GRADE 10

MATHEMATICS

June Exam

TIME: 2 Hours

MARKS: 100

DATE: 3 June 2013

EXAMINER: Miss Pearce

Instructions

1) Illegible work, in the opinion of the marker, will earn zero marks.
2) Number your questions clearly and accurately
3) Staple your submission in the following order
    - Foolscap answers in correct order
    - Question paper at the back.

4) Employ the relevant formulae and show all working out. Answers alone may not be awarded full marks.
5) Non programmable and non- graphical calculators may be used, unless their usage is specifically prohibited.
6) Round off to 2 decimal places where necessary, unless instructed otherwise.

Question 1 (11 Marks)

A calculator may not be used in this question.

1.1) Complete the following table using Y(Yes) and N(No).

	$\mathbb{R}$	$\mathbb{Q}$	$\mathbb{Z}$
4	Y	Y	Y
$\dfrac{3-\sqrt{17}}{2}$			

(1)

1.2) If x is a positive $\mathbb{Z}$ write down one value for x so that

$$\sqrt{\dfrac{8}{4-x}} \quad \text{will be:}$$

1.2.1) Rational

(1)

1.2.2) Non- Real

(1)

1.2.3) equal to zero

(1)

1.2.4) Undefined

(1)

1.3) Between which two consecutive natural numbers does $\sqrt[3]{35}$ lie. Show all your working out.

(3)

1.4) Write $1,2\dot{8}$ as an improper fraction. Show all your working out

(3)

Question 2 (8 Marks)

2.1) Multiply out then simplify the following

2.1.1) $4(x-3)x + 3x$ (2)

2.1.2) $(4a^2 + 6ax + 9x^2)(2a - 3x)$ (2)

2.1.3) $(n^{4p} - 1)^2$ (2)

2.2) What is the value of d, if $(2x - 3)$ is a factor of $6x^2 + dx - 12$? (2)

Question 3 (18 Marks)

Factorise the following fully.

3.1) $4x^2 - 36$ (2)

3.2) $16x^3 + \dfrac{y^3}{4}$ (2)

3.3) $6(m-n)a^2 - 5(n-m)a - n + m$ (4)

3.4) $2x^3 + x^2 - 6x - 3$ (3)

3.5) $3^n + 3^{n+2}$ (2)

3.6) $6.5^{2x} + 5^x - 12$ (3)

3.7) $x^{\frac{1}{2}} - 5x^{\frac{1}{4}} + 6$ (2)

Question 4 (9 Marks)

4.1) Simplify the following, without the use of a calculator

$$\frac{12^x \times 9^{x+1}}{4^{x-1} \times 27^x}$$ (3)

4.2) Write the following as a single term

$$\frac{3a+1}{5} - \frac{2a-1}{10}$$

(2)

4.3) Simplify fully

$$\frac{\frac{1}{x} - \frac{1}{y}}{1 - \frac{x}{y}}$$

(4)

Question 5 (20 Marks)

Solve for x in each of the following

5.1) $x^2 - 4x = 0$ (2)

5.2) $\frac{x-1}{x+2} = \frac{x+2}{3x}$ (5)

5.3) $4x^2 = 2(5x + 3)$ (4)

5.4) $2x^2 - 3 = 0$ (3)

5.5) $(2^x + 1)(2^x - 3) = 0$ (4)

5.6) $4x^{\frac{-3}{2}} = 7$ (2)

Question 6 (9 Marks)

Solve for x !

6.1.1) $5 \leq 1 - 2x < 11$ (2)

6.1.2) Write your answer to 6.1.1) in interval notation (2)

6.1.3) Represent your answer to 6.1.1) on a number line (1)

6.2) Solve for x and y resepectively

Given

$2x = 3y + 5$

$3x + 6y = 12$

(4)

Question 7 (6 Marks)

7.1) Given $7; 19; 31; 43; ...; 475$

7.1.1) Determine an expression for T_n, the general term of the sequence. (2)

7.1.2) Hence, determine how many terms there are in the given sequence. (2)

7.2) The first three terms of an arithmetic sequence are

$2x - 5; 2x + 1; 4x + 3$

Calculate the value of x

(2)

Question 8 (9 Marks)

8.1) A= 64,3° and B=21,87°

Determine the following

8.1.1) $\tan(A - B)$

8.1.2) $2\cos^2 B$

8.1.3) $\sin A + 10$

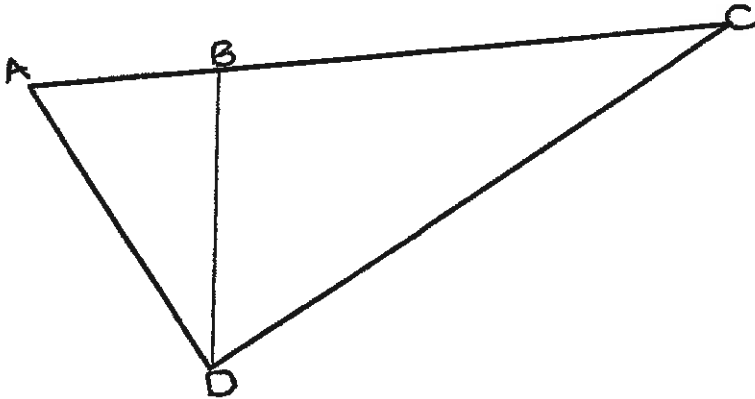8.2) Determine the magnitude of A for

8.2.1) $\sin A = 0,866$ $0 \leq A \leq 90$ (1)

8.2.2) $3\tan A = \sin 34,62$ $0 \leq A \leq 90$ (2)

8.2.3) $\sqrt{3} - 2\cos 4(A - 10°) = 0$ $0 \leq A + 10° \leq 90$ (3)

Question 9 (10 Marks)

9.1) In the following diagram

BD⊥AC and ∠ADC= 90°.

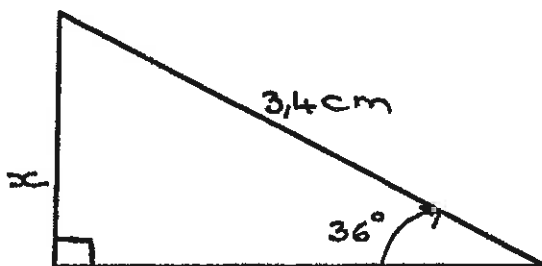In terms of AB,DC,AC, DC,BD and/or AD, write down two trig ratios representing

cos C   (2)
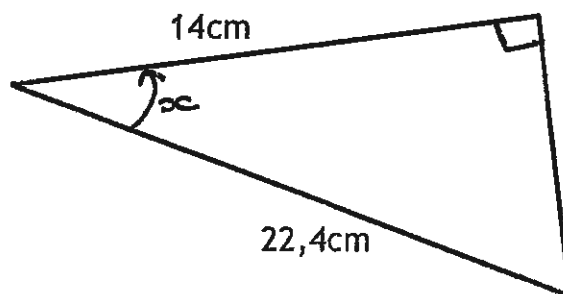
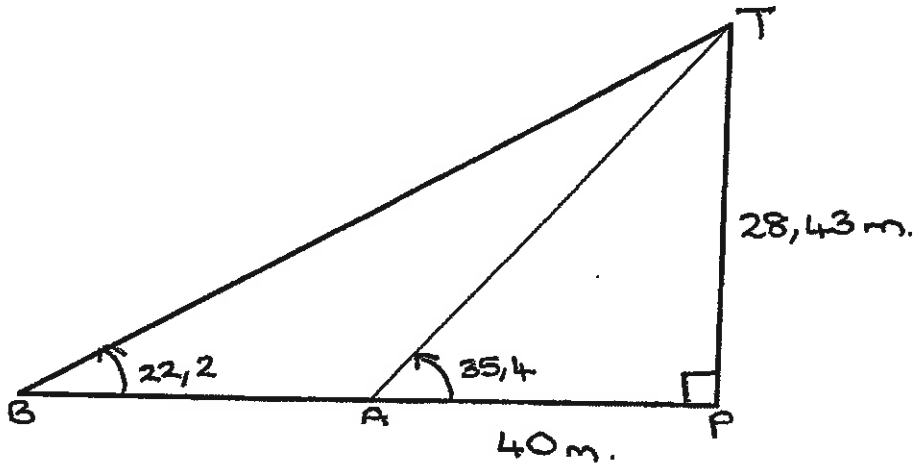9.2) Determine the value of x in each of the following

9.2.1)

3,4cm

36°

x

(2)

9.2.2)

14cm

x

22,4cm

(2)

9.3) From point A, 40m from a building TP the angle of elevation to the top of the building is 35,4°. From the point B, further away from the building, the angle of elevation is 22,2°. As shown in the diagram below

Determine the distance between A and B   (4)

___

Total 100