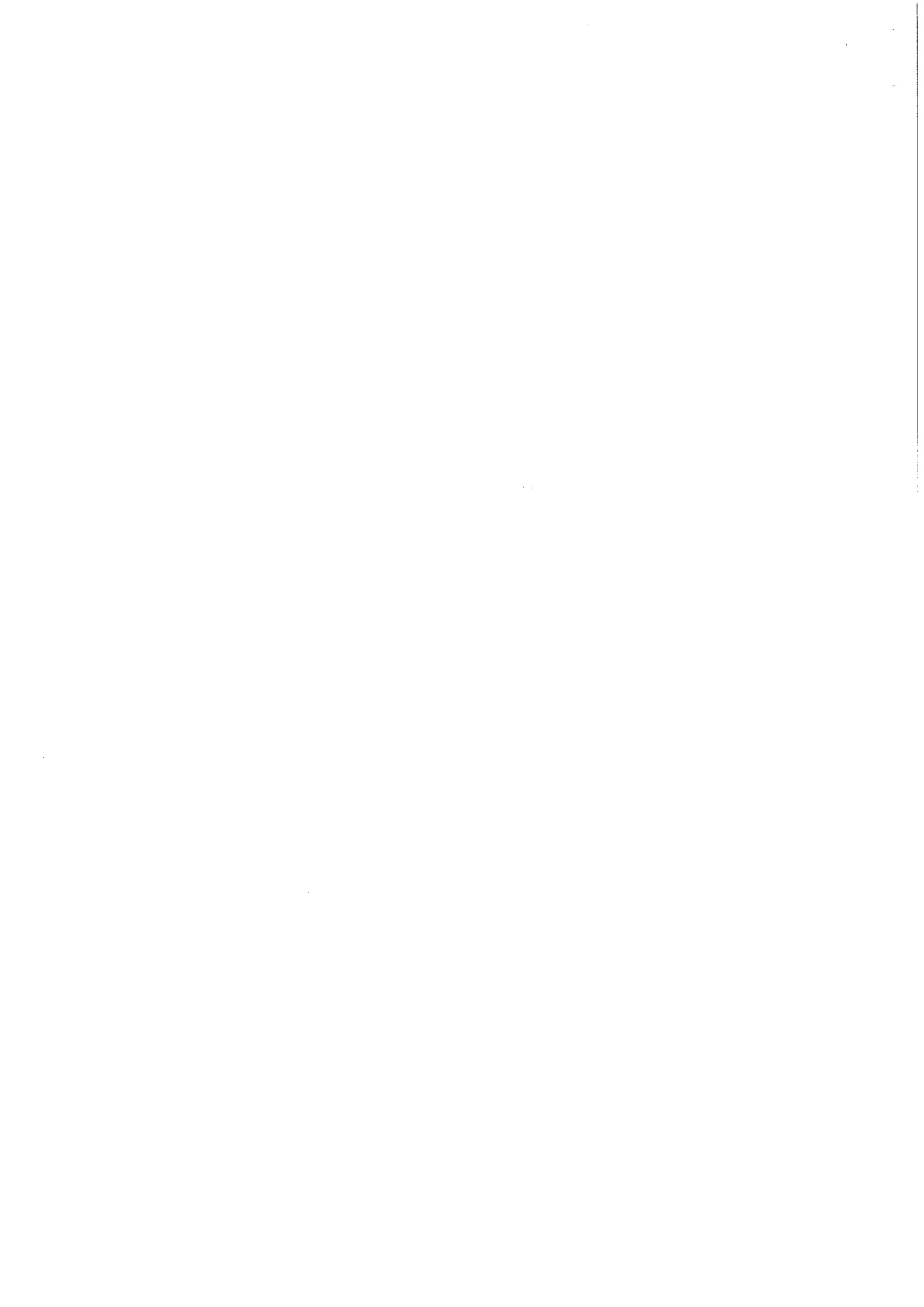


## Question 4

- (a) Solve the systems of inequalities graphically. (6 marks)

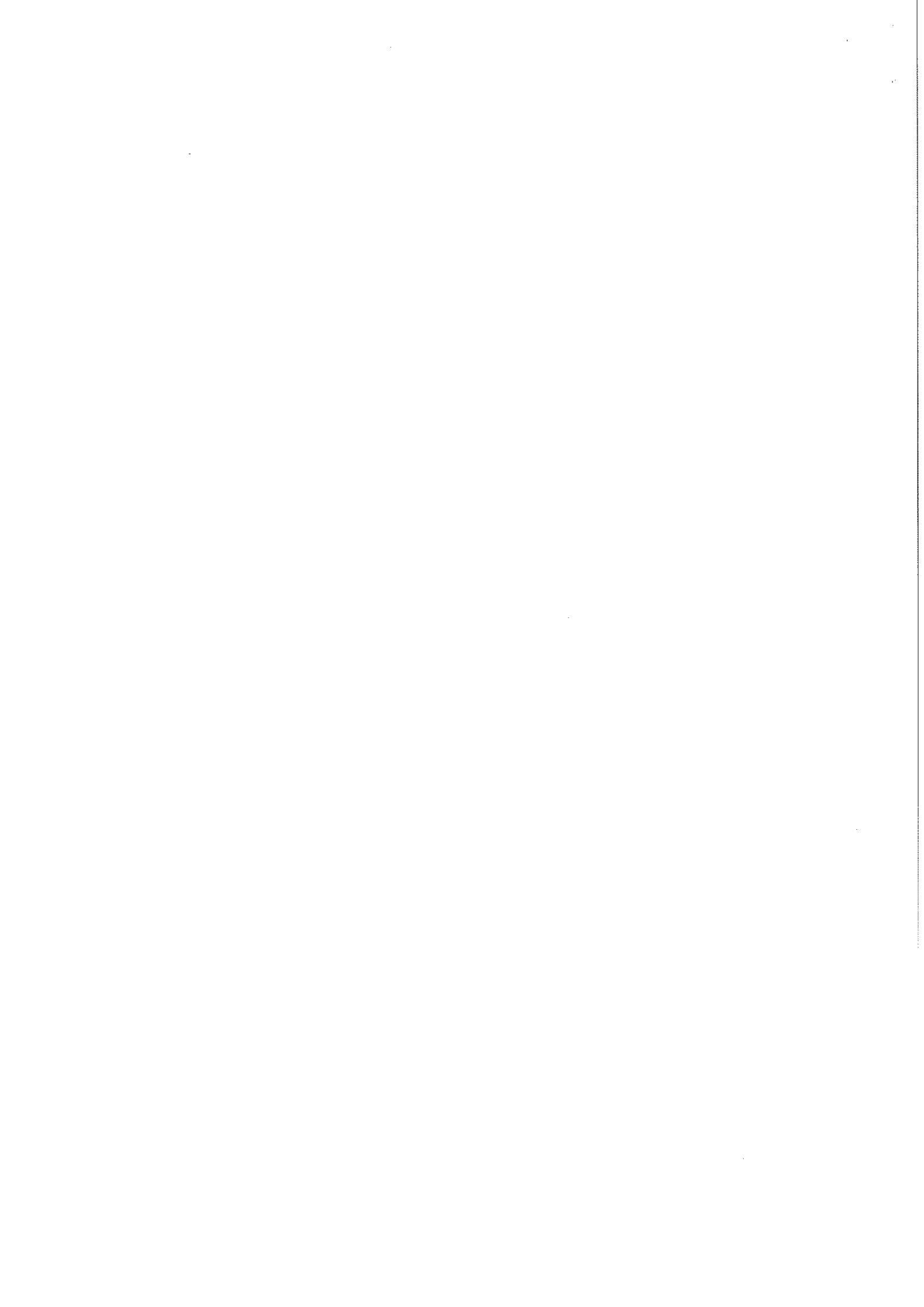
$$\begin{aligned}\frac{3}{2}x - 3y &\geq 6 \\ 2x + 2y &\geq 14 \\ x &\geq 0 \\ y &\geq 0\end{aligned}$$

- (b) Given  $f(x) = -2x^2 + 12x + 13$ .
- (i) Find the y-intercept and x-intercepts. (3 marks)
- (ii) Find the vertex point. (2 marks)
- (iii) Sketch the graph  $f(x)$ . (3 marks)
- (c) Solve  $x = xe^{x+1}$ . (4 marks)
- (d) The sum of two numbers is 7 and the sum of their squares is 29. Find the two numbers. (5 marks)
- (e) Find the midpoint between the points  $(-2, 4)$  and  $(-3, 2)$ . (2 marks)



## Question 5

- (a) The lengths of the sides of a triangle are  $y^2$ ,  $y + 1$ , and 7 meters. If the perimeter is 20 meters, what is the value of  $y$ ? (4 marks)
- (b) Expand of  $(2a + b)^5$  (3 marks)
- (c) Given  $k - 3$ ,  $k + 1$  and  $4k - 2$  are first 3 terms of a geometric sequence.
- (i) Find the possible values of  $k$ . (5 marks)
- (ii) Find the first term and common ratio for each value of  $k$  (4 marks)
- (d) Simplify each of the following logarithms.
- (i)  $\ln x^3 y^4 z^5$  (2 marks)
- (ii)  $\log_3 \left( \frac{9x^4}{\sqrt{y}} \right)$  (4 marks)
- (e) Simplify  $5\sqrt{24} - 3\sqrt{96} + 9\sqrt{6}$ . (3 marks)



**Question 6**

- (a) Find the sum of all the even numbers from 50 to 150, inclusive. (5 marks)
- (b) Solve the following:
- (i)  $4 \log(1 - 5x) = 2$  (4 marks)
- (ii)  $\log x + \log(x - 3) = 1$  (4 marks)
- (d) Sketch the graph of  $y = -\frac{2}{5}x + 3$  by showing its y-intercept and x-intercept points.  
And thus, find the distance of the y-intercept and x-intercept points. (5 marks)
- (e) Find the inverse function of  $f(x) = \sqrt{3 - x}$ . (3 marks)
- (f) Find the 16<sup>th</sup> term of a geometric progression whose first term is  $-2$  and whose fourth term is  $-54$ . (4 marks)

~ The End ~

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