Algebra

QUESTION ONE **[18]**

Simplify the following expressions

(a) $5w + 3y + 2y + 6w$ [2]

(b) $5y^2 - 6z + 7y^2 - 4z$ [2]

(c) $m \times m \times m \times m =$ [1]

(d) $3w^5 \times 6w^4 =$ [2]

(e) $(p^4)^5 =$ [2]

(f) = [2]

(g) = [3]

(h) + = [4]

QUESTION TWO **[8]**

Expand and simplify the following expressions:

(a) $6(2x - 5) =$ [2]

(b) $3(2w - 6) - 7(w + 5) =$ [3]

(c) $(x + 4)(x - 2) =$ [3]

QUESTION THREE **[16]**

Fully factorise the following expressions:

(a) $xy + xw =$ [2]

(b) $6y - 36 =$ [2]

(c) $24x^5y^6 - 32x^3y^2 =$ [4]

(d) $x^2 + 7x + 10 =$ [2]

(e) $y^2 + 14y + 49 =$ [2]

(f) $2x^2 - 8x - 24 =$

QUESTION FOUR **[25]**

Solve the following equations

(a) $w - 3 = 10$ [1]

(b) $3p + 5 = 11$ [3]

(c) $+ 5 = 12$ [4]

(d) $4p - 7 = 2(p + 3)$ [4]

(e) $(x + 9)(x - 2) = 0$ [2]

(f) $x^2 + 11x + 30 = 0$ [3]

(g) $x^2 - 36 = 0$ [4]

(h) + = 31 [4]

QUESTION FIVE **[5]**

The formula for the volume of a cone is:

V = π v = volume r = radius

(a) Calculate the volume of a cone with a radius of 5 cm. [2]

(b) Rearrange the formula to make r the subject. [3]

QUESTION SIX **[16]**

An insurance salesman is paid $500 a week plus $50 commission for every insurance policy sold.

(a) Write an equation to represent the salesman's weekly pay. Use P = pay and C = commission. [2]

Use your equation to answer the following two questions:

(b) How much will the salesman be paid if he sells 7 policies next week? [3]

(c) The salesman was paid $1 050 last week. How many policies did he sell? [3]

(d) Last month the salesman sold two more policies than the previous month. The product of the two months sales was 440. This information is represented by the equation below: [8]

$$x(x + 2) = 440$$

Solve the equation and determine the amount of policies sold for each of last two months.

Graphs

QUESTION ONE **[6]**

Give the next two terms in each of these patterns:

(a) 1, 7, 13, ___, ___ [1]

(b) 1, 4, 9, ___, ___ [1]

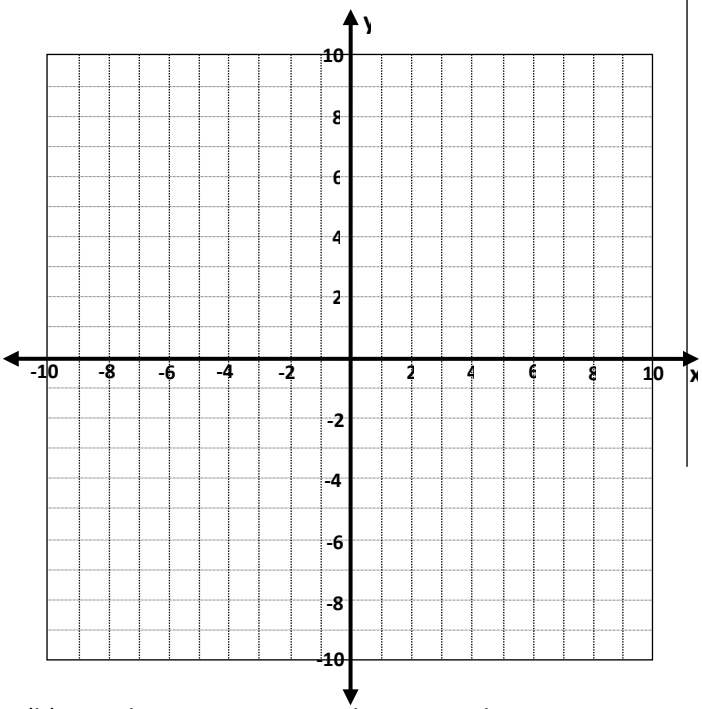
(c) 4, 11, 32, 95, ___, ___ [2]

(d) n, (n + 2), (n + 4), _____, _____ [2]

QUESTION TWO **[6]**

(a) Plot the following co -ordinates on the axes below

(-3, 9), (-2, 4), (-1,1), (0,0), (1,1), (2,4), (3,9) [3]



(b) Join the points up to make a smooth curve. Write the equation of curve. [1]

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(c) If the curve was translated up three squares, what would the new equation be? [2]

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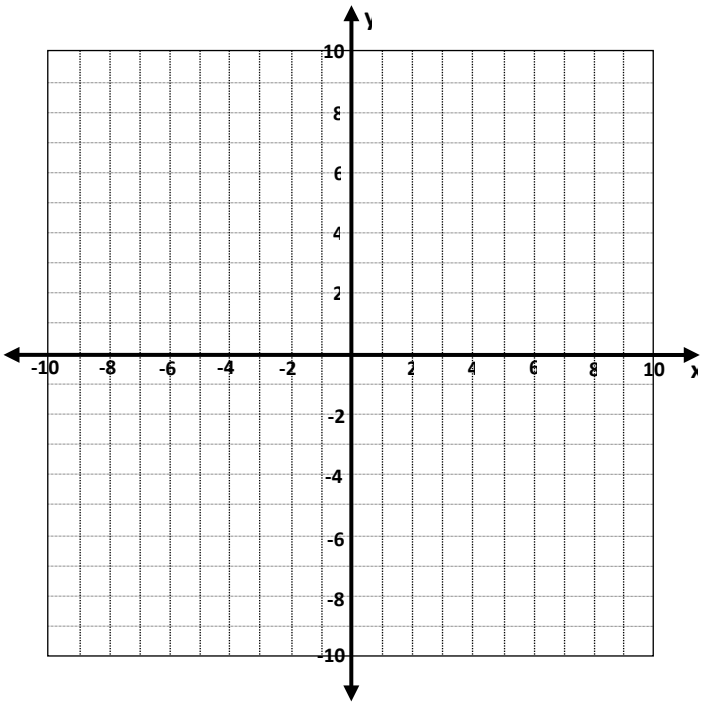
QUESTION THREE **[9]**

Plot the following straight lines on the axes below. Remember to label each line [4]

(a) $y = 3x + 1$

(b) $y = -x + 1$



(c) Describe the differences between the two straight lines using correct mathematical language [5]

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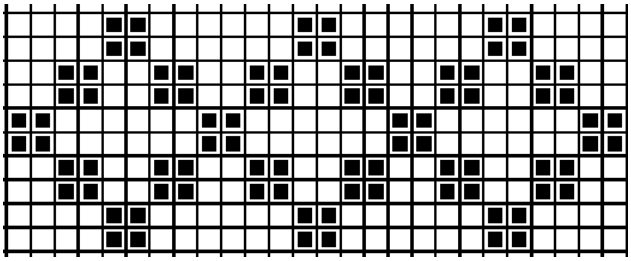
QUESTION FOUR **[10]**

Below is a photograph of a simple cross stitch pattern of black diamonds.



Complete the table below [2]

(a)

Number of Diamonds (D)	Number of black squares
1	32
2	60
3	88
4	
5	
6	
7	

(b) Write an equation that links the number of black squares needed to the number of diamonds. [2]

B=_____

_____

(c) If 20 diamonds were made, how many black squares were cross stitched? [2]

_____

_____

(d) If the points in the table above were plotted and joined to make a straight line on a co-ordinate axes. Describe the line that would be made. [4]

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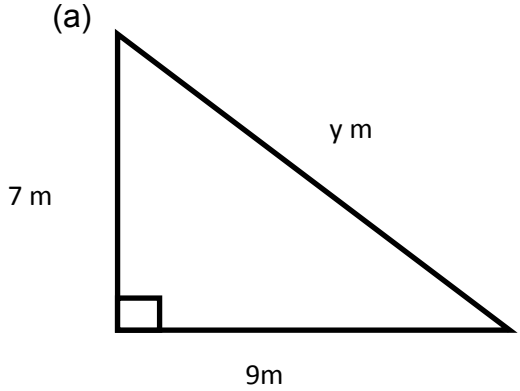
Trigonometry

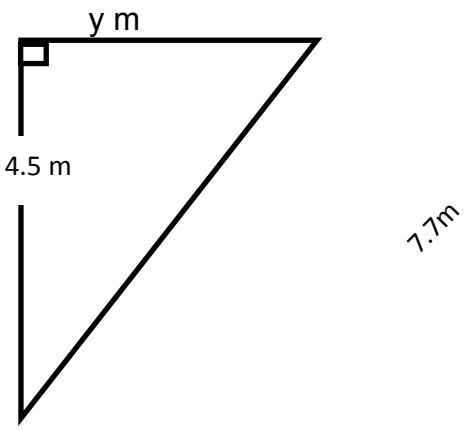
QUESTION ONE **[6]**

Calculate the size of side y.
[3]

(a)



(b) [3]



QUESTION TWO **[8]**

Calculate the values of ***x*** to 1 decimal place.

(a) $8^2 + 7^2 = x^2$ [1]

(b) $x^2 + 3.3^2 = 10.9^2$ [1]

(c) $x = 10 sin\ 40$ [1]

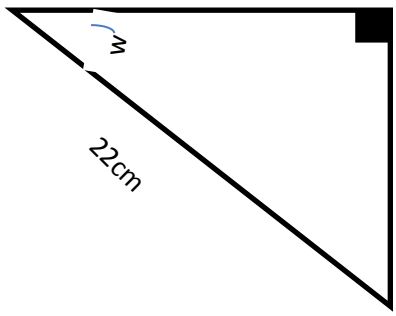
(d) *cos* 40 = [2]

(e) Sin 30 = [3]

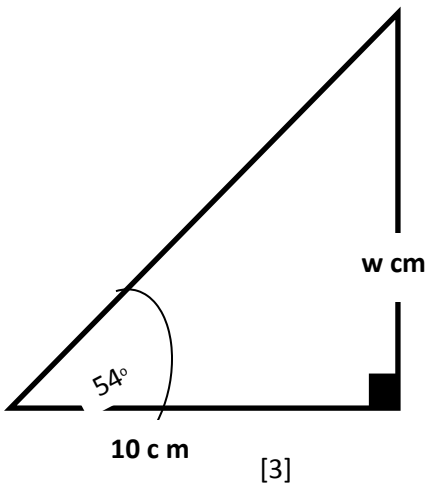
QUESTION THREE **[6]**

Calculate the size of w [3]

(a)



(b)



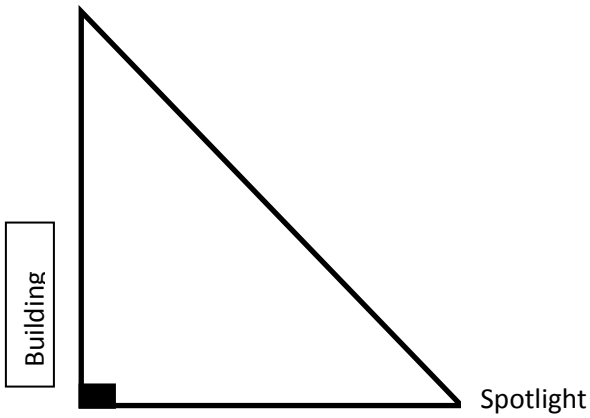
[3]

QUESTION FOUR **[4]**

The city council is installing coloured spotlights lights to light up an old building at night.

The building is 15m high and the lights will be placed 10m away from the base of the building.

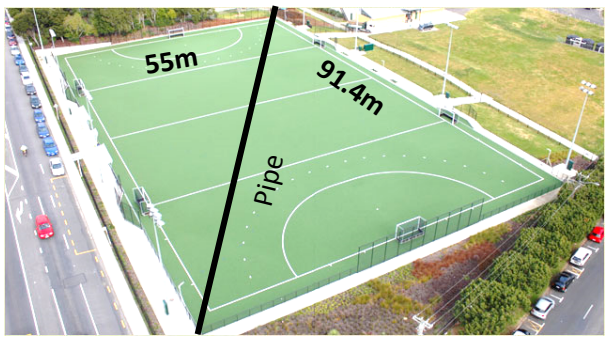
Calculate the angle of elevation the lights need to be set at to shine at the top of the building. [4]



QUESTION FIVE **[3]**

A new water pipe needs to be installed across the Hockey turf.

Calculate the length of the pipe. []



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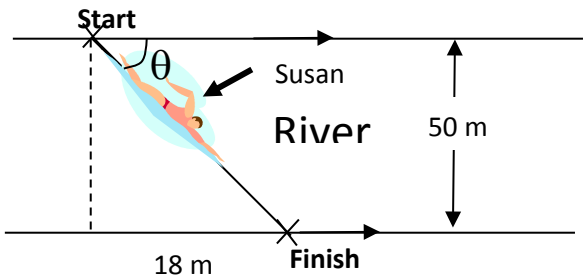
QUESTION SIX **[4]**

Susan swam across the local river to raise money for cancer. The current was quite strong and once she got to the other side Susan realise that she was 18m downstream from her family who were still at the point where she went into the water. The river was 50m across, what angle from the starting bank did the current make Susan swim?



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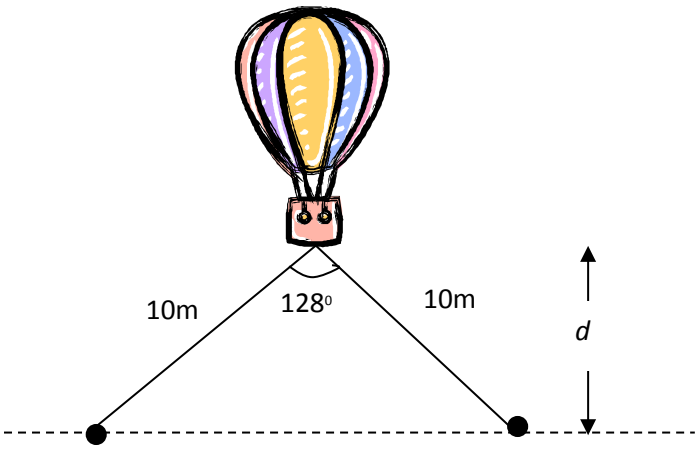
Angle θ = _____

QUESTION SEVEN **[4]**

A hot air balloon is held in place by 2 wires each 10m long attached to the ground, one on either side. The angle that the two wires make when they meet is 128^0 as in the diagram below.

Find the distance *d* from the bottom of the balloon to the ground.



Distance from the ground _____ m

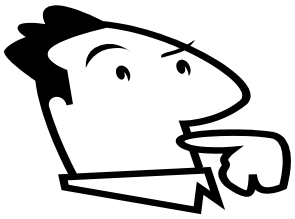
QUESTION EIGHT **[6]**

Another balloon that was being held 7m off the ground comes lose and floats away. When it reaches a height of 24m above ground it has moved 11m east from where it had been held.

Assuming that the wind was constant, what angle did the balloon move from the horizontal to get to its height of 24m?

Draw your own diagram for this situation. Label all distances and angles clearly

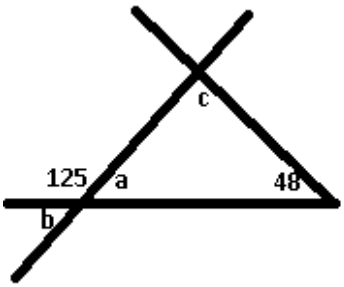
Angle from the horizontal = _____^{0}



Geometry

QUESTION ONE **[8]**

Calculate the size of each marked angle. Give a geometric reason for each answer.



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QUESTION TWO **[7]**

Calculate the size of each marked angle. Give a geometric reason for each answer.

y

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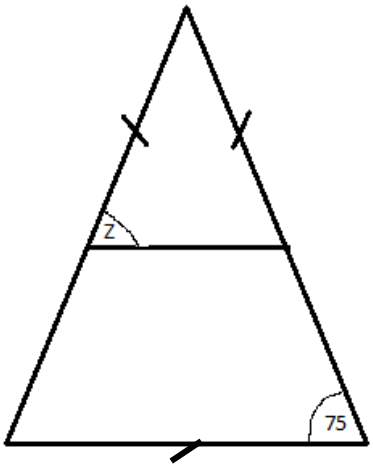

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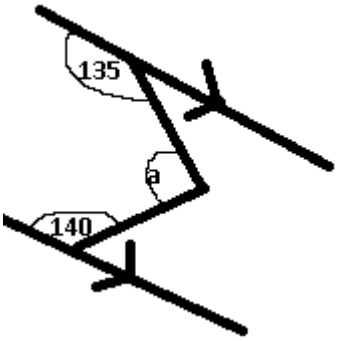
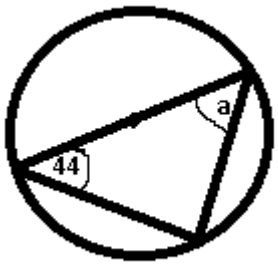
QUESTION THREE **[7]**



QUESTION FOUR **[5]**

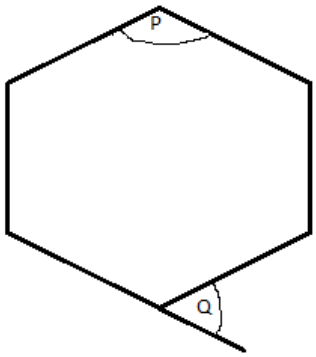
Calculate the size of angle a



QUESTION FIVE **[5]**

Give the size of the marked angles. Give a geometric reason for each answer.

This shape is a regular hexagon

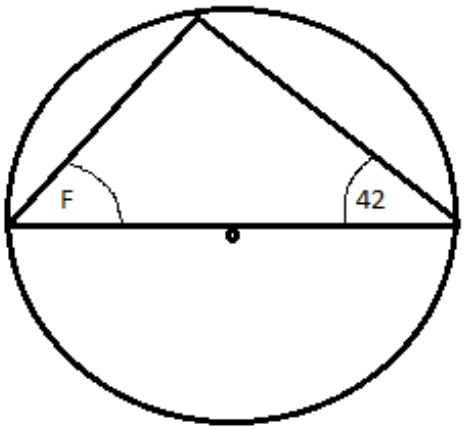


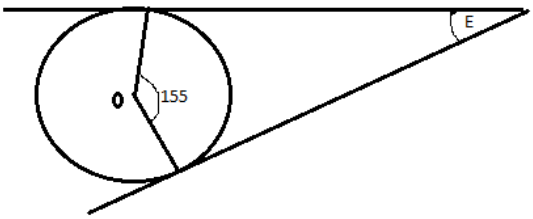
QUESTION SIX **[9]**

Calculate the size of angle E and angle F giving geometric reasons for your answer

C

P R





QUESTION SEVEN **[5]**

Calculate the size of angle E giving a geometric reason for your answer

R

P

T