MARITZBURG COLLEGE

EST. 1863

JUNE EXAMINATIONS

GRADE 9

MATHEMATICS

JUNE 2016

EXAMINER: P SNYMAN **MARKS: 120**

MODERATOR: D GADEMAN **TIME:2 HOURS**

This question paper consists of 7 pages.

P.T.O.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Write your exam number and teacher's name on your answer booklet.
2. This question paper consists of 7 questions.
3. Answer ALL the questions.
4. Clearly show ALL calculations, diagrams, graphs et cetera that you have used in determining your answers.
5. Answers only will not necessarily be awarded full marks.
6. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
7. If necessary, round answers off to TWO decimal places, unless stated otherwise.
8. Diagrams are NOT necessarily drawn to scale.
9. Number the answers correctly according to the numbering system used in this question paper.
10. Write legibly and present your work neatly.

$x^2 + y^2 = r^2$	$\text{A} = \frac{1}{2}(\text{sum //side}) \times h$	$A = b \times h$	$A = l \times b$

QUESTION 1

Simplify the following and leave your answers with positive exponents where applicable.

1.1 $2a^2 \times 4a^4$ (2)

1.2 $\frac{3^9}{3^5}$ (2)

1.3 $\frac{5a^2b}{3ab} \div \frac{20a^3b}{27}$ (3)

1.4 $2x^{-2} \times \frac{x^4}{4}$ (2)

1.5 $2y^0$ (1)

[10]

QUESTION 2

Consider the following expression:

$$-3x^5 + \frac{x}{2} - x^2 + 2$$

2.1 Classify the polynomial (1)

2.2 Give the constant term. (1)

2.3 Give the degree of the polynomial (1)

2.4 Write down the co-efficient of x (1)

2.5 Arrange the polynomial in descending powers of x (1)

2.6 Calculate the value of if $-3x^5 + \frac{x}{2} - x^2 + 2$ when $x = 2$ (2)

2.7 Subtract $x^2 - 2x + 2$ from $-3x^2 + 2 + 9x + 2x^3$ (3)

[10]

QUESTION 3

3.1 Simplify:

3.1.1 $xy^2 - 2x^2y - 7xy^2 + 6x^2y - 2xy^2$ (2)

3.1.2 $3a^2b^2c(3a^2 - 4b - c)$ (3)

3.1.3 $(2x - 3)(x + 1)$ (3)

3.1.4 $(x - 4)^2 - x(x - 3)$ (3)

3.1.5 $\left(\frac{x}{2} + \frac{y}{4}\right)^2$ (3)

3.1.6 $(-xy^2)^3$ (3)

3.1.7 $\sqrt{\frac{36(xy^2)^3}{x}}$ (3)

[20]

3.2 Factorise fully:

3.2.1 $8t^2 - 4t$ (2)

3.2.2 $4a^2 - 25$ (2)

3.2.3 $x^2 - 5x + 6$ (2)

3.2.4 $2x^4 - 2$ (3)

3.2.5 $x^2 + 81$ (1)

[10]

QUESTION 4

4.1 Simplify:

4.1.1 $\frac{x-3}{2x} \div \frac{x^2-9}{2x}$ (3)

4.1.2 $\frac{2x}{y} \times \frac{3y}{4}$ (2)

4.1.3 $\frac{-x^3+2x}{x} - \frac{15x^2-5}{5}$ (5)

[10]

QUESTION 5

5.1 Solve for x:

5.1.1 $2x - 5 = 5x + 16$ (2)

5.1.2 $x - \frac{x-1}{2} = 3$ (3)

5.1.3 $x^2 - 1 = 0$ (3)

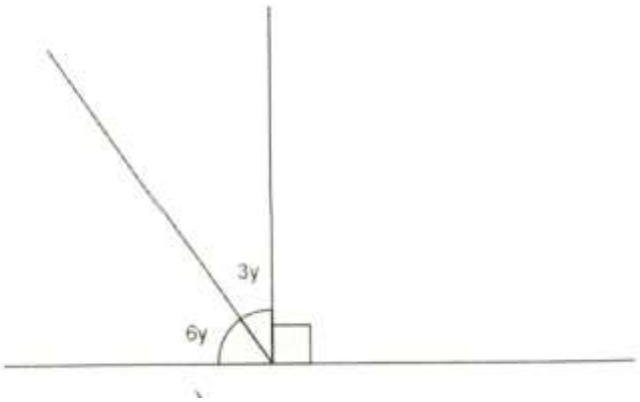
5.1.4 $3x - 2 \geq 4x - 6$ (2)

[10]

P.T.O.

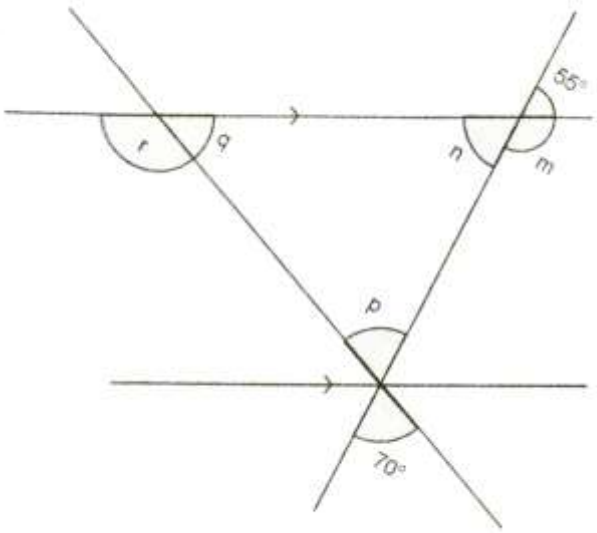
QUESTION 6

6.1 Find the values of the variables in these diagrams with reasons:



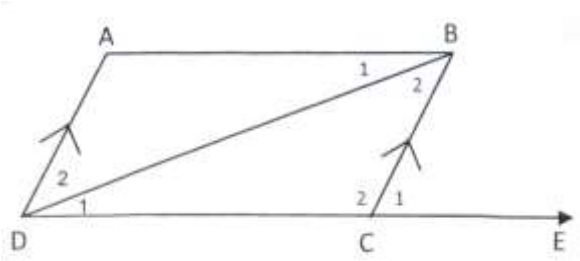
(3)

6.2



(10)

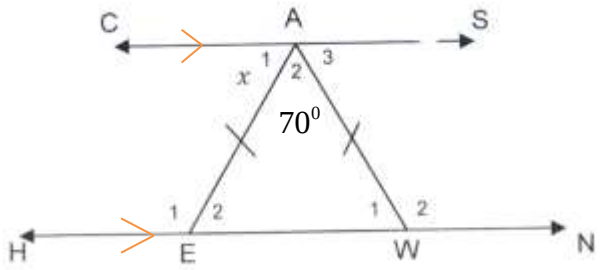
6.3 Calculate the values of x and y if $\hat{B}_2 = x, \hat{D}_2 = y, \hat{D}_1 = 44^0, \hat{C}_1 = 75^0$ and $AB // BC$.



(5)

6.4 In the diagram below $CS // HN, \hat{A}_2 = 70^0, AE = AW, \hat{A}_1 = x$.

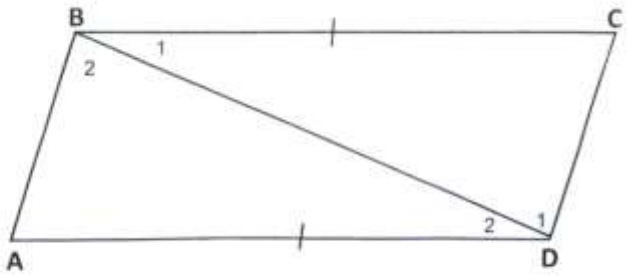
Determine the value of x.



(6)

6.5

In the figure below $\hat{D}_1 = \hat{B}_2 = 90°$ and $AD = BC$.

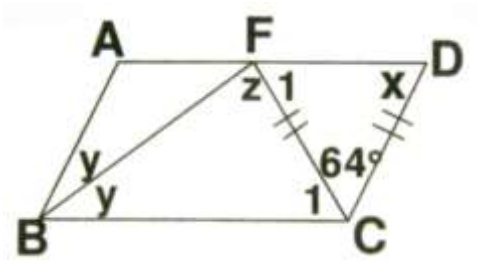


Prove that $\Delta ABD \equiv \Delta CDB$.

(5)

6.6 ABCD is a parallelogram.

6.6.1 Determine the values of x, y and z.



(8)

6.7 Which of the following quadrilalaterals are not parallelograms?

6.7.1 rhombus

6.7.2 rectangle

6.7.3 square

6.7.4 trapezium

6.7.5 kite (2)

[39]

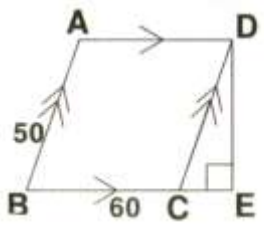
QUESTION 7

7.1 If $BC = 60mm, AB = 50mm$ and $BE = 90mm,$ determine:

7.1.1 the perimeter of trapezium ABED, (5)

7.1.2 the area of the trapezium. (3)

7.1.3 the area of parallelogram ABCD. (3)



[11]

INFORMATION SHEET: MATHEMATICS

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$A = P(1+ni) \qquad A = P(1-ni) \qquad A = P(1-i)^n \qquad A = P(1+i)^n$$

$$T_n = a + (n-1)d \qquad S_n = \frac{n}{2}\left(2a + (n-1)d\right)$$

$$T_n = ar^{n-1} \qquad S_n = \frac{a\left(r^n - 1\right)}{r-1}\ ;\ r \neq 1 \qquad S_\infty = \frac{a}{1-r}\ ;\ -1 < r < 1$$

$$F = \frac{x\left[(1+i)^n - 1\right]}{i} \qquad P = \frac{x\left[1-(1+i)^{-n}\right]}{i}$$

$$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \qquad M\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c \qquad y - y_1 = m(x - x_1) \qquad m = \frac{y_2 - y_1}{x_2 - x_1} \qquad m = \tan\theta$$

$$(x-a)^2 + (y-b)^2 = r^2$$

In ΔABC: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$ $\qquad a^2 = b^2 + c^2 - 2bc.\cos A$ $\qquad$ Area $\Delta ABC = \frac{1}{2}ab.\sin C$

$$\sin(\alpha + \beta) = \sin\alpha.\cos\beta + \cos\alpha.\sin\beta \qquad \sin(\alpha - \beta) = \sin\alpha.\cos\beta - \cos\alpha.\sin\beta$$

$$\cos(\alpha + \beta) = \cos\alpha.\cos\beta - \sin\alpha.\sin\beta \qquad \cos(\alpha - \beta) = \cos\alpha.\cos\beta + \sin\alpha.\sin\beta$$

$$\cos 2\alpha = \begin{cases} \cos^2\alpha - \sin^2\alpha \\ 1 - 2\sin^2\alpha \\ 2\cos^2\alpha - 1 \end{cases} \qquad \sin 2\alpha = 2\sin\alpha.\cos\alpha$$

$$\bar{x} = \frac{\sum fx}{n} \qquad \sigma^2 = \frac{\sum_{i=1}^{n}\left(x_i - \bar{x}\right)}{n}$$

$$P(A) = \frac{n(A)}{n(S)} \qquad P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$\hat{y} = a + bx \qquad b = \frac{\sum(x - \bar{x})(y - \bar{y})}{\sum(x - \bar{x})^2}$$

NAME:

TEACHER:

DIAGRAM SHEET

QUESTION (…)