MANZANILLA SECONDARY SCHOOL

5 SCIENCE END OF TERM 1 TEST
MATHEMATICS
MS. RAGBIR

STUDENT'S NAME:_____

LIST OF FORMULAE

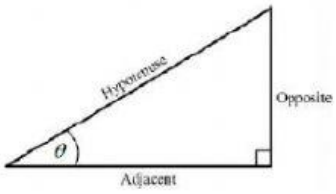
Volume of a prism	$V = Ah$ where A is the area of a cross-section and h is the perpendicular length.
Volume of a cylinder	$V = \pi r^2 h$ where r is the radius of the base and h is the perpendicular height.
Volume of a right pyramid	$V = \frac{1}{3}Ah$ where A is the area of the base and h is the perpendicular height.
Circumference	$C = 2\pi r$ where r is the radius of the circle.
Area of a circle	$A = \pi r^2$ where r is the radius of the circle.
Area of Trapezium	$A = \frac{1}{2}(a+b)h$ where a and b are the lengths of the parallel sides and h is the perpendicular distance between the parallel sides.
Roots of quadratic equations	If $ax^2 + bx + c = 0$, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Trigonometric ratios

$$\sin\theta = \frac{\text{opposite side}}{\text{hypotenuse}}$$

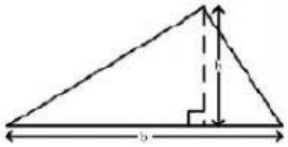
$$\cos\theta = \frac{\text{adjacent side}}{\text{hypotenuse}}$$

$$\tan\theta = \frac{\text{opposite side}}{\text{adjacent side}}$$



Area of triangle

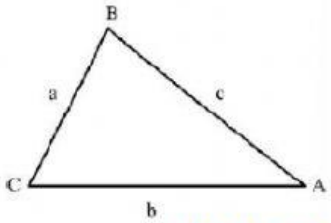
Area of $\Delta = \frac{1}{2}bh$ where b is the length of the base and h is the perpendicular height



Area of $\Delta ABC = \frac{1}{2}ab\sin C$

Area of $\Delta ABC = \sqrt{s(s-a)(s-b)(s-c)}$

where $s = \frac{a+b+c}{2}$



Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

LIVEWORKSHEETS

SECTION B

This section has three questions worth 30 marks. You can use a calculator. You have 75 minutes to complete this section.

Answer ALL questions.

All working must be clearly shown.

1. (a) Simplify completely

(i) $3p^2 \times 4p^5$

2 marks

(ii) $\dfrac{3x}{4y^3} \div \dfrac{21x^2}{20y^2}$.

(2 marks)

(b) Solve the equation

$$\frac{3}{7x-1} + \frac{1}{x} = 0.$$

x =

(3 marks)

LIVEWORKSHEETS

(c) When a number, x, is multiplied by 2, the result is squared to give a new number, y.

(i) Express y in terms of x.

Y =

.....

(1 mark)

(ii) Determine the two values of x that satisfy the equation $y = x$ AND the equation derived in (c) (i).

X = **y =**

X = **y =**

.....

(2 marks)

Total marks = 10

LIVEWORKSHEETS

2. (a) Using a ruler, a pencil and a pair of compasses only, construct the triangle NLM, in whicl $LM = 12$ cm, $\angle MLN = 30°$ and $\angle LMN = 90°$.

(Credit will be given for clearly drawn construction lines.)

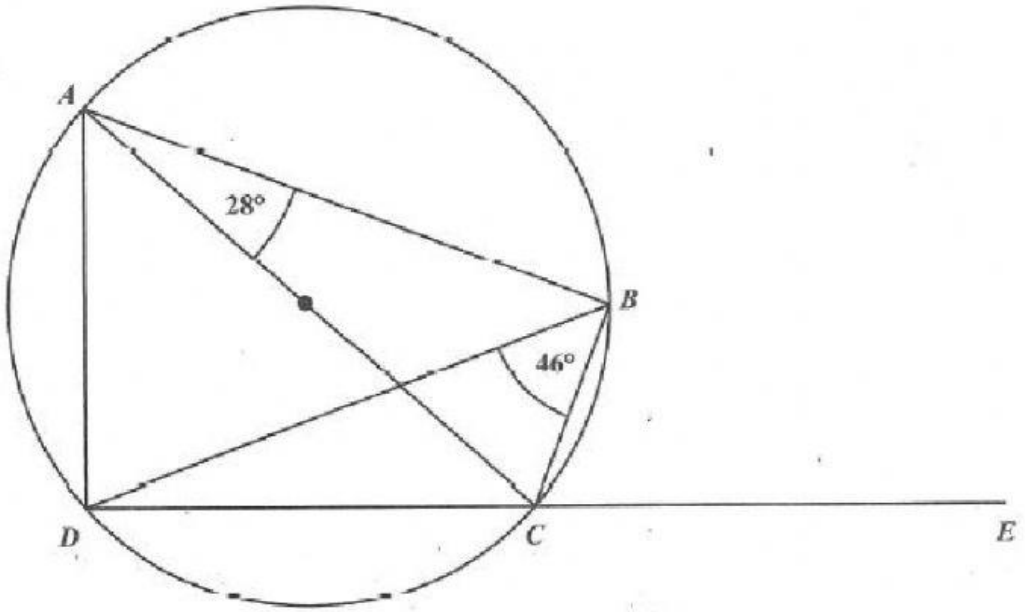
Length of LN = **cm**

Length of MN = **cm**

(4 marks)

LIVEWORKSHEETS

B.(a) The diagram below shows a circle where AC is a diameter. B and D are two other points on the circle and DCE is a straight line. Angle $CAB = 28°$ and $\angle DBC = 46°$.



Calculate the value of each of the following angles. Show detailed working where necessary and give a reason to support your answers.

(i) $\angle DBA$

= **degrees**

Reason .....

.....

.....

(2 marks)

LIVEWORKSHEETS

(ii) $\angle DAC$

= **degrees**

D.

Reason .....

.....

.....

(2 marks)

(iii) $\angle BCE$

= **degrees**

Reason .....

.....

.....

(2 marks)

TOTAL MARKS = 10

LIVEWORKSHEETS

3.

(a) The functions f and g are defined by

$$f(x) = \frac{9}{2x+1} \quad \text{and} \quad g(x) = x - 3.$$

(i) State a value of x that CANNOT be in the domain of f.

X cannot be _____

.....

(1 mark)

(ii) Find, in its simplest form, expressions for .

a) $fg(x)$

_____

.....

(2 marks)

LIVEWORKSHEETS

b) $f^{-1}(x)$.

$f^{-1}x$ = _____ _____

.....

3 marks

LIVEWORKSHEETS

c. The equation of a straight line is given as

$$\frac{x}{3} + \frac{y}{7} = 1.$$

This line crosses the y-axis at Q.

(i) Determine the coordinates of Q.

Q = (,)

2 marks

(ii) What is the gradient of this line?

m = $\frac{\quad}{\quad}$

(2 marks)

TOTAL MARKS = 10

LIVEWORKSHEETS