KILLARA HIGH SCHOOL

YEAR 11 - MATHEMATICS - 2 UNIT

TERM IV 1991 - Assessable Test

Time Allowed: 2 periods

Instructions: Attempt all questions.
Show all necessary working.

Question 1 (10 marks)

(i) Evaluate $\sqrt[3]{\frac{(6.2)^2 \times 4.5}{5.2 - 1.9}}$ correct to 2 decimal places

(ii) If $m = 7.3 \times 10^{-5}$ and $n = 1.2 \times 10^{-4}$ evaluate $\sqrt{m^2 + n^2}$ giving your answer in scientific notation to two significant figures.

(iii) Given $f(x) = 2^{x-4}$ find:
(a) $f(1)$
(b) the value of x if $f(x)=2$

(iv) A man's wage increases by 5% to \$481.95.
How much was the increase?

(v) A rectangle has length $(\sqrt{5} + 2)$ cm. and breadth $(\sqrt{5} - 2)$ cm.
Find an expression for (a) its perimeter (in simple surd form)

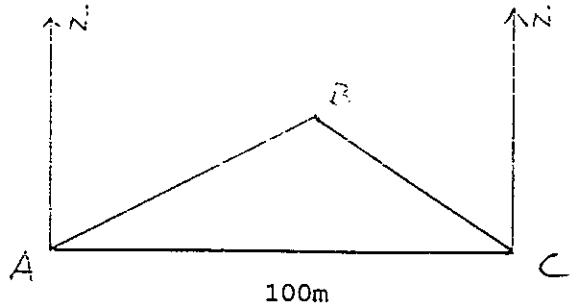
(b) its area (in simple surd form)

Question 2 (9 marks)

(i) Find the equation of the line parallel to $6x-3y+1=0$ which passes through the point of intersection of $2x+5y-4=0$ and $2x-2y+3=0$.

(ii) Find the values of θ correct to the nearest minute if $0^\circ \leq \theta \leq 360^\circ$ and $\tan\theta = 2.7642$

(iii)



The bearing of B from A is 075° and of B from C is 320°. C is due east of A and AC is 100m.

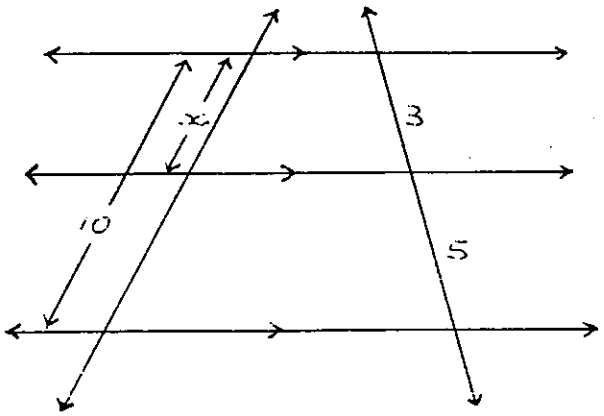
(a) Copy the diagram onto your answer sheet.

(b) Find the size of $\hat{BCA}$ and $\hat{ABC}$.

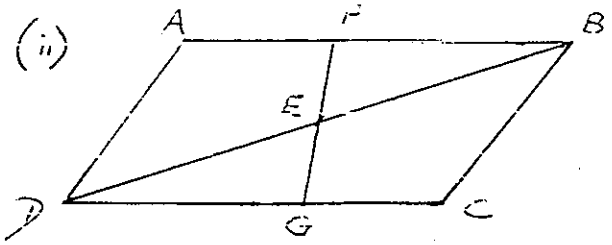
(c) Find the length of BC correct to the nearest metre.

Question 3 (9 marks)

(i) Find the value of x, giving reasons to support your result.



(ii)



ABCD is a parallelogram;
DB, FG are straight lines;
E is the midpoint of BD
Prove that AF=CG.

(iii) Using the fact that $x^4 - y^4 = (x^2 + y^2)(x^2 - y^2)$ prove that

$\sin^4\theta - \cos^4\theta = 1 - 2\cos^2\theta$.

Question 4 (11 marks)

(i) If $f(x) = x^2 - 2x + 1$ find:

(a) an expression for $\frac{f(x+h) - f(x)}{h}$ and hence

or otherwise,

(b) determine the derivative of f(x) from first principles

(ii) Find $\frac{dy}{dx}$ if:

(a) $y = (x-3)(2x^2 - 2x + 4)$

(b) $y = \frac{5x^3 - x}{x^2}$

(iii) Find the equation of the normal to the curve $y = x^3 - 4x^2$ at the point where x=1.

Question 5 (11 marks)

(i) Sketch, on separate diagrams, but not on graph paper, showing the essential features of:

(a) $y = 3^{-x}$

(b) $y = 6x - x^2$

(ii) (a) Find the stationary points on the curve $y = 2x^3 - 9x^2 + 12$ and determine their nature.

(b) Sketch the curve $y = 2x^3 - 9x^2 + 12$ showing its essential features.

END of TEST.