Name and Surname : .....

Grade/Class : 10/..... **Mathematics Teacher** : .....

Hudson Park High School

GRADE 10

MATHEMATICS

PAPER II

NOVEMBER FINAL ASSESSMENT 2021

Marks : 100

Time : 2 hour Date : 22 November 2021

Exam : GWS Moderator(s) : SLT, PHL, CYT

INSTRUCTIONS

1. Illegible work, in the opinion of the marker, will earn zero marks.
2. Number your answers clearly and accurately, exactly as they appear on the question paper.
3. **NB** ∘ **Leave *2 lines* open between each of your answers.**
4. **NB** ∘ **Fill in the details requested on the front of this Question Paper and Answer Booklet.**
   ∘ **Hand in your submission in the following manner :**
   Answer Booklet (on top)
   Question Paper (below)
   Do NOT staple Answer Booklet and Question Paper together.
5. Employ relevant formulae and show all working out.
   Answers alone *may* not be awarded full marks.
6. (Non-programmable and non-graphical) Calculators may be used, unless their usage is specifically prohibited.
7. Round off answers to 2 decimal places, where necessary, unless instructed otherwise.
8. If (Euclidean) GEOMETRIC statements are made, REASONS must be stated appropriately.

QUESTION 1

1.1 Given the following frequency table:

Value	Frequency
$0 < x \leq 10$	8
$10 < x \leq 20$	13
$20 < x \leq 30$	23
$30 < x \leq 40$	27
$40 < x \leq 50$	18
$50 < x \leq 60$	7
$60 < x \leq 70$	2

For this data:

1.1.1 State the modal class. (1)

1.1.2 Estimate the mean. (4)

1.1.3 In which interval will the 7^{th} decile fall? (2)

1.2 Given the following set of data:

1	3	3	4	5	5	5	6	6	7	9	9	9	10	11	11	12

For this data:

1.2.1 State the **5** number summary. (1)

1.2.2 Draw a box and whisker diagram (3)

1.3 In this June exam, a class of 25 learners achieved a class average of 68%.

However, when the marks were checked in class, it was found that a learner, who achieved 81% had a mark of 18% entered for them.

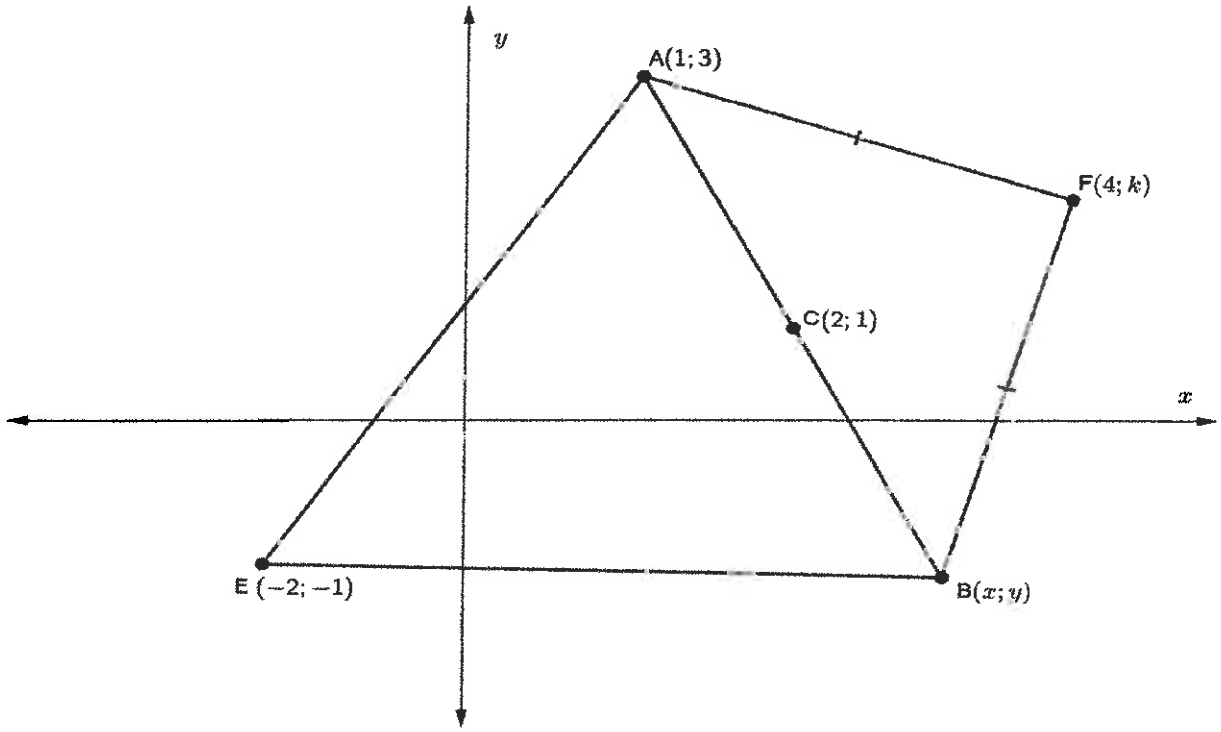
What will the class average be once the learner has the correct mark of 81% next to their name? (3)

[14]

QUESTION 2

In the diagram below, A(1; 3), B$(x; y)$ and E$(-2; -1)$ and are points on the Carte sian plain.

C(2; 1) is the midpoint of AB.



2.1	Calculate the length of AE.	(2)
2.2	Calculate the coordinates of B.	(2)
2.3	Calculate the length of EB.	(2)
2.4	What type of special quadrilateral is AFBE?	(1)
2.5	If E, C and F are collinear, calculate the value of k.	(4)
2.6	Is AF ⊥ FB? Justify your answer.	(4)
2.7	IF ABDF is a parallelogram, determine the coordinates of D.	(2)
		[17]

QUESTION 3

3.1 if $x = 25°$ and $y = 55°$ calculate the value of:

3.1.1	$\sin^2 2x$	(1)
3.1.2	$5 \sec y$	(1)
3.1.3	$\frac{1}{\cos x - 3}$	(1)

3.2 WITHOUT using a calculator, determine the value of:

3.2.1 $\tan 30°$ (1)

3.2.2 $\cos 45°$ (1)

3.3 If $5\sin\theta - 3 = 0$ and $\cos\theta < 0$, use a diagram, but not a calculator to determine $\tan\theta$. (3)

3.4 If $\tan 40° = k$, use a diagram to determine $\sec 40°$ in terms of k. (3)

[11]

QUESTION 4

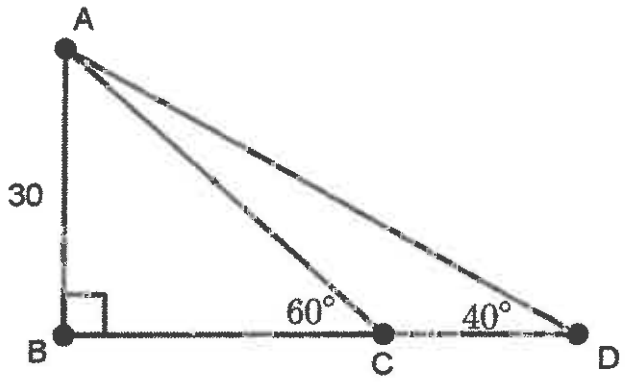
4.1 Solve for x, correct to TWO decimal places, where $x \in (0°; 90°)$:

4.1.1 $2\sin x = 0{,}56$ (2)

4.1.2 $\dfrac{\cot x}{2} = \dfrac{1}{3}$ (3)

4.1.3 $\tan 2x = 4\cos(35°)$ (3)

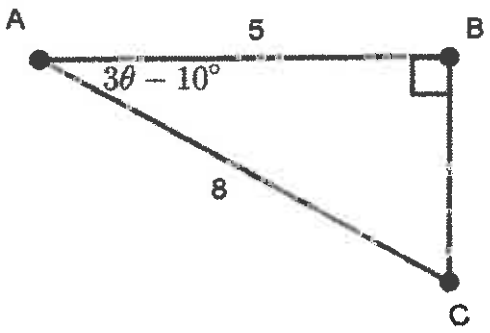
4.2 In the diagram below, $AB = 30$, $A\hat{C}B = 60°$ and $A\widehat{D}B = 40°$.



4.2.1 Calculate the length of BC. (2)

4.2.2 Calculate the length of CD. (3)

4.3 In the given diagram:

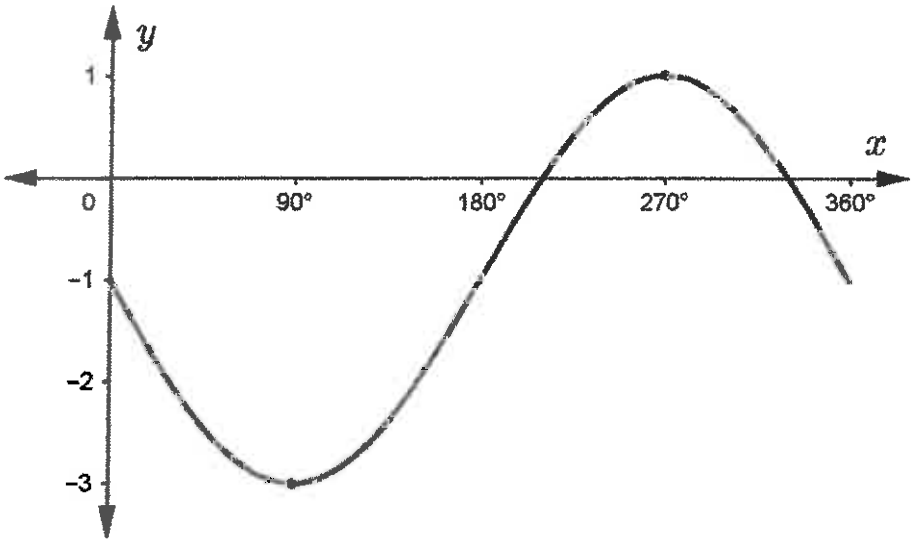


Calculate θ. (3)

[16]

QUESTION 5

5.1 Sketched below is the graph of $g(x) = a.\sin x + q$ for $x \in [0°; 360°]$.



5.1.1 Write the values of:

(a) a (1)

(b) q (1)

5.1.2 What is the amplitude of the function g? (1)

5.1.3 For which values of x is $g(x)$ increasing? (1)

5.1.4 State the range of g. (1)

5.2 Consider the function $f(x) = 2\tan x$.

5.2.1 In the ANSWER BOOK provided, sketch f for $x \in [0°; 180°]$.

Clearly show ALL the intercept(s) and asymptote(s). (3)

5.2.2 What is the period of f? (1)

5.2.3 If f is

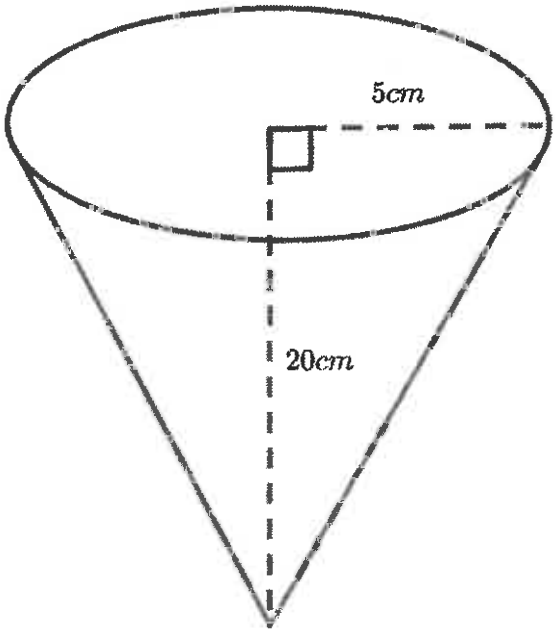
- translated 3 units vertically downwards, and then
- reflected in the x-axis,

what will its new equation be? Leave your answer in y-form. (2)

[11]

QUESTION 6

6.1 The diagram below shows a solid cone with a radius of 5 cm and a perpendicular height of 20 cm.



$$A = \pi r^2$$

$$A = \pi r h_s$$

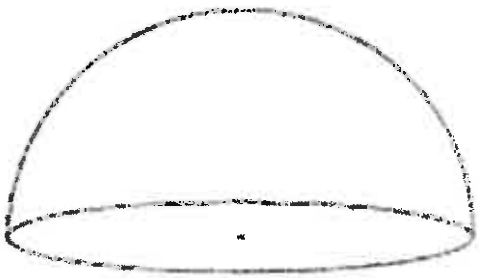
$$V = \frac{1}{3}Ah$$

For this solid, calculate the

6.1.1 TSA. (4)

6.1.2 Volume. (2)

6.2 A solid hemisphere has a volume of 30 cm^3.

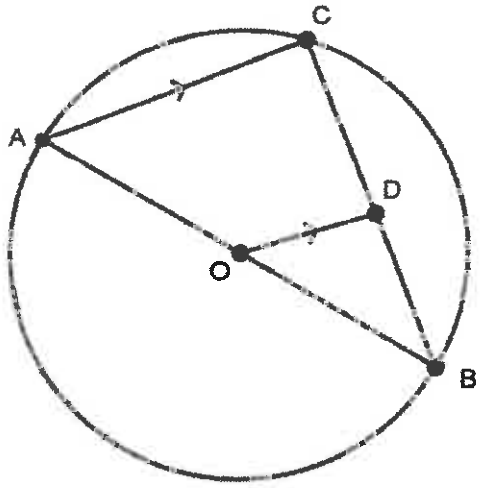


$$V = \frac{4}{3}\pi r^3$$

If the diameter of the hemisphere is doubled, what will the volume of the new hemisphere become? (3)

[9]

QUESTION 7



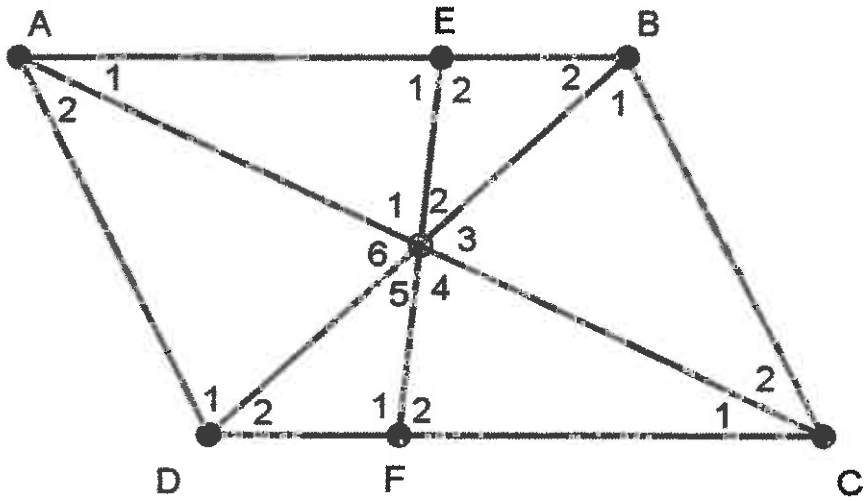
O is the centre of the circle, with diameter AB.

7.1 Prove that CD= DB. (2)

7.2 If OD = $3cm$, Calculate the length of AC. (2)

[4]

QUESTION 8



ABCD is a parallelogram with diagonals intersecting at O. EOF is constructed.

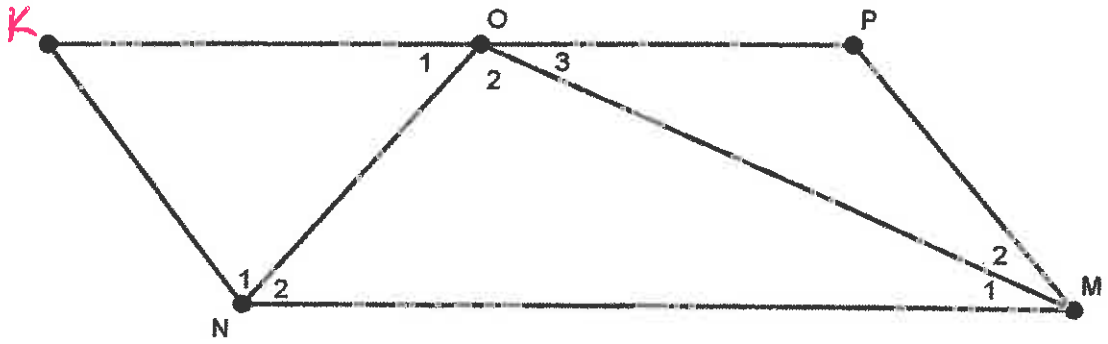
Prove that:

8.1 EO = FO. (5)

8.2 EDFB is a parallelogram. (1)

[6]

QUESTION 9



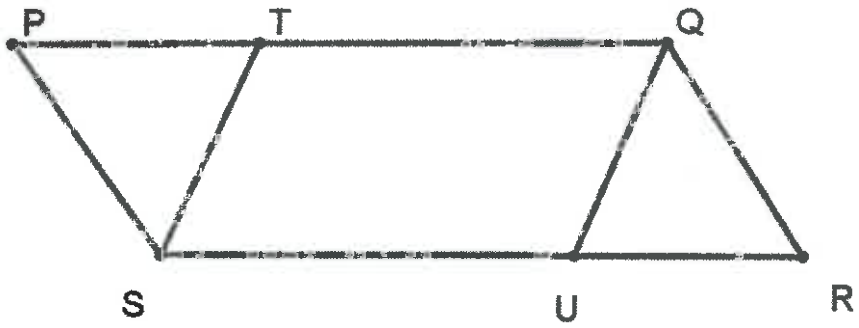
KPMN is a parallelogram. ON bisects $K\hat{N}M$ and OM bisects $N\hat{M}P$.

9.1 Show that $N\hat{O}M = 90°$. (3)

9.2 Prove that O is the midpoint of KP. (5)

[8]

QUESTION 10



PQRS is a parallelogram and TQUS is a rhombus.

10.1 Show that PT = UR. (2)

10.2 Hence, show that Area ΔPTS = Area ΔURQ. (2)

[4]

TOTAL 100