HILLCREST HIGH SCHOOL

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INTERNAL ASSESSMENT

GRADE 10

MATHEMATICS
TERM 2
June Exam

MARKS: 100 **TIME: 2 Hours**
EXAMINER: Mr Alborough **MODERATOR: Mrs Woodrow**

Students Name : _____

Question	One (12)	Two (22)	Three (10)	Four (16)	Five (4)	Six (17)	Seven (19)	Total (100)
Mark								
Marked By								

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions

1. This test consists of **SEVEN** questions.
2. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining your answers.
3. Answers only will NOT necessarily be awarded full marks.
4. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
5. If necessary, round off answers correct to TWO decimal places, unless stated otherwise.
6. Write neatly and legibly.

QUESTION ONE:

1.	Simplify the following	
1.1.	$(x+1)(x^2-x+1)$	(2)
1.2.	$3(x-3)^2-3x(x+1)$	(3)
1.3.	$\frac{5x-10}{x-2}$	(2)

1.4.	$\frac{x^2-x-2}{x^2-4} \div \frac{x^2+1}{x^2+2x}$	(5)

[12]

QUESTION TWO:

2.1	Solve for x in the following:	
2.1.1	$x(x-1)^2 = 0$	(2)
2.1.2	$x^2 - 2x - 24 = 0$	(2)

2.1.2	$5x^2 - 17x + 6 = 0$	(4)
2.1.3	$3^{2x+1} = \frac{1}{27}$	(3)
2.1.3	$V = 3x^2 - r \ \ where\ x > 0$	(3)
2.1.4	$5 - 3x \leq 20$	(3)
2.2	Solve simultaneously for x and y in the following equations: $3x + 2y = 3$ and $x = 2y - 7$	(5)

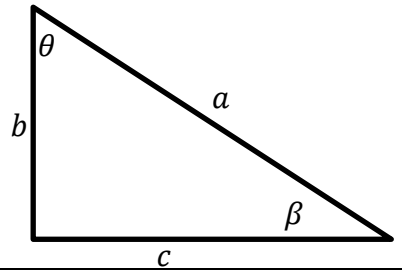
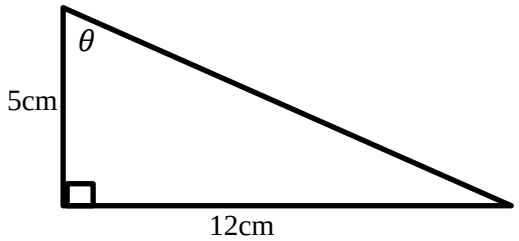
[22]

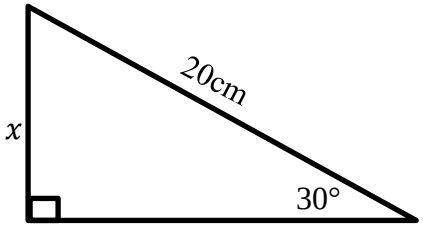
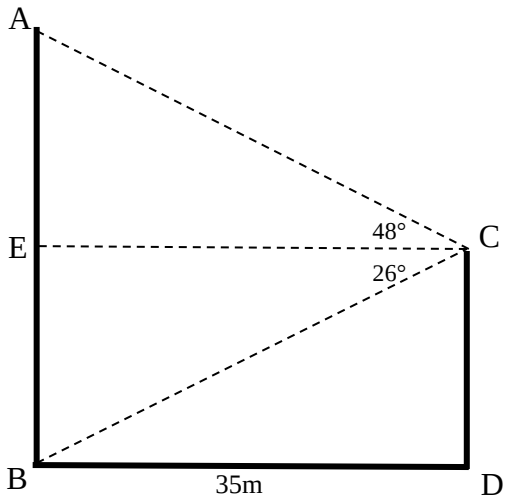
QUESTION THREE:

3	Given the following sequence: 7 ; 3 ; -1 ; -5 ; …	
3.1	State the next 2 terms in the sequence	(1)
3.2	State the constant difference	(1)
3.3	Give a formula for the n^{th} term, T_n.	(2)
3.4	Calculate the value of the 23^{rd} term in the sequence	(2)
3.5	Which term in the sequence would have a value of -125	(3)
3.6	Determine a general formula T_n for a second sequence, 49 ; 9 ; 1 ; 25. **HINT:** Look for a connection between the two patterns.	(1)

[10]

QUESTION FOUR

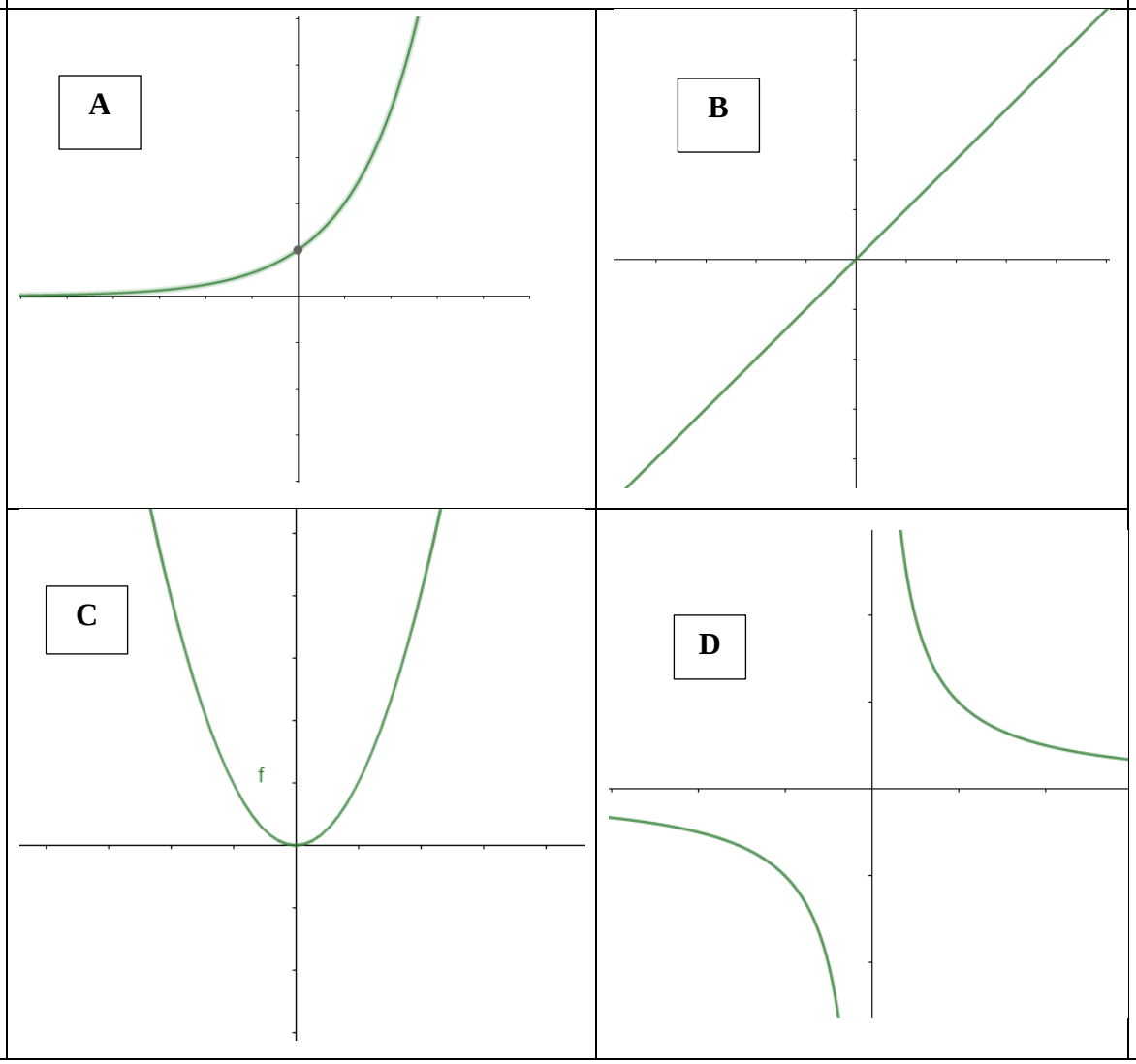
4.1	State the following in terms of a, b and c as depicted in the triangle shown below: $\left(\mathbf{e.g.}\ \tan\beta = \frac{b}{a}\right)$  	
4.1.1	$sin\ \theta$ =	(1)
4.1.2	$cos\ \beta$ =	(1)
4.1.3	$cot\ \theta$ =	(1)
4.2	Use your calculator to calculate the following, where A = 32° and B = 68° Round to 2 decimal places if necessary. You are NOT required to show workings.	
4.2.1	$3cos^2A$ =	(1)
4.2.2	$2secBcosB$ =	(1)
4.3	Solve for the unknown variable in each case:	
4.3.1	 	(2)

4.3.2		(3)
4.4	In the following diagram, a tall building (represented by AB) stands 35m away from a smaller building (represented by CD). A person standing at the top of building CD looks up at the top of building AB at an angle of elevation of 48°. When they look down at the base of building AB, the angle of depression is 26°. Calculate AB, the height of the taller building. **(HINT: Calculate EB first, then AE)** 	(6)

[16]

QUESTION FIVE

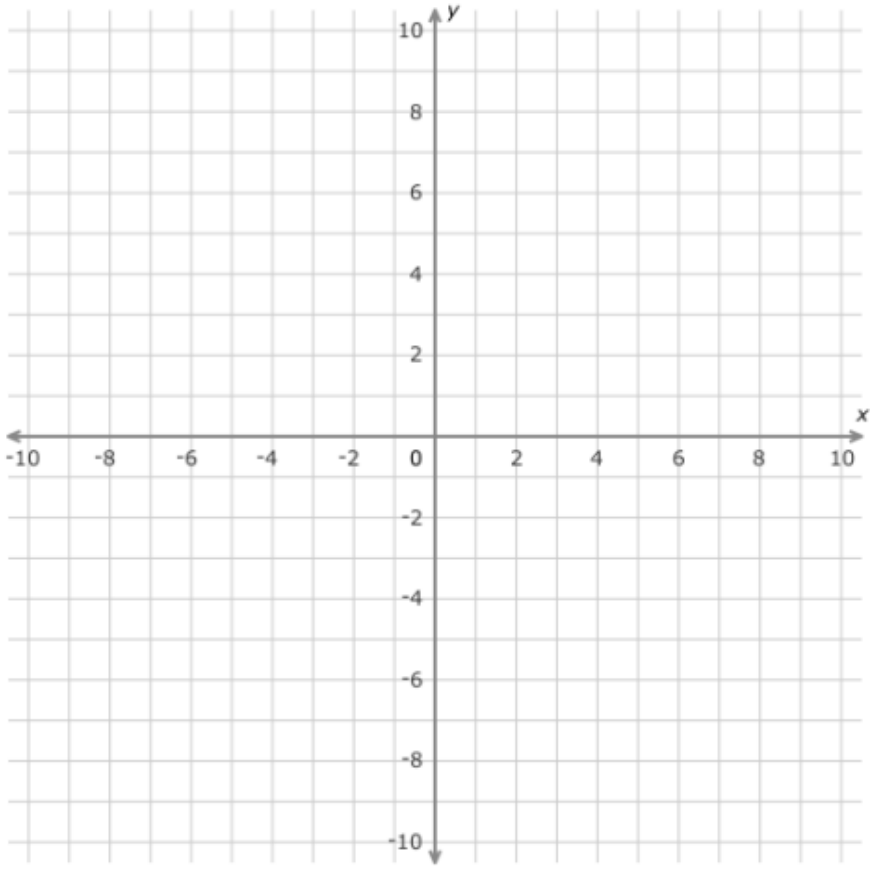
5.	Match each of the below graphs to the equations at the bottom of the page:	(4)

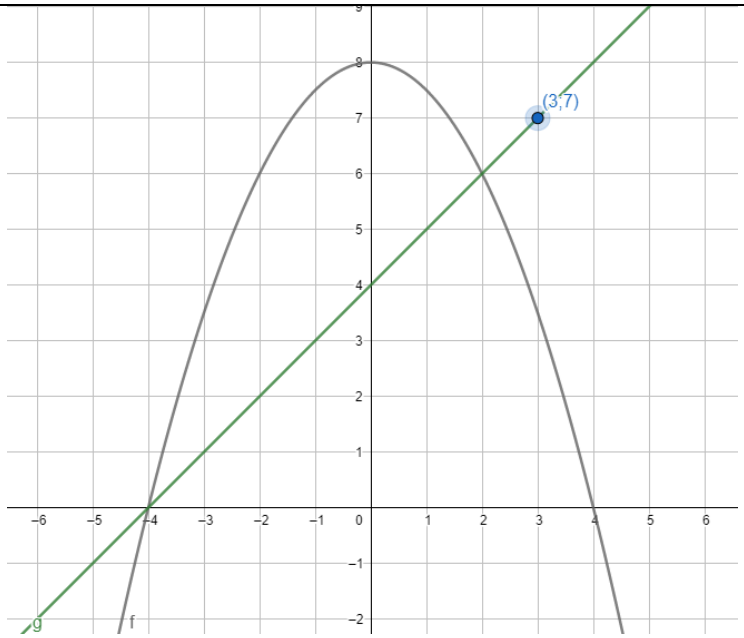


EQUATION	$y = x$	$y = x^2$	$y = \frac{1}{x}$	$y = 2^x$
GRAPH (Just give letter)				

[4]

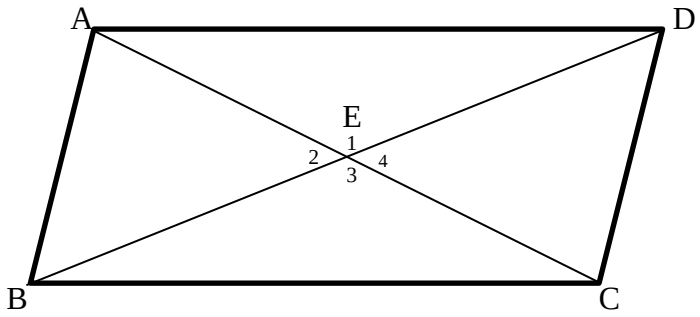
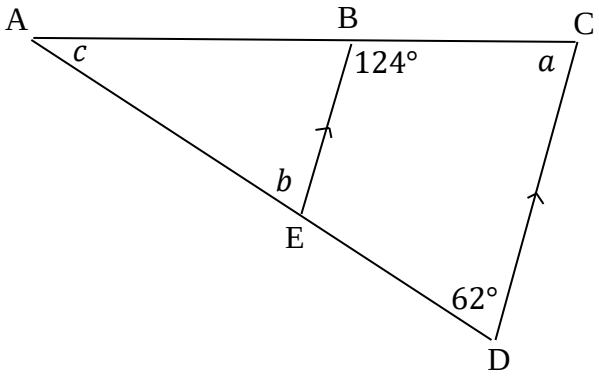
QUESTION SIX:

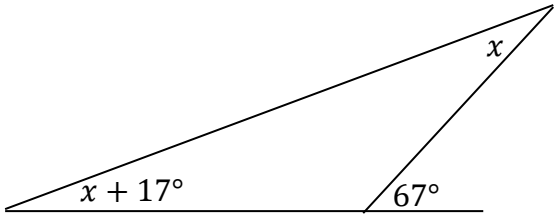
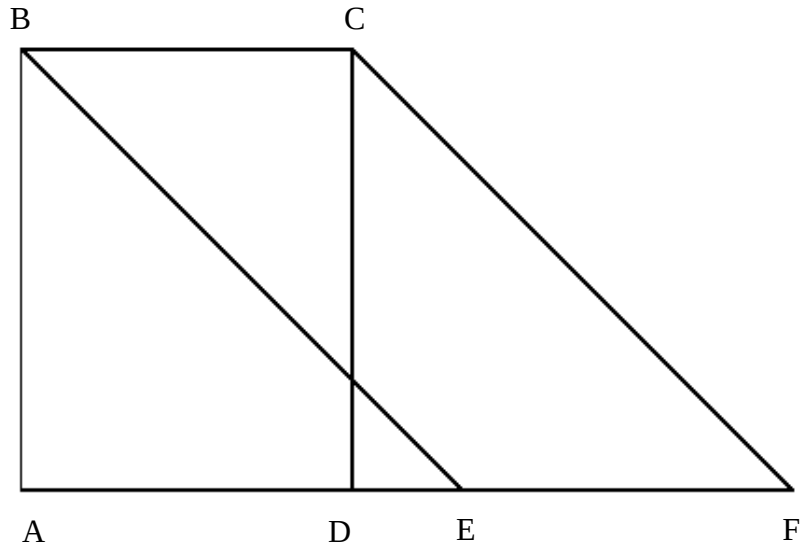
6.1	Sketch the following graphs on the axes provided, showing all intercepts and asymptotes clearly: $f(x) = 3x - 6$ and $g(x) = \frac{4}{x} - 2$	(6)
		
	WORKINGS	

6.2		
6.2.1	Using the above diagram, show with workings that the equation of the parabola is $f(x) = -\frac{1}{2}x^2 + 8$	(4)
6.2.2	Using the above diagram, determine the equation of the straight line in the form $g(x) = mx + c$	(3)
6.2.3	State the values of x for which $f(x) = g(x)$	(2)
6.2.4	Determine the range of $f(x)$	(2)

[17]

QUESTION SEVEN: Give all necessary reasons for the following questions

7.1	Prove the theorem which states that the diagonals of a parallelogram bisect each other. You may use the diagram below to assist you.	(5)
		
7.2	Find the sizes of the angles marked $a - c$, in that order, giving reasons 	(6)
	$a =$	
	$b =$	
	$c =$	

7.3	Solve for x in the following diagram, giving reasons 	(3)
7.3	In the diagram below, ABCD is a parallelogram, BEFC is a parallelogram and ADEF is a straight line. Prove that AE = DF.	(5)
		

[19]

THE END