ASSIGNMENT NO 1

<mark>MATHEMATICS N1</mark>

QUESTION 1

1.1   Simplify each of the following without a calculator by using exponential laws:

     1.1.1 $85 \times (735)^0$ (1)

     1.1.2 $\dfrac{a^3(b^2)^5}{a^2 b^{12}}$ (2)

     1.1.3 $\dfrac{15^x \times 3^{x+1} \times 25^x}{9^{x+1} \times 125^x}$ (7)

1.2   Simplify each of the following logarithms without a calculator:

     1.2.1 $\log_3 81 - \log_3 3$

     1.2.2 $\dfrac{\log_2 64}{\log_2 4}$

                                                 (2 × 3)   (6)

                                                             [16]

QUESTION 2

2.1   Divide $-10x + x^3 - 8 - x^2$ by $x - 4$.   (3)

2.2   From $4x^2 - 5x - 2$ subtract $8 - 10x - 5x^2$.   (3)

2.3   Simplify the following:

     $2(x + 2)^2 - (2x - 1)(x + 3)$ (6)

                                                                     [12]

QUESTION 3

3.1   Fully factorise each of the following expressions:

     3.1.1 $9a + 12b$ (2)

3.1.2 $\quad t^2(x - y) - z^2(y - x)$ (3)

3.2 Simplify the following:

$$\frac{x - y}{x + y} \times \frac{(x + y)^2}{x - y} \times \frac{4}{2x + 2y}$$ (3)

3.3 Determine the lowest common multiple (LCM) and the highest common factor (HCF) of the following algebraic terms by using prime factors:

$6x^4y^3z^2$; $18x^3y^2z$; $20x^2yz^3$ (5)

[13]

QUESTION 4

4.1 Solve for x:

4.1.1 $3x - 8 = 16$ (2)

4.1.2 $2(x - 2) = 3(x - 4)$ (4)

4.2 John is twice as old as Steven and the sum of their ages is 75 years.

Express the information in an equation and then calculate John and Steven's age. (4)

4.3 The volume of a solid is given as:

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

4.3.1 Change the subject of the formula to r. (3)

4.3.2 If $V = 147 \ m^3$, determine the value of r. (2)

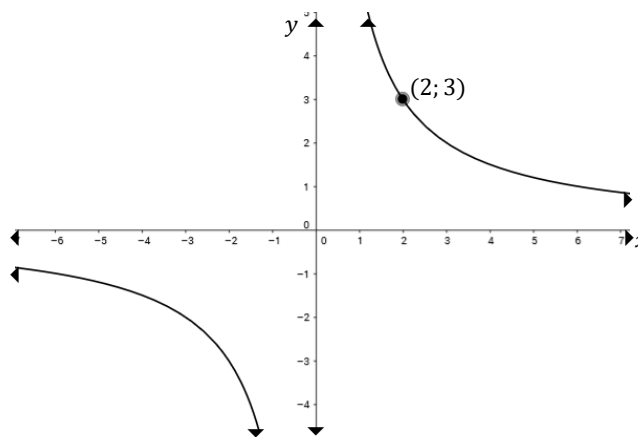4.3.3 What is the name of the solid? (1)

[16]

QUESTION 5

5.1   Given: $y = -3x + 5$

    5.1.1   Determine the gradient of the graph. (1)

    5.1.2   Draw the graph by using a table $x \in (-3 < x \leq 2)$. [Use graph paper.] (5)

5.2   Study the graph below which represents the function of $y = \frac{a}{x}$.

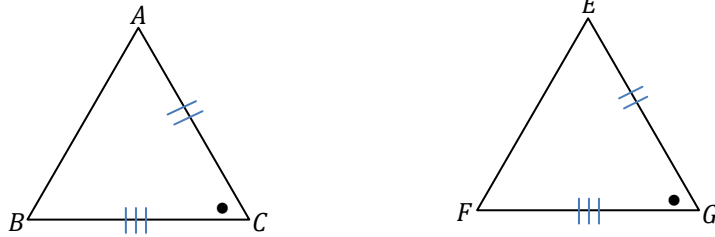

    5.2.1   In which quadrant(s) is the graph drawn? (1)

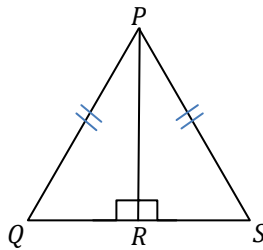   5.2.2   Calculate the value of a and then determine the equation of the graph. (2)

    [9]

QUESTION 6

6.1   State the case of congruency represented by each of the following:
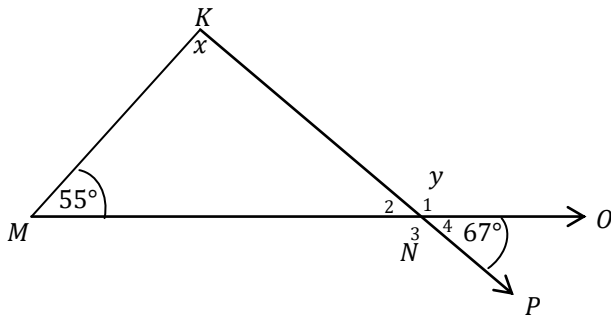
6.1.1

6.1.2

(2 × 1)   (2)

6.2   Given: ΔKMN with KN extended to P, MN extended to O, $\hat{M} = 55°$ and $\hat{N}_4 = 67°$

Calculate the value of x and y. Give reasons for the answers.

(4)

6.3   Given: ΔABC III ΔAEF with EF ∥ BC

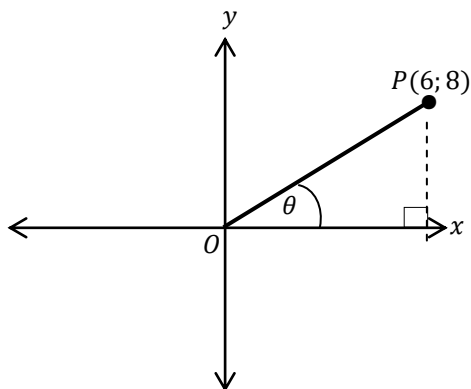Calculate the value of x.
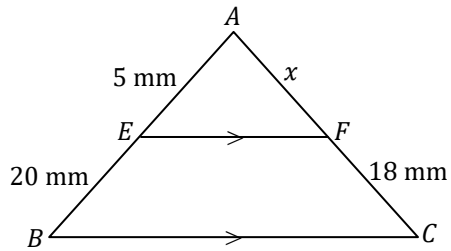
(2)

[8]

QUESTION 7

7.1   Given:

7.1.1   Find the length of OP.   (3)
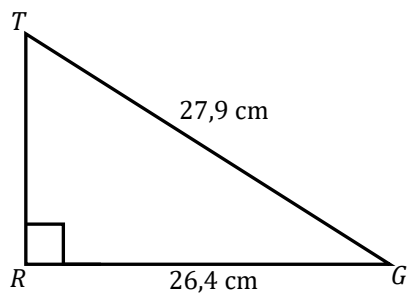
Determine the values of each of the following trigonometric ratios:

7.1.2 $\sin \theta$ (1)

7.1.3 $\dfrac{\cos \theta}{\tan \theta}$ (3)

7.2   Given: ΔTRG with $\hat{R} = 90°$, $TG = 27{,}9$ cm and $RG = 26{,}4$ cm

Calculate the following:

7.2.1 $\hat{G}$
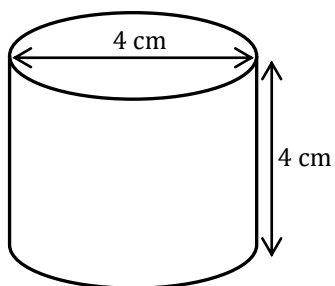
7.2.2 $\hat{T}$ (Give a reason for the answer.)

(2 × 2)   (4)

[11]

QUESTION 8

8.1   Calculate 20% of R850.   (1)

8.2   Calculate the percentage decrease of the price of rice if it decreases from R1 280 per ton to R1 165 per ton.   (3)

8.3   Given: A cylinder with a diameter of 4 cm and a height of 4 cm.

8.3.1   Calculate the volume of the cylinder.   (4)

8.3.2   Calculate the surface area of the cylinder.   (4)

8.4   A circle has a diameter of 80 cm.

Calculate the circumference of this circle. Give the answer in m. (3)

[15]

TOTAL: **100**

FORMULA SHEET

Rectangle:

Perimeter = 2(l + b)
Area = l × b

Square:

Perimeter = 4a
Area   = a^2

Triangle:

Perimeter = a + b + c
Area   = ½b × h

Rectangular prism:

Volume = l × b × h

Right triangular prism:

Volume = ½b × h × l

Cube:

Volume = a^3

Right pyramid:

Volume = $\frac{1}{3}$(base area × h)

Ellipse:
Area = $\frac{\pi}{4}$(major axis × minor axis)

Circle:

Circumference = πD or 2πr

Area = $\frac{\pi D^2}{4}$ or πr^2

Cylinder:
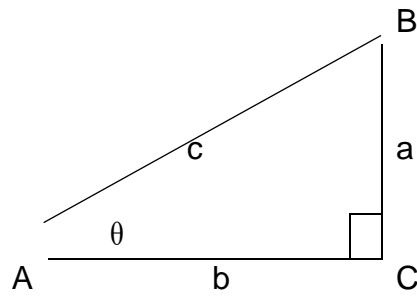
Volume = $\dfrac{\pi D^2}{4} \times h$ or $\pi r^2 h$

Cone:

Volume $= \dfrac{\pi D^2}{4} \times \dfrac{h}{3}$ or $\dfrac{\pi r^2 h}{3}$

Annulus:

$A = \pi\left(R^2 - r^2\right)$

Right-angled triangle:

The theorem of Pythagoras:

$c^2 = a^2 + b^2$

Ratios of angle θ:

$\sin\theta = \dfrac{a}{c}$ $\qquad \cos\theta = \dfrac{b}{c}$ $\qquad \tan\theta = \dfrac{a}{b}$