

NAME:	TEACHER:
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Hamilton Girls High School

Year 9 Mathematics

2010 Examination

Time: 1.5 hours

Instructions to students

- You may use a calculator.
- Write in Blue or Black pen. Do not use correction fluid.
- Answer ALL questions in the spaces provided in this booklet.
- Show ALL working.
- Each section is two pages and starts with easier questions and ends with harder ones. You need to attempt every section. You should only spend 22 minutes on each.

Sections

Topic	CL3	CL4	CL5	Total	Grade
Algebra					
Geometry					
Measurement					
Statistics					

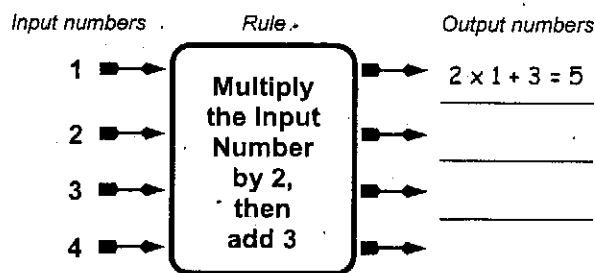
Algebra

1. Count the number of dots in each diagram and write this as a **number sequence**



Work out what would be the next 5 numbers for this sequence,

2. Use the rule in the box to work out the 'output numbers' to create part of a number sequence.



3. C.D.'s can be purchased by mail order. The cost of a purchase is given by the rule ...

'\$9.00 for each C.D. plus \$5.00 postage'

What would it cost to buy 3 CD's by mail-order? _____

What would it cost to buy 12 CD's by mail-order? _____

Sam spent \$77.00 on mail order CD's. How many CD's did he buy? _____



4. Heidi thinks of a number, and adds to 16 and gets 41. What is Heidi's number? _____

5. Courtenay's number is C . She adds her number to itself three times then adds 52. Courtenay writes " $C+C+C+52$ ". Her friend Zinab writes " $3C+52$ "

(a) Who is correct? Why?

(b) If Courtenay's number is 21 what answer will she get?

- (c) If Courtenay's number is 103 what will Zinab's calculation give?

6. Work out what number would go where the letter is in each equation. That is, solve each equation.

$19 + a = 26$ $a =$ _____

$14 - b = 9$ $b =$ _____

$c \times 9 = 63$ $c =$ _____

$35 \div d = 5$ $d =$ _____

7. Marnie says that $3+3+3+3+3$ can be written as 5 lots of 3, but she writes " 5×3 ".

What would she write for

(a) $11 + 11 + 11 + 11 + 11 + 11 + 11$

(b) $5 + 5 + 5 + 5 + 7 + 7 + 7 + 7 + 7$

(c) $b + b + b$

(d) $q + q + k + k + k + k$

(e) $(f + 2) + (f + 2) + (f + 2) + (f + 2)$

8. Write these using powers

(a) $3 \times 3 \times 3 \times 3 \times 3 =$ _____

(b) $1.27 \times 1.27 \times 1.27 =$ _____

9. Using a variable (e.g. x or n) for unknown numbers, write **expressions** for these descriptions.

(a) A number is reduced by six.

(b) A number that has been doubled, and then had four added to it.

(c) A number that has had three subtracted from it, and the result multiplied by four.

10. Simplify these expressions.

(a) $2k + 5m - k$

(b) $d \times d \times d \times d$

(c) $5 \times p$

(d) $2n \times 7$

(e) $e \times 15e$

(f) $1.25p \times 0.5p$

(g) $13d - d \times 8$

11. If $x = 5$, $y = 2$ and $z = -1$, evaluate (work out the value of) these expressions.

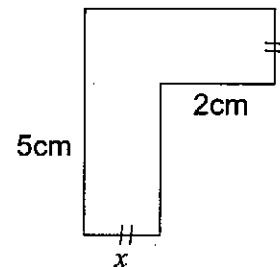
(a) $xy + 2$

(b) $x - z$

(c) $2y - x$

(d) $x^2 + z^2$

12 On the shape below, the two shorter sides have small lines drawn on them, this means that they are the same length

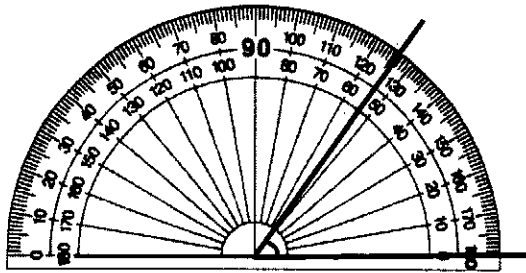


(a) Write an expression for the **AREA** of this shape. Simplify if possible.

(b) Write an expression for the **PERIMETER** of this shape. Simplify if possible.

Geometry

1. Read the size of this angle off the protractor.



It measures _____ degrees

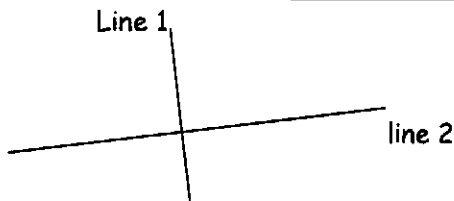
2. Name these shapes (eg: hexagon, rectangle etc)



3. List 3 things that make a square a square



4. Are the two lines below PARALLEL or PERPENDICULAR?



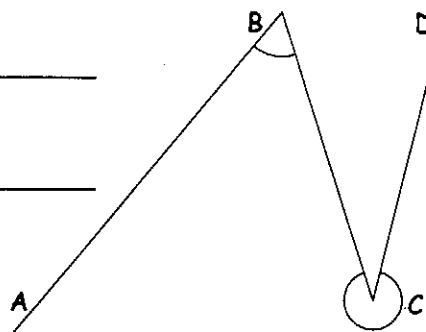
5. For each angle, write acute, obtuse, right or reflex



6. Use your protractor to measure the marked angles

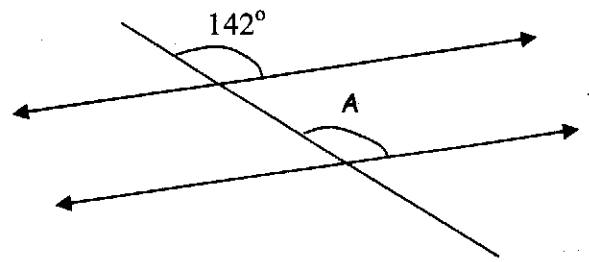
$\angle ABC =$ _____

$\angle BCD =$ _____



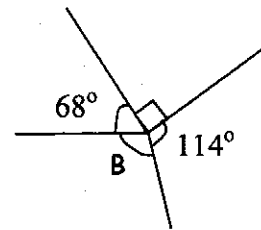
7. Use the angle properties to calculate the size of the following angles. You do not have to give a reason.
(The diagrams are NOT drawn to scale)

(a)



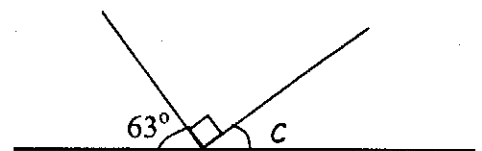
A = _____

(b)



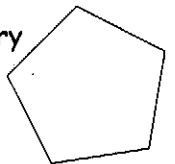
B = _____

(c)



C = _____

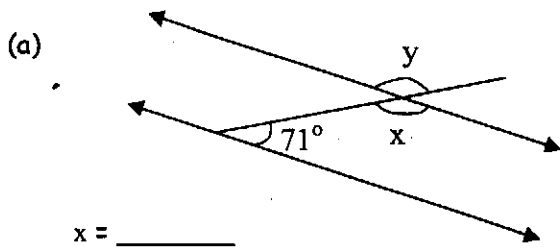
8. (a) Draw all the lines of symmetry on this shape.



(b) Give the order of rotational symmetry for the shape above

9. In the space below draw an angle of 147°

9. For the following questions, give the angle sizes and give a reason (rule) for each one.

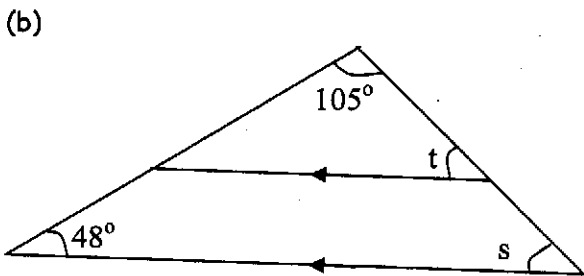


$x =$ _____

Reason: _____

$y =$ _____

Reason: _____



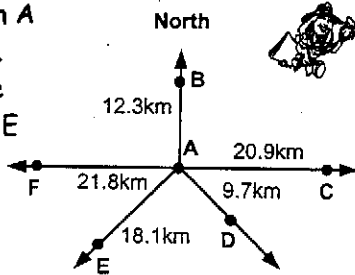
$s =$ _____

Reason: _____

$t =$ _____

Reason: _____

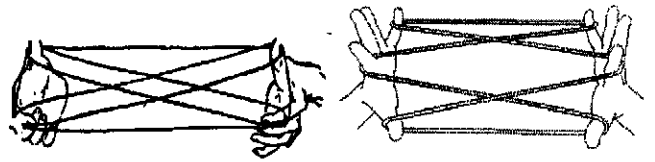
10. On this diagram, Town F is 21.8 km from Town A on a bearing of 270° . What is the distance and bearing of Town E from Town A?



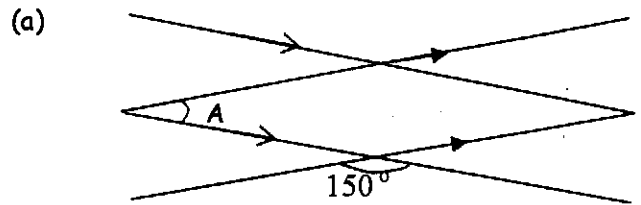
Distance: _____

Bearing: _____

11. In the "Cat's Cradle" string game, a lot of parallel lines can be created.

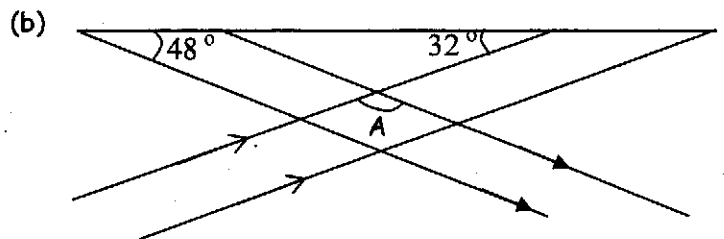


Here are some diagrams based on cat's cradles. Your job is to work out the size of the angles marked A. Number any angles (use 1, 2, etc.) in the diagram you used to help solve the problem. Give a reason for each one.



Angle Number	Size	Reason
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$A =$ _____



Angle Number	Size	Reason
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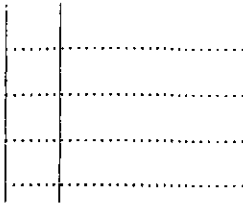
$A =$ _____

Statistics

1. Draw a stem and leaf graph to display this data.

Weight of pumpkin (kg)

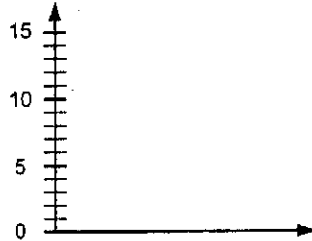
17, 43, 25, 36, 34,
27, 13, 18, 24, 31



2. For 30 days at 12:00 p.m. each day, the weather was recorded as either sunny, cloudy, raining or snowing. This table displays the results.

Complete the bar graph, including labels, to display these results.

Weather	Total
sunny	10
cloudy	5
raining	13
snowing	2

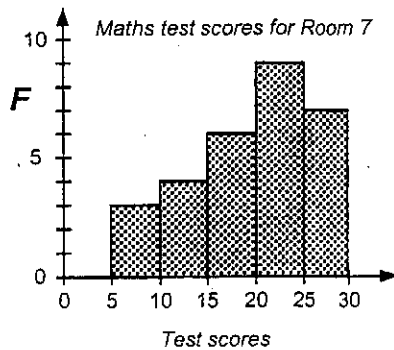


Write Two statements about what you notice about the weather over the 30 days.

I notice... _____

I notice... _____

3. This graph of grouped data is called a histogram and there are NO gaps between columns.



How many pupils scored between 15 and 20? _____

How many pupils scored more than 20? _____

Describe the distribution of Room 7's math test scores.

4. The data in this box shows the number of Lego blocks used to create different models.

Organise the data using this frequency table.

9, 12, 23, 28,
32, 19, 39, 10,
21, 34, 8, 29,
37, 21, 39, 26,
11, 38, 9, 29,
26, 18, 16, 24,
35, 40, 16, 26,
13, 24, 36, 34,
26, 27, 18, 9,
23, 27, 34, 40

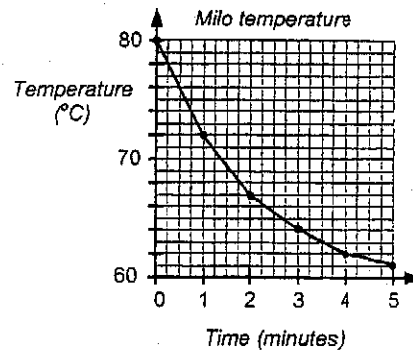
Number of blocks	Tally	F
1 - 10		
11 - 20		
21 - 30		
31 - 40		

How many models were created? _____

How many models used 1-10 blocks? _____

How many models used more than 20 blocks? _____

5. The time-series graph below shows how the temperature of a milo drink cools down over time.



What was the starting temperature? _____

What was the temperature after 2 minutes? _____

After what time was the temperature 64°C? _____

Describe what will happen to the temperature as time continues.

6. The number of sunshine hours per day was recorded for 10 days and is shown below.

4, 4, 5, 6, 7, 8, 8, 9, 9, 10

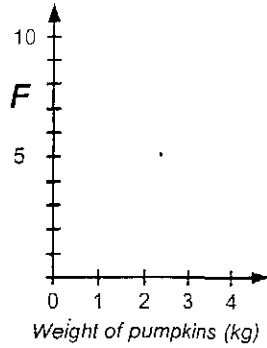


For these results calculate the following.

mean _____ median _____ mode _____ range _____

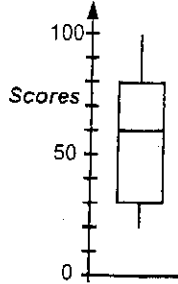
7. Draw a histogram for the continuous data in this table.

Weight (kg)	Frequency
0 —	7
1 —	10
2 —	5
3 — 4	8
	30



8. Use this box & whisker graph to list the following scores.

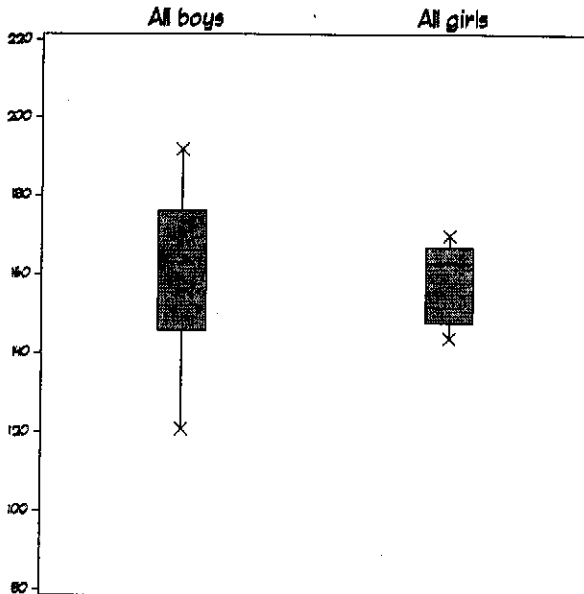
lowest score _____
highest score _____
range _____ median _____
lower quartile _____ upper quartile _____



9. An investigation was conducted on how heights of school aged boys compare to heights of school aged girls. A random sample of 25 students, taken from the Census at Schools Data, was taken and a box and whisker graph was drawn to display the results.

What do you notice about the heights of boys compared to girls?

- Write your comments in the space provided in the next column
- Justify your statements, by saying what part of the graph allowed you to say what you have



Q9. Comments:

10. What other information would help verify the comments you have made?