Girraween High School
Year 10 Mathematics
Yearly October 2019
Part A Answer Sheet

Name: _____

Teacher: _____

Total Marks
(Percentage)

Total marks for PART A: /20

Total marks for PART B: /138

Total marks for Yearly: /158

Select the alternative A, B, C or D that best answers the question.
Indicate your selection by filling in the corresponding circle.

STRANDS

									NA	MG	SP
1.	A	O	B	O	C	O	D	O			
2.	A	O	B	O	C	O	D	O			
3.	A	O	B	O	C	O	D	O			
4.	A	O	B	O	C	O	D	O			
5.	A	O	B	O	C	O	D	O			
6.	A	O	B	O	C	O	D	O			
7.	A	O	B	O	C	O	D	O			
8.	A	O	B	O	C	O	D	O			
9.	A	O	B	O	C	O	D	O			
10.	A	O	B	O	C	O	D	O			
11.	A	O	B	O	C	O	D	O			
12.	A	O	B	O	C	O	D	O			
13.	A	O	B	O	C	O	D	O			
14.	A	O	B	O	C	O	D	O			
15.	A	O	B	O	C	O	D	O			
16.	A	O	B	O	C	O	D	O			
17.	A	O	B	O	C	O	D	O			
18.	A	O	B	O	C	O	D	O			
19.	A	O	B	O	C	O	D	O			
20.	A	O	B	O	C	O	D	O			
									/8	/7	/5

GIRRAWEEN HIGH SCHOOL

YEAR 10 YEARLY EXAMINATION

MATHEMATICS

2019

Time allowed: Two hours

Reading Time: 5 minutes

Name: _____

Teacher: _____

INSTRUCTIONS TO STUDENTS

- You should attempt all questions in Part A and Part B.
- The answers to all questions in Part A must be recorded in blue or black pen on the separate Multiple Choice answer sheet.
- Approved scientific calculators may be used in all parts of the examination.
- Diagrams are **not** drawn to scale unless otherwise stated.

Year 10 Yearly Examination 2019

Marking Sheet for examiners' use only

Name: Teacher:

Section	Marks for NA	Marks for MG	Marks for SP	TOTALS
Non-calculator	**/20**			
PART A	**Q1-8** **/8**	**Q9-15** **/7**	**Q16-20** **/5**	**/20**
PART B **Question 21**	**a-j** **/10**	**k-o** **/5**		**/15**
Question 22			**/15**	**/15**
Question 23		**/20**		**/20**
Question 24	**/16**			**/16**
Question 25	**/34**			**/34**
Question 26		**/12**		**/12**
Question 27	**/26**			**/26**
TOTALS	**/114**	**/ 44**	**/20**	**/158**

Girraween High School
MATHEMATICS

Year 10 Yearly Examination 2019 **Time allowed: 2 hours**

Name_____ **Teacher**_____

Instructions: Fill in the circle corresponding to the correct answer on the Multiple Choice Answer Sheet.

PART A (20 marks)

1. Theo invested \$3000 for a period of 2 years to earn compound interest of 8% per annum. The amount of INTEREST that Theo will earn is

(A) \$480.00 (B) \$499.20 (C) \$3480.00 (D) \$3499.20

---

2. $\left(\sqrt{5}-1\right)^2 =$

(A) 4 (B) 6 (C) $6-2\sqrt{5}$ (D) $6-\sqrt{10}$

---

3. The graph $y=2x^2+b$ passes through the point $(-3,4)$.
What is the value of b?

(A) -35 (B) -32 (C) -14 (D) 22

---

4. $\frac{x}{3}-\frac{x-1}{2} =$

(A) $\frac{-x-3}{6}$ (B) $\frac{-x-1}{6}$ (C) $\frac{-x+1}{6}$ (D) $\frac{-x+3}{6}$

---

5. Make n the subject of $nc=n+50$.

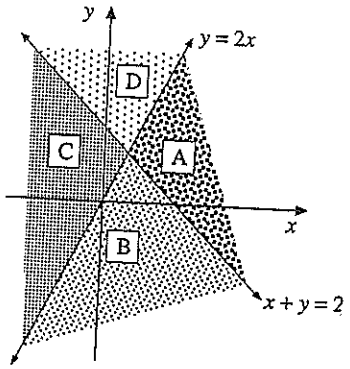
(A) $n=50-c$ (B) $n=50-c+1$ (C) $n=\frac{c+50}{c}$ (D) $n=\frac{50}{c-1}$

---

6. Solve $3x^2-5x-1=0$.

(A) $x=\frac{-5\pm\sqrt{13}}{6}$ (B) $x=\frac{-5\pm\sqrt{37}}{6}$ (C) $x=\frac{5\pm\sqrt{13}}{6}$ (D) $x=\frac{5\pm\sqrt{37}}{6}$

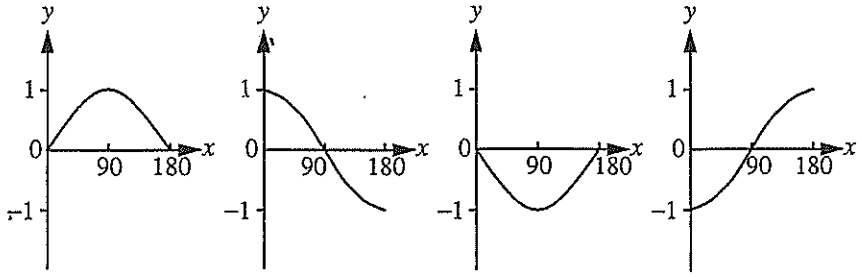
7. Which of the regions A, B, C, or D represents the set of points satisfying both $x+y \geq 2$ and $y \leq 2x$?



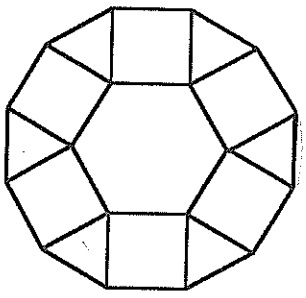
---

8. Which is the graph of $y = \cos x$, where x is measured in degrees and $0 \leq x \leq 180$?

(A) (B) (C) (D)



9.



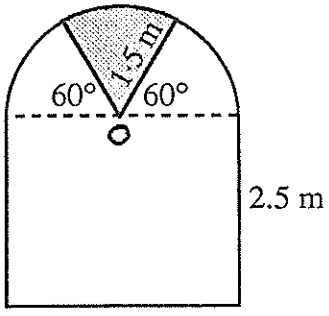
In this figure, the ratio of the areas of **each** triangle, square and hexagon is

triangle	square	hexagon
10 :	23 :	60

What fraction of the area of the figure is covered by the hexagon?

(A) $\frac{10}{43}$ (B) $\frac{1}{4}$ (C) $\frac{10}{33}$ (D) $\frac{20}{31}$

10.



The **clear** part of this window is to be tinted.

The area to be tinted is closest to

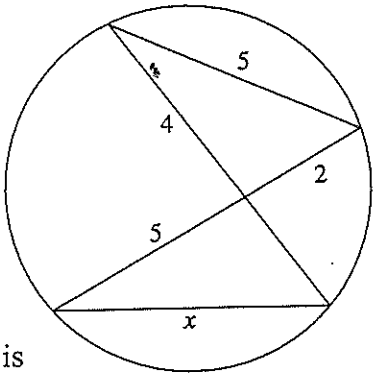
(A) $8.6m^2$ (B) $9.9m^2$ (C) $11.0m^2$ (D) $12.2m^2$

11. A lead cube $10cm \times 10cm \times 10cm$ is melted down and made into spherical balls of diameter $0.5cm$.

The greatest number of spheres that could be made would be closest to

(A) 15 (B) 150 (C) 1500 (D) 15 000

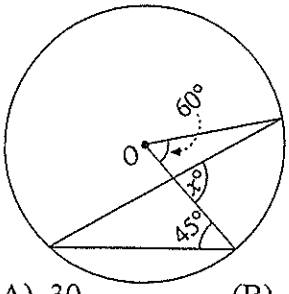
12.



The value of x is

(A) 2.5 (B) 6.25 (C) 10 (D) 12.5

13.

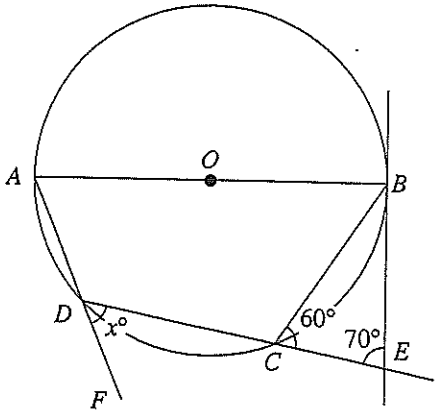


O is the centre of the circle.

Find the value of x.

(A) 30 (B) 45 (C) 75 (D) 90

14.



O is the centre of the circle.

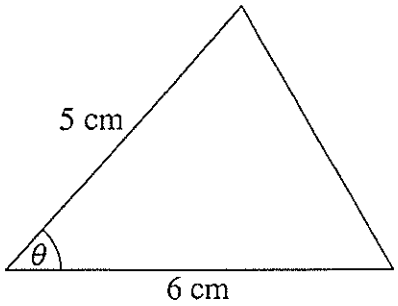
AB is a diameter.

BE is a tangent to the circle.

Find the value of x.

(A) 40 (B) 50 (C) 60 (D) 70

15.



Find the value of $\sin\theta$ if the area of this triangle is $10cm^2$.

(A) $\frac{1}{3}$ (B) $\frac{2}{3}$ (C) $\frac{3}{2}$ (D) 3

16.

Score	Frequency
11	5
12	4
13	1
14	6
15	4

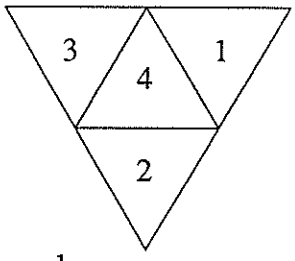
A score of 13 is added to this sample.

Which measure will change?

(A) median (B) range (C) mode (D) mean

---

17. A die is made in the form of a tetrahedron (triangular pyramid). The net of the die is shown below.



The faces are numbered 1, 2, 3, and 4.
The die is rolled twice.
The number on the face that the die lands on is recorded each time.
Find the probability that the sum of the two recorded numbers is 4.

(A) $\frac{1}{16}$ (B) $\frac{1}{8}$ (C) $\frac{3}{16}$ (D) $\frac{1}{4}$

---

18. The information below relates to a group's performance on two tests.

	Test 1	Test 2
Mean	60	68
Standard deviation	6	10

What mark in Test 2 is equivalent to a mark of 72 in Test 1?

(A) 72 (B) 80 (C) 84 (D) 88

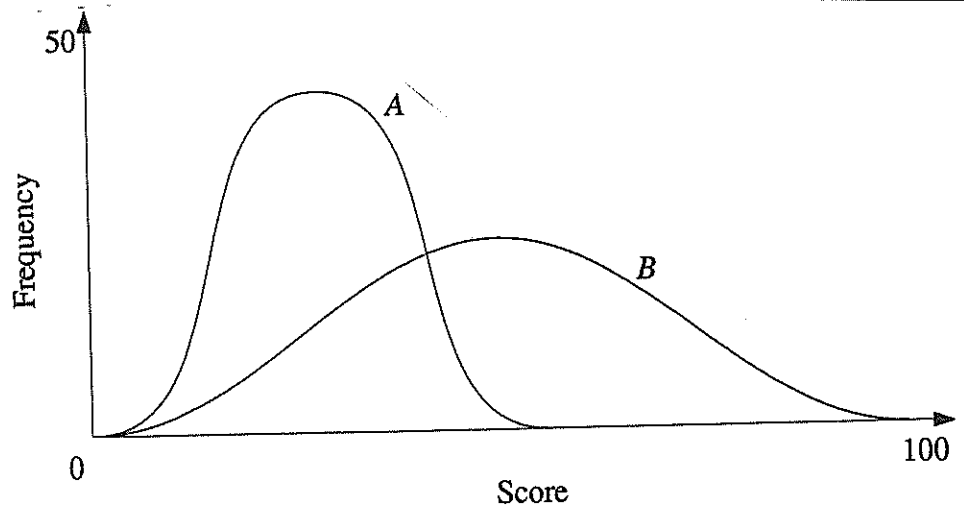
19. For the scores represented in the frequency distribution table, the mean is 5 and the mode is 4.

Score	Frequency
x	10
y	5

The range of the scores is

(A) 2 (B) 3 (C) 5 (D) 6

20.



The graph shows the frequency curves for two sets of test results, A and B.

$\overline{x_A}$ = mean of A σ_A = standard deviation of A

$\overline{x_B}$ = mean of B σ_B = standard deviation of B

Which of the following is true?

(A) $\overline{x_A} > \overline{x_B}$ and $\sigma_A < \sigma_B$ (B) $\overline{x_A} < \overline{x_B}$ and $\sigma_A > \sigma_B$

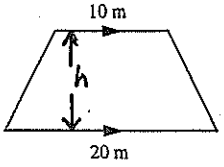
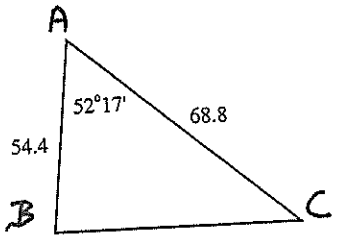
(C) $\overline{x_A} < \overline{x_B}$ and $\sigma_A < \sigma_B$ (D) $\overline{x_A} > \overline{x_B}$ and $\sigma_A > \sigma_B$

END OF PART A

PART B

QUESTION 21(1 mark each – write answers in the spaces provided)

(a)	Solve for x: $8^x = 4$
(b)	Find the exact distance between the points (3, 2) and (5, −3).
(c)	Find the midpoint of the interval joining (−4, 2) and (2, −6).
(d)	Find the gradient of the line joining (−1, 1) and (2, 4).
(e)	Simplify $\dfrac{3x+6}{x^2-4}$
(f)	If $f(x)=\dfrac{2x+1}{x-4}$, find $f(-4)$.
(g)	Make h the subject of the formula $D=5\sqrt{\dfrac{h}{2}}$.

(h)	Factorise fully $(m+3)^2-(m-2)^2$.
(i)	Write the equation $2y-\frac{x}{2}+\frac{2}{3}=0$ in general form.
(j)	Find the **exact** value of $\cos 225°$.
(k)	The area of this trapezium is $180m^2$.  Find the value of h.
(l)	Convert $0.0025m^3$ to cm^3.
(m)	Calculate the **exact** volume of a cone with base radius $15mm$ and height $30mm$.
(n)	Find the slant height of a cone that has base radius $5cm$ and surface area $90\pi\ cm^2$.
(o)	Calculate the area of ΔABC correct to 1 decimal place. 

QUESTION 22(15 marks)

(a) 15 people were surveyed to find out whether they run or swim for exercise.
6 said they run, 4 said they swim and 8 said they neither run nor swim.

(i) Draw a Venn diagram to represent the above information. **2m**

(ii) Find the probability that a person selected from this group: **2m**

(α) runs or swims_____ (β) only swims _____

(b) In a raffle 100 tickets are sold and there are 2 prizes. Aadit buys 5 tickets.

(i) Draw a tree diagram showing all outcomes and probabilities. **4m**

(ii) Find the probability that Aadit wins:

(α) the first prize **1m**

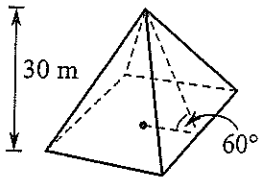
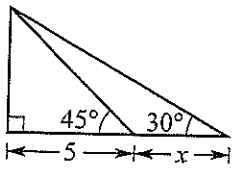
(β) both prizes **2m**

(γ) neither prize **2m**

(δ) at least 1 prize **2m**

QUESTION 23 (20 marks)

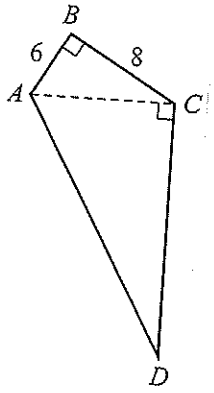
(a)	In a parallelogram $ABCD$, $AB=10cm$, $DB=16cm$ and $\angle A=100°$. Find the size of $\angle ADB$, correct to the nearest degree.	**3m**
(b)	Two hikers left camp at the same time. The first hiker travelled 8km in a direction $S30°E$. The second hiker travelled 6km in a direction $N40°E$. (i) Draw a diagram to represent the above information.	**2m**
	(ii) How far apart are the hikers?	**3m**
(c)	Solve these equations for $0° \le \theta \le 360°$. Give answers in degrees and minutes. (i) $\sin\theta = 0.2$	**2m**
	(ii) $\cos\theta = -0.8$	**3m**
	Question 23 continues on the next page	

(d)	The triangular faces of a right square pyramid are at an angle of 60° to the base. The height of the pyramid is 30m. Find the perimeter of the base of the pyramid, correct to 1 decimal place. 	**3m**
(e)	Given the following diagram, show that $x = 5\left(\sqrt{3}-1\right)$. 	**4m**

QUESTION 24 (16 marks)

(a)	Solve $3x - \frac{4}{x} = 4$	**4m**
(b)	Solve $x^2 + 7x - 3 = 0$ by the method of completing the square.	**4m**

Question 24 continues on the next page.

(c)	Use the quadratic formula to solve $15x^2 + 3x - 9 = 0$ correct to 2 decimal places.	**3m**
(d)	Quadrilateral ABCD has a perimeter of 64cm with measurements as shown in the diagram. Find the lengths of AD and CD. 	**5m**

QUESTION 25 (34 marks)

(a)	A parabola has its vertex at (1, −27) and it cuts the x–axis at (4, 0). (i) Draw a sketch of the parabola. **2m** (ii) Find the equation of the parabola in the form $y = ax^2 + bx + c$. **4m**	

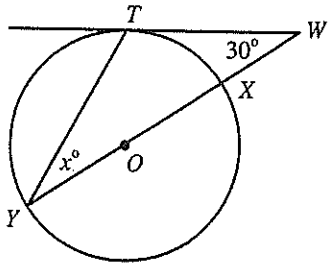
Question 25 continues on the next page

(b)	Use the discriminant to show that the line $y = 2x + 1$ does not intersect the parabola $y = x^2 + 3$.	**3m**
(c)	Find the centre, radius and x– and y– intercepts of the circle $x^2 - 6x + y^2 - 4y - 3 = 0$.	**8m**
(d)	For the hyperbola $y = \frac{-2}{x-3} - 2$ (i) State the asymptotes _____ (ii) Find the x– and y– intercepts. (iii) Sketch the graph of $y = \frac{-2}{x-3} - 2$.	**2m** **4m** **3m**

Question 25 continues on the next page

(e)	If y varies inversely with x and $y = 40$ when x=30, find the value of y when x=80.	**4m**
(f)	Find the inverse function for $y = 4x - 5$.	**2m**
(g)	Solve for x: $2x^3 - 3 = -9$. Give your answer correct to 2 decimal places.	**2m**

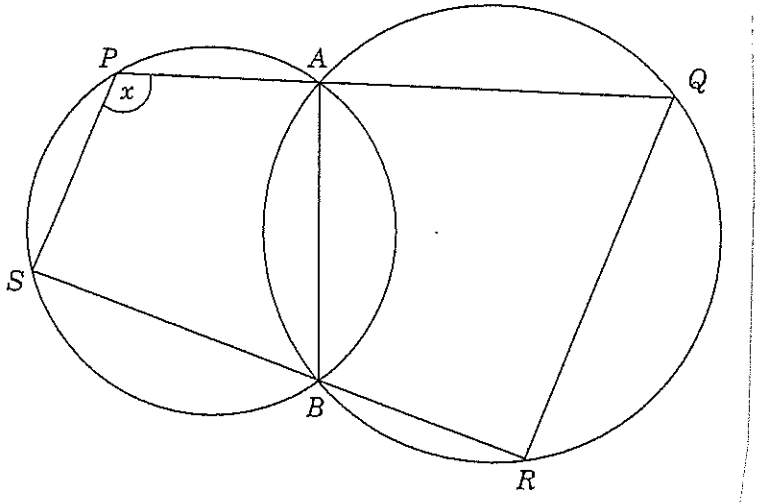
QUESTION 26 (12 marks)

(a)	In the figure, O is the centre of the circle. XY is a diameter. Find the value of x, giving reasons. [Hint: Join TX.] 	**5m**

Question 26 continues on the next page.

(b)

For the following diagram, $\angle APS = x$.



Show that:

(i) $\angle PQR = (180 - x)^0$. **4m**

(ii) QR is parallel to PS. **3m**

QUESTION 27 (26 marks)

(a)	Solve for x, correct to 3 decimal places: $3^x = 7$.	**2m**
(b)	Evaluate using the laws of logarithms $\log_{10} 5 + \log_{10} 20$.	**3m**
(c)	Simplify $\log_a 4 + \log_a 6 - \log_a 8$	**3m**
(d)	Evaluate $\log_{16}\left(\frac{1}{\sqrt{2}}\right)$	**3m**
(e)	Which of the following is a **monic** polynomial? (A) $1+2x+3x^5$ (B) $2-6x+x^7$ (C) $\frac{1}{x+1}$ (D) $x^2+\sqrt{x}$ Answer: _____	**1m**
(f)	$P(x)=x^3+3x+m$ has a remainder of 10 when divided by $(x-2)$. Find the value of m.	**3m**

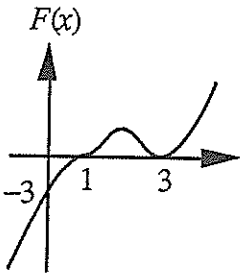
Question 27 continues on the next page

(g)	(i) Show that $(x+1)$ is a factor of x^3+2x^2-5x-6.	**2m**
	(ii) Use long division to divide (x^3+2x^2-5x-6) by $(x+1)$.	**3m**
	(iii) Factorise x^3+2x^2-5x-6 completely.	**1m**
(h)	$P(x)$ and $Q(x)$ are two polynomials. $P(x)$ has degree 3 and $Q(x)$ has degree 4. What is the degree of $[P(x)\times Q(x)]$? Answer _____	**1m**

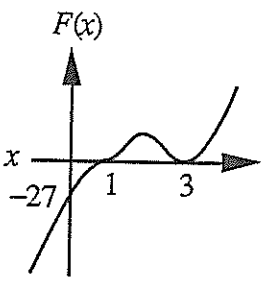
Question 27 continues on the next page

(i) Which graph best illustrates $F(x)=(x-1)^2(x-3)^3$? **1m**

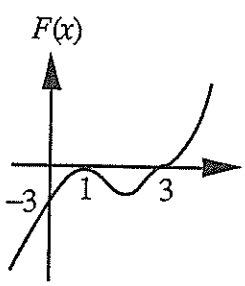
(A)



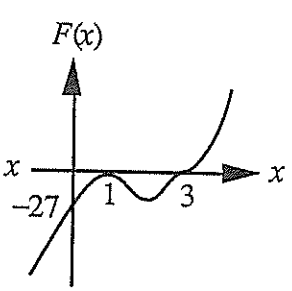
(B)



(C)



(D)



Answer: _____

(j) Sketch the curve $y=2(x+1)(x-1)(x-2)$. **3m**

Show clearly the value where the curve cuts the y–axis.

END OF EXAMINATION