


Name and Surname :

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

Hudson Park High School



GRADE 10
MATHEMATICS
November Paper 2

Marks :

100

Time : 2 hours

Date : November 2020

Examiner : SLT

Moderator(s) : FRD PHL CYT GWS

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 the Answer Booklet.
◦ Hand in your submission in the following manner :
 Question Paper (on top)
 Answer Booklet (below)
◦ **Do not staple your Question Paper and Answer Booklet 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. A group of Grade 10's was surveyed about their latest Mathematics Test result.

The results were organized as follows :

Test result %	No of learners
$40 < x \leq 50$	12
$50 < x \leq 60$	23
$60 < x \leq 70$	48
$70 < x \leq 80$	31
$80 < x \leq 90$	16
$90 < x \leq 100$	9

- 1.1. How many learners were surveyed ? (1)
- 1.2. Estimate the average result for this group of learners. (3)
- 1.3.1. State the position of the 65th percentile. (1)
- 1.3.2. In which interval will the 65th percentile lie ? (1)

[6]

QUESTION 2

2. A supermarket recorded the number of cupcakes sold on consecutive days.

The results were recorded and arranged into ascending order :

10	11	12	13	16	17	18	20	20	22	23	24	25
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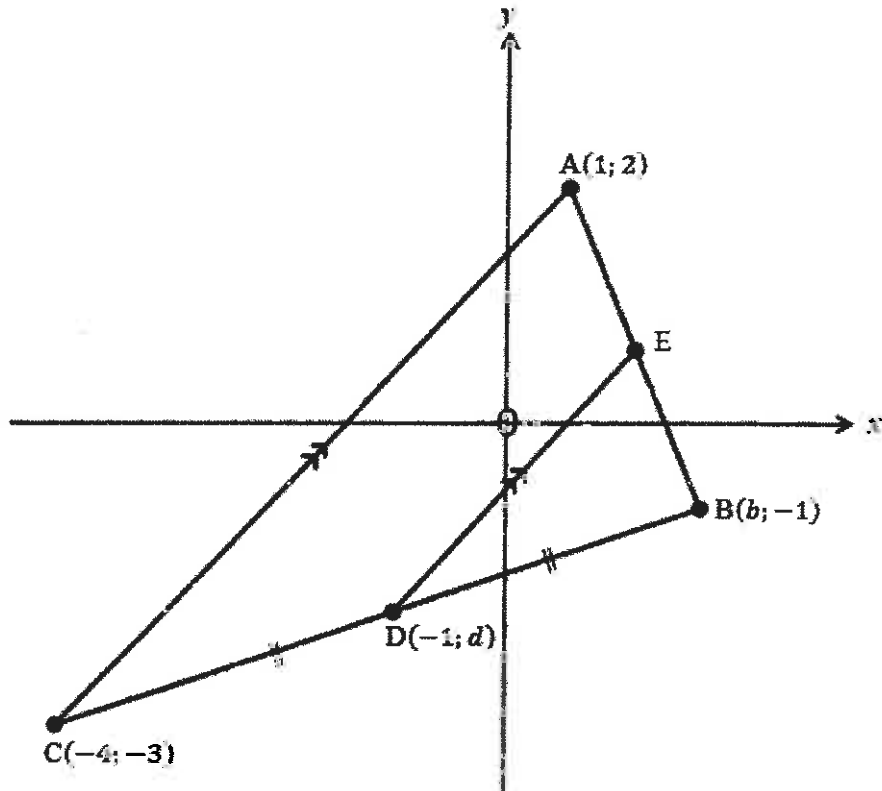
For this data :

- 2.1. Determine the
- 2.1.1. range (1)
 - 2.1.2. mode (1)
- 2.2.1. Write down the five number summary, clearly labeling the values. (1)
- 2.2.2. Hence draw a box-and-whisker diagram. (2)
- 2.3. Calculate the semi-interquartile range. (2)

[7]

QUESTION 3

3. $C(-4; -3)$, $D(-1; d)$, $B(b; -1)$ and $A(1; 2)$. $AC \parallel DE$ and D is the midpoint of BC .

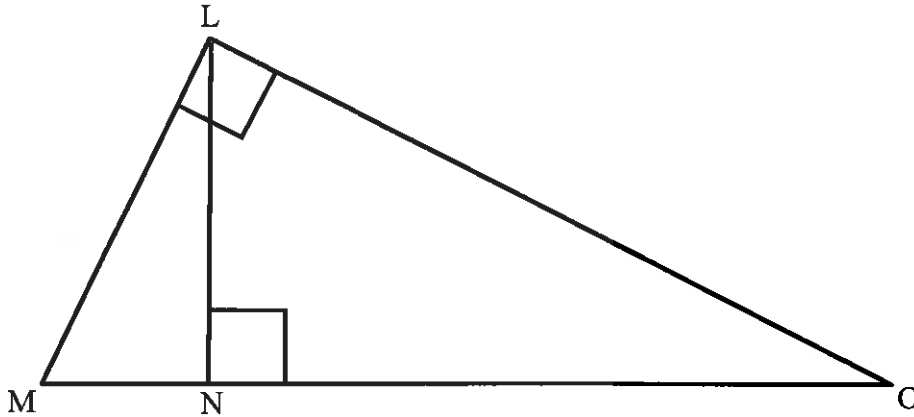


- 3.1. Calculate the length of AC . (2)
- 3.2.1. Give the reason why E will be the midpoint of AB . (1)
- 3.2.2. Hence, determine the length of DE . (1)
- 3.3. Calculate the values of
- 3.3.1. d (1)
- 3.3.2. b , showing that it will be 2. (1)
- 3.4.1. Calculate the gradients of
- (a) BC (1)
- (b) AB (1)
- 3.4.2. Prove that $BC \perp AB$. (2)
- 3.5. If A , C and $F(f; -10)$ (not shown in the diagram) are collinear, calculate the value of f . (4)

[14]

QUESTION 4

4.1. $OM \perp LN$ and $\widehat{MLO} = 90^\circ$.



Determine TWO expressions for $\tan \widehat{M}$ in terms of LM, MN, NO, OM, LO and/or LN. (2)

4.2. If $x = 17^\circ$, calculate :

4.2.1. $1 - \sin^2 3x$ (1)

4.2.2. $5 \sec x + 3$ (1)

4.3. Solve for x :

4.3.1. $12^2 = 10^2 + 11^2 - 2 \cdot 10 \cdot 11 \cdot \cos x$ $x \in (0^\circ; 90^\circ)$ (2)

4.3.2. $\frac{\sin 5x}{8} = \frac{\sin 120^\circ}{11}$ $5x \in (0^\circ; 90^\circ)$ (3)

4.3.3. $5 - 2 \cot x = 1$ $x \in (0^\circ; 90^\circ)$ (3)

[12]

QUESTION 5

CALCULATORS MAY NOT BE USED IN THIS QUESTION

5.1.1. Sketch the special diagram used when dealing with :

- (a) 30° and 60° (1)
- (b) 45° (1)
- (c) 0° and 90° (1)

5.1.2. Now use your diagrams to determine :

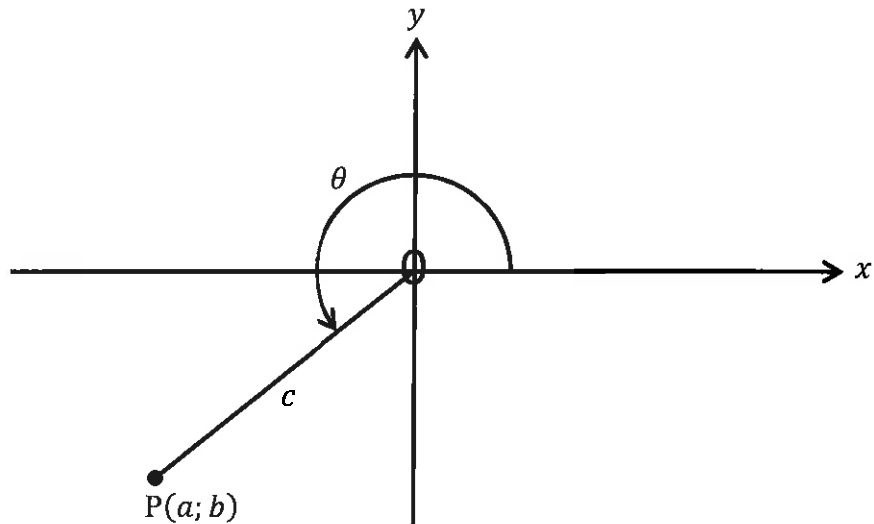
- (a) $\tan 30^\circ$ (1)
- (b) $\cos 45^\circ$ (1)
- (c) $\cot 90^\circ$ (1)

5.2. Given

- $\operatorname{cosec} \theta = -\frac{5}{3}$
- $\theta \in (90^\circ; 270^\circ)$

5.2.1. Explain why θ will be an angle in Quadrant 3 ($180^\circ < \theta < 270^\circ$). (2)

5.2.2. Now, determine the values of a , b and c in the following diagram, where $P(a; b)$ and $OP = c$:



(3)

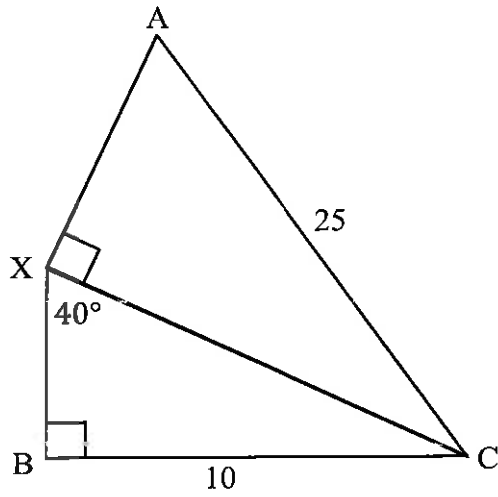
5.2.3. Hence, determine : $\cos \theta$. (1)

5.3. If: $\tan 16^\circ = k$, where $k > 0$, use an appropriate diagram to determine $\sin 16^\circ$ in terms of k . (3)

[15]

QUESTION 6

6. $AX \perp XC$, $\widehat{XBC} = 90^\circ$, $BC = 10$, $AC = 25$ and $\widehat{BXC} = 40^\circ$.



Calculate \widehat{XCA} .

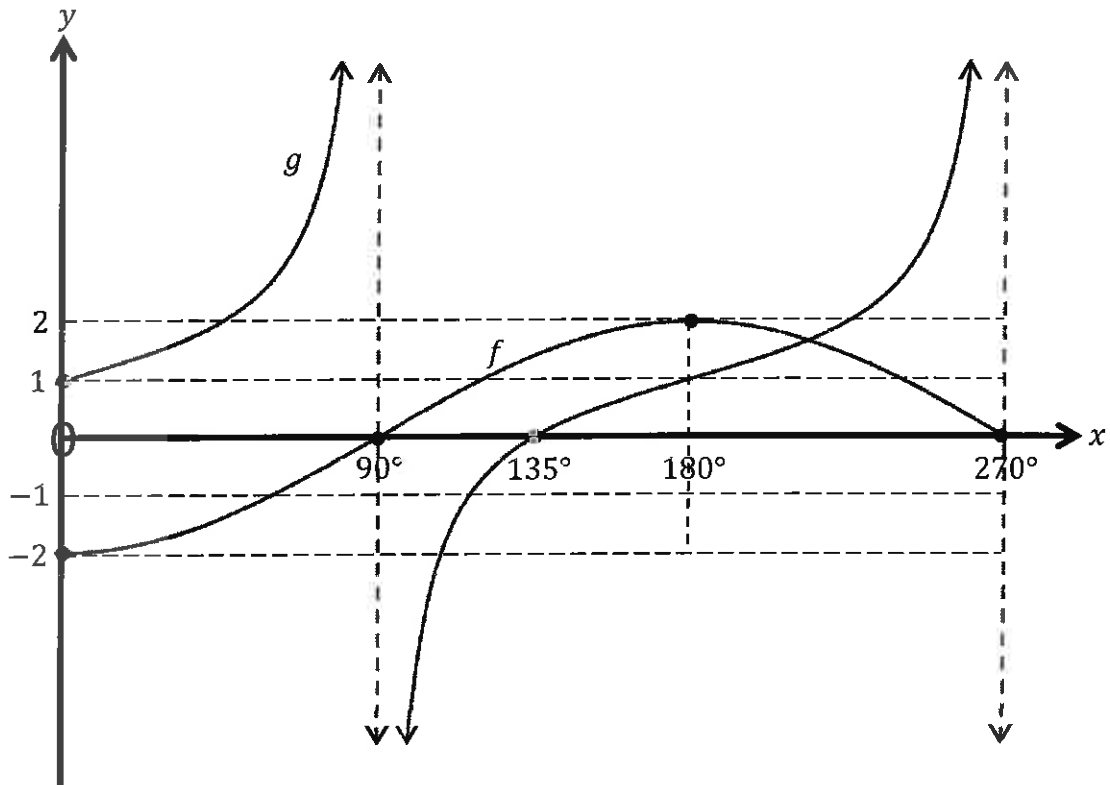
[5]

QUESTION 7

7. Sketched are the graphs of

$$f(x) = a \cos x \quad \text{and} \quad g(x) = \tan x - b$$

for $x \in [0^\circ; 270^\circ]$.



7.1. Write down the

7.1.1. period of g (1)

7.1.2. amplitude of f (1)

7.2. Use the graphs to solve for x , where $x \in [0^\circ; 270^\circ]$:

7.2.1. $\tan x - b > 0$ (2)

7.2.2. $f(x) \times g(x) \leq 0$ (2)

7.3. Write down the values of

7.3.1. a (1)

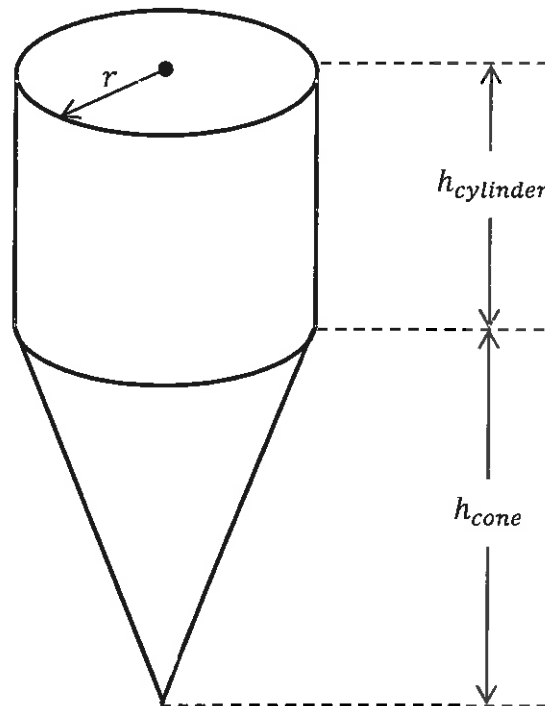
7.3.2. b (1)

[8]

QUESTION 8

$$A = \pi r h_s \quad V = \frac{1}{3} Ah$$

8. The solid shown in the diagram consists of a (right circular) cylinder and a (right circular) cone glued together.
The cylinder and cone have the same radius, $r = 3$ cm.
The perpendicular heights of the cone and cylinder are $h_{\text{cone}} = 4$ cm and $h_{\text{cylinder}} = 3,5$ cm, respectively.



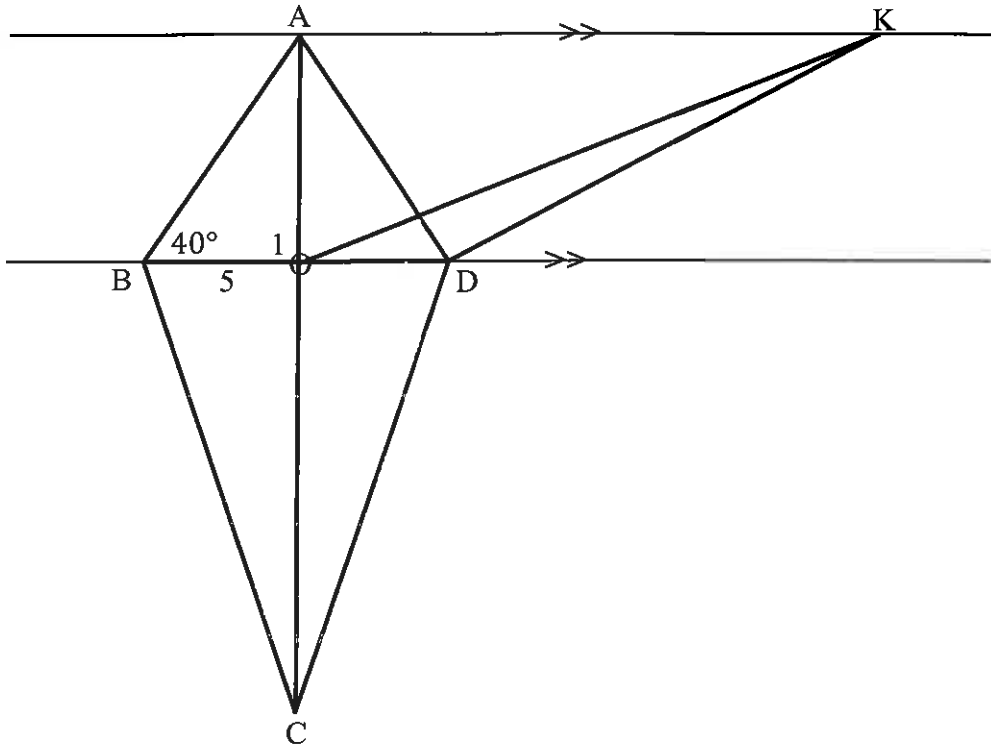
Calculate the :

- 8.1. slant height of the cone, h_s (1)
8.2. volume of the solid (3)
8.3. total surface area of the solid. (4)

[8]

QUESTION 9

9. ABCD is a (convex) kite with $AB = AD$ and $BC = DC$. $\widehat{ABO} = 40^\circ$, $BO = 5$ and $AK \parallel BD$.



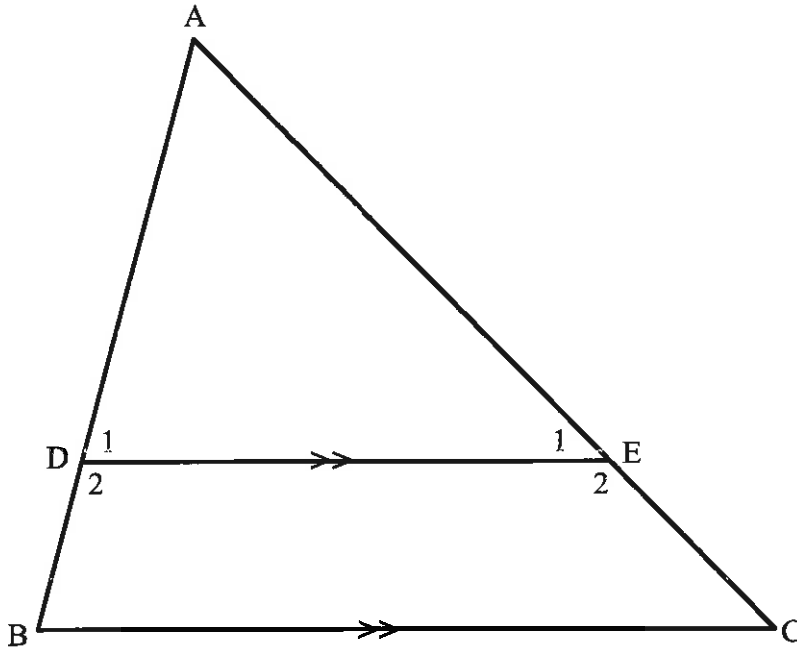
Determine

- | | | |
|------|----------------------|-----|
| 9.1. | \widehat{ADB} | (2) |
| 9.2. | $\widehat{O_1}$ | (1) |
| 9.3. | AO | (2) |
| 9.4. | area $\triangle AOB$ | (1) |
| 9.5. | area $\triangle KDO$ | (4) |

[10]

QUESTION 10

10. In the given diagram, $DE \parallel BC$.

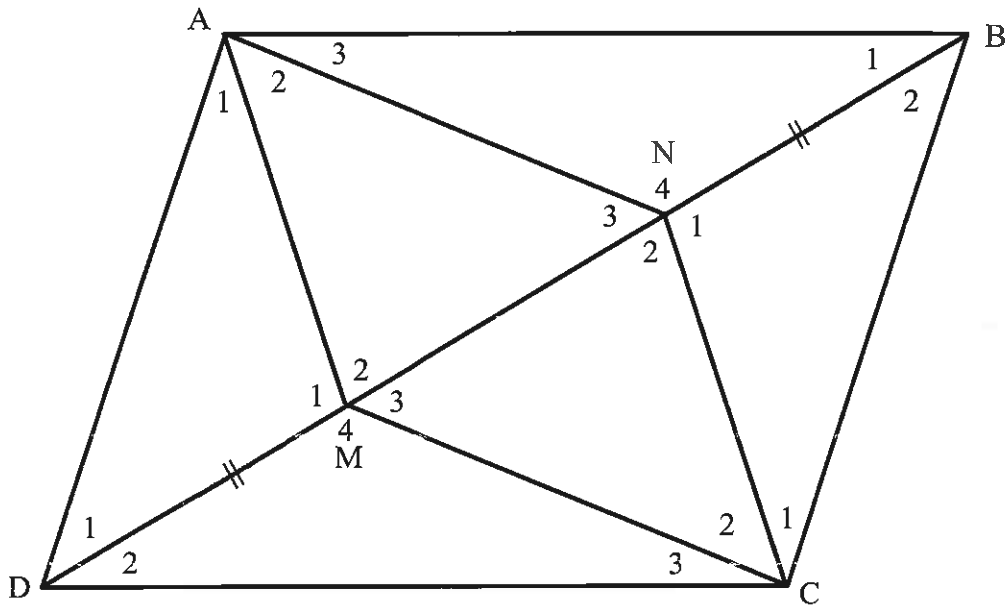


- 10.1. Complete: $\triangle ABC \parallel \triangle \dots$ (1)
- 10.2. Prove (10.1) (3)
- 10.3. Now, if $AE = 5$, $EC = 3$ and $BC = 7$, calculate the length of DE . (2)

[6]

QUESTION 11

11. ABCD is a parallelogram and $DM = BN$.



11.1.1. Prove that $\triangle DMA \cong \triangle BNC$. (4)

11.1.2. Hence, prove that $AM \parallel CN$. (3)

11.2. Prove that $AMCN$ is a parallelogram (2)

[9]

TOTAL	100
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