

Name: \_\_\_\_\_ I.D.#: \_\_\_\_\_

Answer all questions. Calculators are NOT allowed. 30 minutes.

1. Answer TRUE or FALSE for each of the following questions.

WRITE "True" OR "False", DO NOT USE "T,F".

[50]

(a)  $|x + 3| \geq |x|$ . \_\_\_\_\_

(b)  $\lfloor -2.154 \rfloor = -2$ . \_\_\_\_\_

(c)  $g(x) = 2x \sin\left(\frac{3\pi}{2} - x\right)$  is an odd function. \_\_\_\_\_

(d)  $|a - b| < |a| + |b|$ . \_\_\_\_\_

(e)  $1.\overline{9} < 2$ . \_\_\_\_\_

(f) The solution set of the inequality  $25x^2 - 10x + 1 \geq 0$  consists of all real numbers  $x$ . \_\_\_\_\_(g) The solution set of the inequality  $25x^2 - 10x + 1 \leq 0$  is the empty set  $\emptyset$  (i.e. there are no solutions). \_\_\_\_\_(h) The domain of the function  $f(x) = \frac{\sqrt{x-5}}{x(x-8)}$  is  $[5, 8) \cup (8, \infty)$ . \_\_\_\_\_(i) The solution set of  $|7x^4 - 2x^3 + 13x + 4| < -2|x + 1|$  is the empty set  $\emptyset$ . \_\_\_\_\_(j) If  $P$  is a point in the third quadrant, and  $Q$  is a point in the second quadrant, then the line  $PQ$  joining them has positive slope. \_\_\_\_\_

TURN OVER FOR QUESTIONS 2 AND 3

For questions 2 and 3, show your work in the space provided.

2. Solve the inequality  $\frac{x+1}{2} \geq \frac{3}{x+2}$ . [25]

3. Find an equation of the line parallel to  $3x - 2y = 1$  passing through the centre of the circle  $x^2 - 4x + y^2 + 6y = 3$ . [25]

END OF PAPER