Education and Sport Development

Department of Education and Sport Development
Departement van Onderwys en Sport Ontwikkeling
Lefapha la Thuto le Tlhabololo ya Metshameko
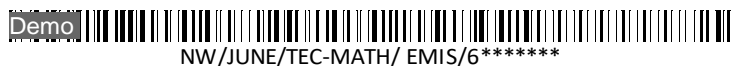
NORTH WEST PROVINCE

GRADE 10

TECHNICAL MATHEMATICS PAPER 2

HALF-YEARLY EXAMINATION 2018

MARKS: 75

TIME: 1½ HOURS

**This question paper consists of 7 pages and 1 diagram sheet.**

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1.   This question paper consists of 6 questions.

2.   Answer ALL the questions.

3.   Clearly show ALL calculations, diagrams, graphs et cetera that you used to determine the answers.

4.   Answers only will NOT necessarily be awarded full marks.

5.   If necessary, round off answers to TWO decimal places, unless stated otherwise.

6.   Diagrams are NOT necessarily drawn to scale.

7.   A DIAGRAM SHEET for answering QUESTION 3.1 is given at the end of the question paper. Detach and attach it in your answer book/ sheet.

8.   You may use an approved scientific calculator (non-programmable and non-graphical)

9.   Write neatly and legibly

QUESTION 1

1.1 In the diagram below $\triangle$ABC is a right angled triangle.
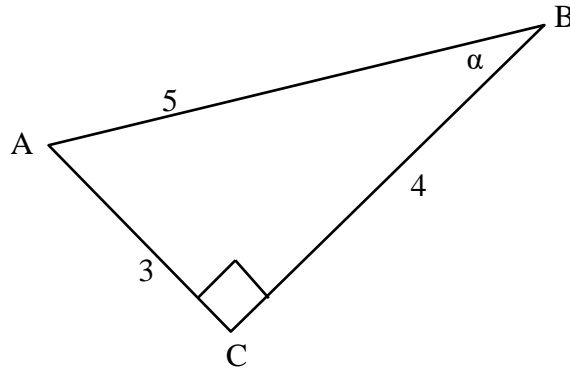
Complete the following trigonometric ratios:

1.1.1 $\sin \alpha =$ (1)

1.1.2 $\sec \alpha =$ (1)

1.2 If $p = 62°$ and $q = 28°$, use a calculator to find the values of the following:

1.2.1 $\sin (p + q)$ (2)

1.2.2 $5 \cot q + \dfrac{\sin p}{2}$ (2)

1.3 Solve for x, if $0° < x < 90°$, rounded to a whole number.

1.3.1 $3 \cos x = 1,5$ (2)

1.3.2 $\tan (2x + 15°) = 3$ (2)

1.4 If $13 \cos \theta - 5 = 0$ and $90° \le \theta \le 360°$, determine the value of the following **with the aid of a sketch.**

1.4.1 $\cot \theta$ (4)
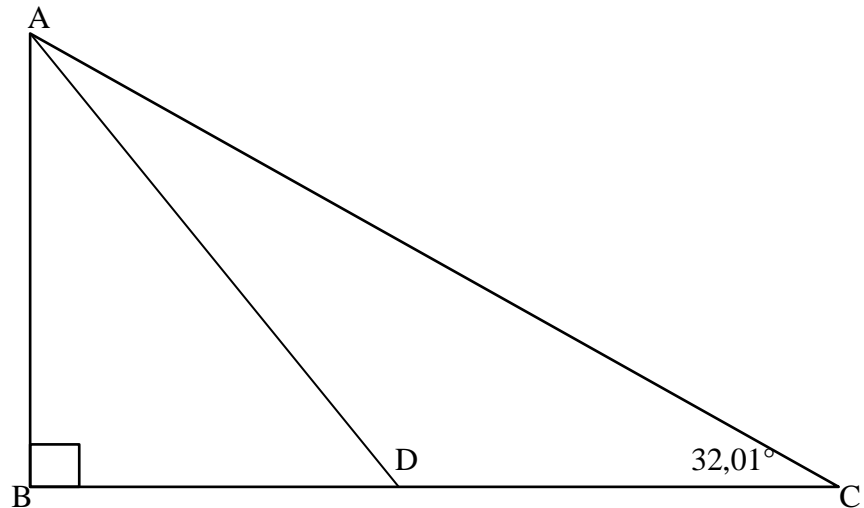
1.4.2 $\sin \theta + \cos \theta$ (2)

[16]

QUESTION 2

2.1   Given below is triangle ABC with D as the midpoint on BC. The length of BC is 8 m
      and $\hat{ACD} = 32,01°$.

2.1.1   Calculate the length of AB.   (3)

2.1.2   Calculate the length of AC.   (2)

2.2   In the figure below, a window washer (A) on a ladder looks at a nearby building (BD)
which is 100 m away. The angle of elevation of the top of the building is $18,7°$ and the angle
of depression of the foot of the building is $6,5°$.
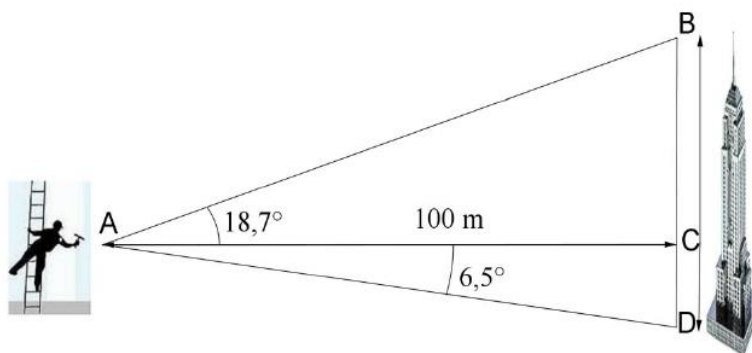
Determine:

2.2.1   the length of AD.   (3)

2.2.2   how tall is the building.   (4)

2.2.3   the area of ΔABD.   (3)

   **[15]**

QUESTION 3

Given: $f(x) = 2 \tan x$ and $g(x) = \sin x - 1$

3.1 Use the set of axes provided on the attached DIAGRAM SHEET and draw the graph of f and g in the interval $x \in [0°; 360°]$. (7)

3.2 Write down the range of g. (2)

3.3 For which values of x is $g(x) = -1$? for $[0°; 360°]$? (2)

3.4 If the values of x is 162° and 318° where $f(x) = g(x)$ what will the value(s) of x be if $g(x) > f(x)$ for $[90°; 270°]$. (2)

[13]

QUESTION 4

4.1 In the diagram below, PQ // RS, $P\hat{A}D = 53°$, $B\hat{E}D = 104°$ and $C\hat{F}E = 149°$.

$A\hat{D}E = x$, $A\hat{B}E = y$ and $E\hat{F}K = z$. Use the diagram below to answer the following questions. Give reasons where necessary.
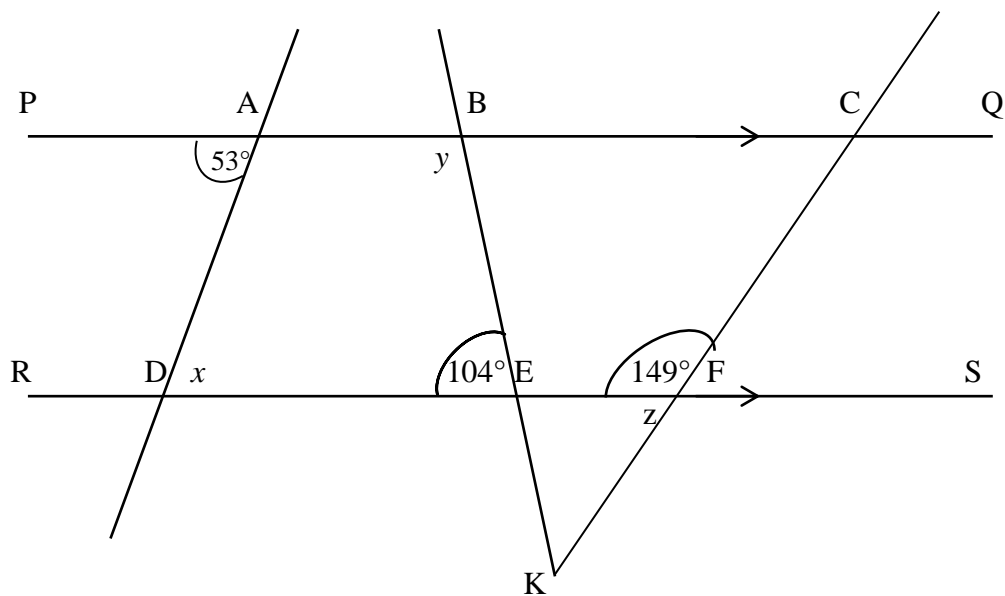
4.1.1 Calculate the size of angle x. (2)

4.1.2 Calculate the size of angle y. (2)

4.1.3 Calculate the size of angle z. (2)

4.2   In the diagram below, $B\hat{C}E = x$, $E\hat{C}F = 2x$, $A\hat{B}C = A\hat{B}C = 65°$ and BC = CE.
   Use the diagram below to answer the following questions.

A ‖ B 65° E

65° D ‖ C 2x + 5 F

x
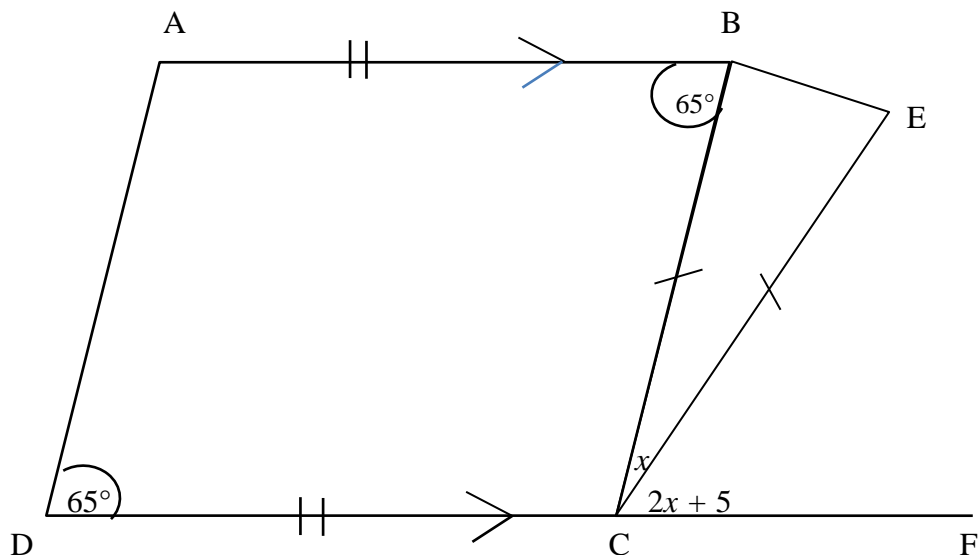
Calculate, stating reasons:

4.2.1   The size of BÂD.   (2)

4.2.2   The size of *x*.   (2)

4.2.3   The size of $B\hat{C}F$ (2)

[12]

QUESTION 5
5.1   State any condition for two triangles to be congruent.   (1)
5.2   EFGH is a quadrilateral with interior Ê = 116, 67°, exterior Ĝ = 243,43° and EH//FG.
       Use the diagram below to answer the following questions.

E 116,57° F

H 243,43° G
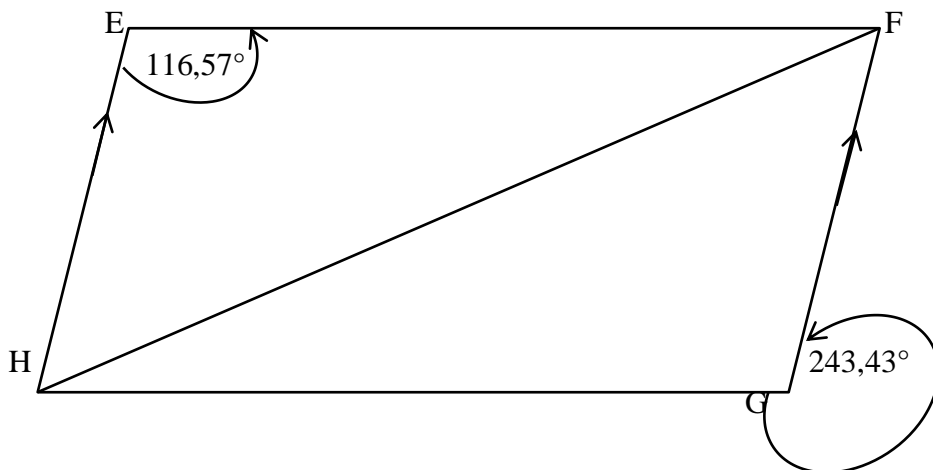
    5.2.1   Calculate, stating reasons the internal angle HĜF. (2)

    5.2.2   Prove that ΔHEF ≡ ΔHFG. (4)

    5.2.3   What kind of quadrilateral is EFGH? (2)

[9]

QUESTION 6

In the diagram below DC // EB and DC = 9 units and EB = 6 units.
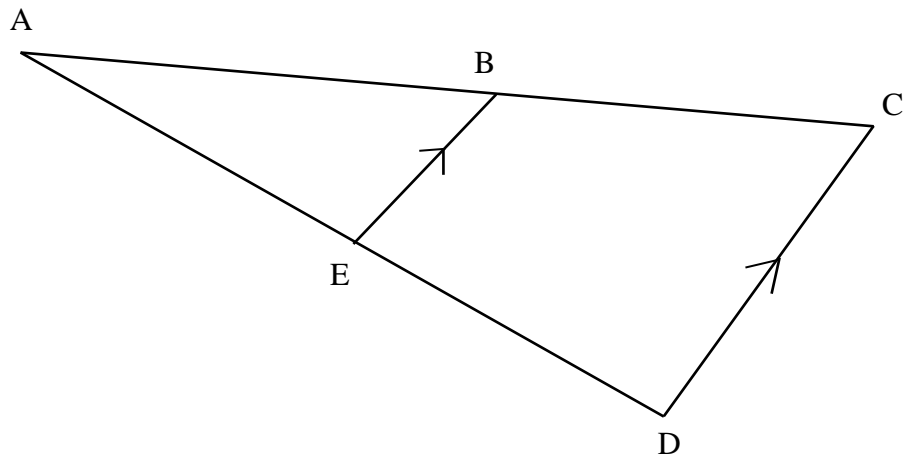
    6.1   If AC = 24 units, how long is AB? (5)

    6.2   If AE = 10 units, how long is ED? (5)

[10]

TOTAL: 75

DIAGRAM SHEET

QUESTION 3.1

SURNAME AND NAME:_____ GR. 10_____.