Mine

ST. THOMAS AQUINAS SECONDARY SCHOOL

COURSE CULMINATING TASK

MFM 2P - GRADE 10 APPLIED MATH

TEACHER - Mr. R. MacLeod

STUDENTS NAME- _____

INSTRUCTIONS:

- This assignment is worth 15% of your year's grade.
- This assignment is to be completed in 3 - 75 minute class periods.
- You may use your notes and your textbook, if you need assistance.

THE FINAL EXAMINATION WILL BE SET UP EXACTLY THE SAME.

SO AS YOU COMPLETE THE QUESTIONS YOU CAN MAKE UP A STUDY SHEET

Part 1 - **Trigonometry** (20Marks)

1) Solve each proportion for x. (2)

A) $\frac{x}{3} = \frac{18}{27}$

$27x = 54$

$x = 2$ ✓

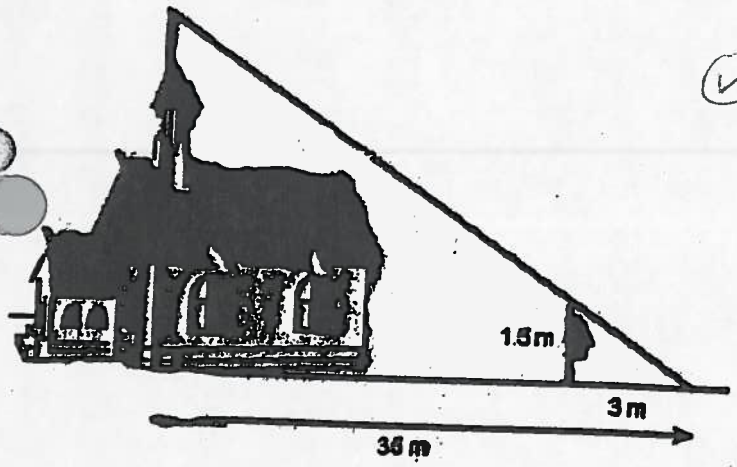
B) $\frac{34}{x} = \frac{17}{45}$

$17x = 1530$ ✓

$x = 90$ ✓

2

2) In the diagram below, a man 1.5m tall is standing outside a church. How tall is the church? (3)



✓ $\frac{1.5}{3} = \frac{x}{35}$ ✓

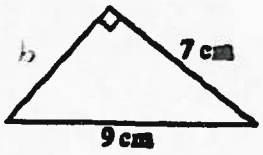
$3x = 52.5$

$x = 17.5$ m ✓

3

3) Use the Pythagorean Theorem to find the missing side in each triangle. (4)

A)



$c^2 - a^2 = b^2$

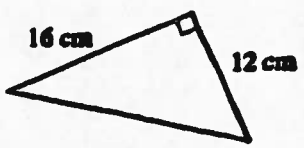
$9^2 - 7^2 = b^2$ ✓

$81 - 49 = b^2$

$32 = b^2$

$5.66 = b$ ✓

B)



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

$12^2 + 16^2 = c^2$ ✓

$144 + 256 = c^2$

$400 = c^2$

$20 = c$ ✓

4

4) Find the value of each of the following to three decimal places. (2)

A) Tan 46°

1.036 ✓

B) Sin 23°

0.391 ✓

(2)

5) Find the measure of each angle to the nearest degree. (2)

A) Sin $\angle F = 0.7314$

47° ✓

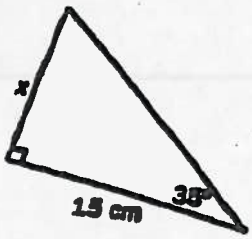
B) Cos $\angle H = 0.6972$

45.8° ✓

(2)

6) Use one of the three basic trigonometric ratios to find the measure of the missing side or angle , find the value of x ? (4)

A)



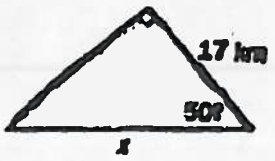
$\text{Tan} = \frac{\text{opp}}{\text{adj}}$

$\text{Tan}35 = \frac{x}{15}$ ✓

$x = 10.5\text{cm}$ ✓

$\text{Tan}35 \times 15 = x$

B)



$\text{Cos} = \frac{\text{adj}}{\text{hyp}}$

$\text{Cos}\,50 = \frac{17}{x}$ ✓

$x = \frac{17}{\text{Cos}50}$

$x = 26.45$ ✓

(4)

7) A ladder that is 5 m long leans up against a wall, with the foot (bottom) of the ladder 1.5 m from the base (bottom) of the wall. What angle does the ladder make with the ground.? (3)

$\text{Cos} = \frac{\text{adj}}{\text{hyp}}$ ✓

$\text{Cos} = \frac{1.5}{5}$ ✓

$\text{Cos} = 0.3$

~~Cos~~ $= 0.3$

$\angle = 72.5°$ ✓

(3)

(3)

Part 2: Solving Equations/Conversions /Volume and Surface Area (20marks)

1 Solve the following equations for x. (3)

A) $\frac{x+3}{2}=5$ B) $5(2x-4)=6$ C) $5(x-2)=-4(2x-4)$

3

$x+3=10$

$x=7$ ✓

$10x-20=6$

$10x=26$

$x=2.6$ ✓

$5x-10=-8x+16$

$13x=26$

$x=2$ ✓

2) Convert the following into the units indicated. (4)

A) 1000 cm = 10 meters

B) 4 L = 4000 milliliters

C) 9ft = 3 yards

D) 325 km = 195 203 miles

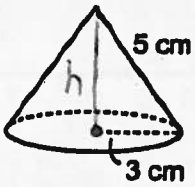
$\frac{325}{1.6}=\frac{x}{1}$

20
16 | 325.0
32
0

4

3) Find the volume of the following figures. (4)

A)



$h=\sqrt{5^2-3^2}$

$h=\sqrt{25-9}$

$h=\sqrt{16}$

$h=4$

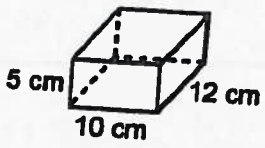
$V=\frac{\pi r^2 h}{3}$

$V=\frac{3.14\times3^2\times4}{3}$

$V=\frac{113.04}{3}$

$V=37.68\,cm^3$

B)



$V=L\times W\times H$

$V=10\times12\times5$

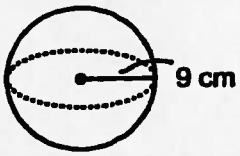
$V=600\,cm^3$

4

(8) (4)

4) Find the surface area of the following figures. (4)

A)

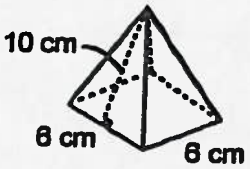


$A = 4\pi r^2$

$A = 4 \times 3.14 \times 9^2$ ✓

$A = 1017.36\,cm^2$ ✓

B)



$A = (L \times W) + 4\left(b \times \frac{b}{2}\right)$

$A = (6 \times 6) + 4\left(\frac{60}{2}\right)$ ✓

$A = 36 + 120$

$A = \frac{156\,cm^2}{3}$ ✓

$A = 52\,cm^2$

(4)

5) A sphere just fits inside a cube with edges 18cm long. (5)

A) Find the volume of the sphere?
B) Find the volume of the cube (prism)?
C) How much empty space is there in the cube when the sphere is placed inside?

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

$V = \frac{4 \times 3.14 \times 9^3}{3}$ ✓

$V = \frac{4 \times 3.14 \times 729}{3}$

$V = 3052.08\,cm^3$ ✓

$V = L \times W \times H$

$V = 18 \times 18 \times 18$ ✓

$V = 5832\,cm^3$ ✓

(5)

Empty Space → $5832\,cm^3 - 3052.08\,cm^3$

$= 2779.92\,cm^3$ ✓

5

Part 3 : **Linear Systems** (20marks)

1) Rearrange each equation so that it's solved for y . (3)

A) $y+7x=-9$ **B)** $-4x+2y-8=0$

$y=-7x-9$ ✓

$2y=4x+8$ ✓

$y=2x+4$ ✓

3

2) Solve the system of equations by graphing.(4)

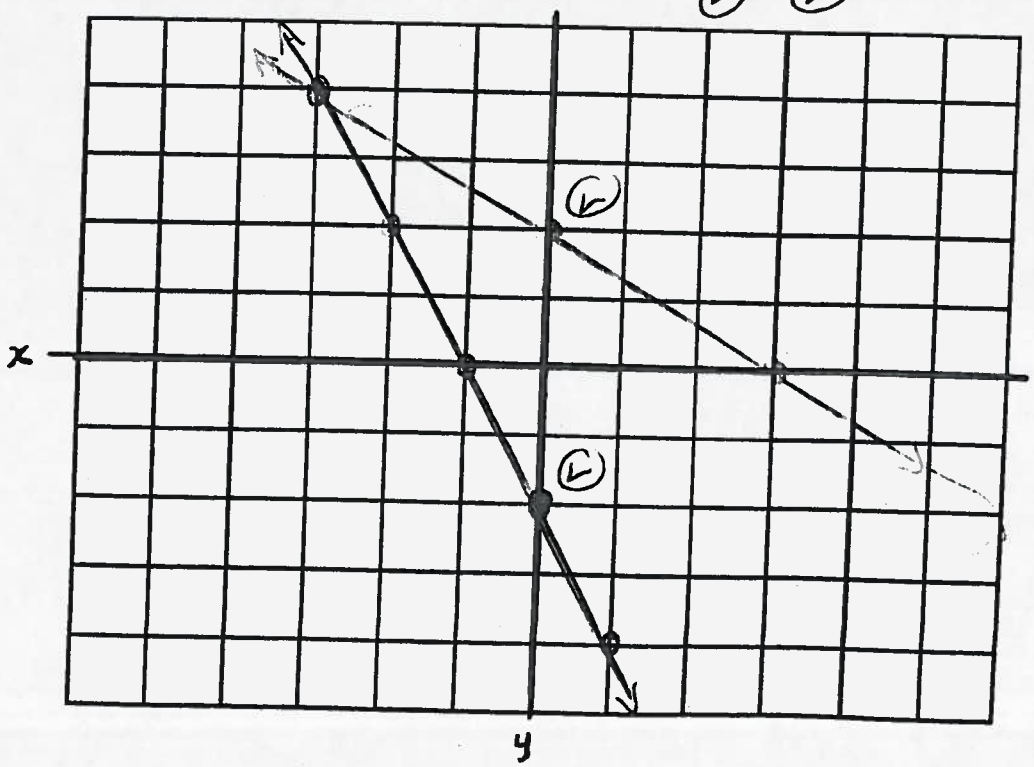
$2x+3y=6$

$y=-2x-2$

$y=-\frac{2}{3}x+2$

$(-3,4)$ ✓ ✓

4



3) Solve the following system of equations using substitution. (4)

$y = 3x + 5$
$x + y = -3$

$x + 3x + 5 = -3$
$4x = -8$
$x = -2$

$y = 3(-2) + 5$
$y = -6 + 5$
$y = -1$

$(-2, -1)$

4

4) Solve the following system of equations using elimination. (4)

$3x + 5y = 12$
$2x + 5y = 8$

$3x + 5y = 12$
$-2x + 5y = 8$
$1x = 4$

$2(4) + 5y = 8$
$8 + 5y = 8$
$5y = 0$
$y = 0$

$(4, 0)$

4

5) The Athletic Council wants to buy a total of 45 volleyballs and basketballs. The council has $435.00 to spend. Each volleyball costs $8.00 and each basketball costs $11.00. Write a system of equations and then solve the system to find out how many of each type of balls the Council could buy for $435.00. (5)

$V + B = 45 \rightarrow 11V + 11B = 495$
$8V + 11B = 435 \rightarrow -8V + 11B = 435$
$3V = 60$
$V = 20$

$V + B = 45$
$B = 45 - 20$
$B = 25$

5

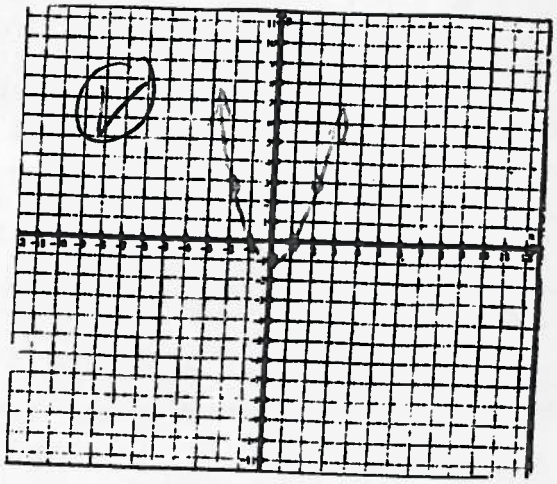
(7)

Part 4: **Linear and Non-Linear Equations** (20Marks)

1) For the relation $y = x^2 - 1$, complete the table of values and draw a graph. (2)

x	y
-2	3
-1	0
0	-1
1	0
2	3

(✓)

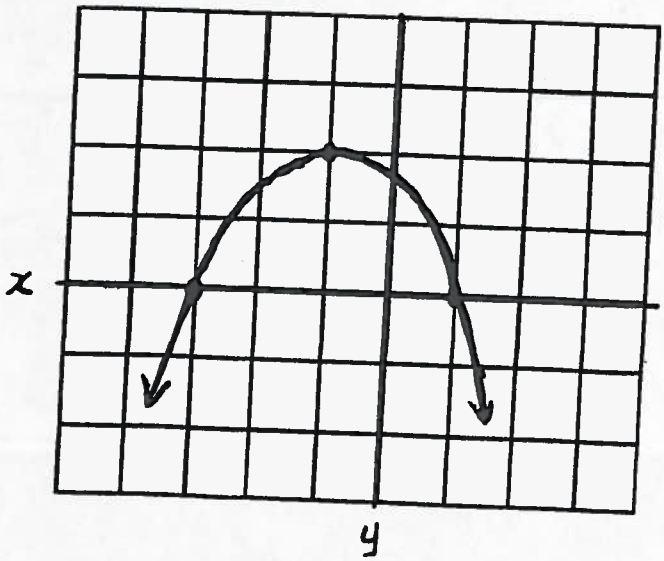


(2)

2) Use the graph of the following parabola and state the direction of opening, the coordinates of the vertex, the axis of symmetry and whether it is has maximum or minimum value. (5) State the x intercepts from the graph. (2)

Opens	Vertex (x,y)	Axis of Sym	max/min	x- int	x - int
Down	(-1, 2)	x = -1	Max	-3	1

(5)



(2)

(8)

3) Rearrange the following equation into standard form. (2)

$-2y = -3x + 5$

$3x - 2y - 5 = 0$ ✓ ✓

4) Rearrange the following equation into slope y-intercept form . (2)

$x + 2y - 8 = 0$

$2y = -1x + 8$

$y = \frac{-1}{2}x + 4$ ✓ ✓

(6)

5) State the slope and y-intercept of the following equation. (2)

$y = -3x + 5$

Slope = -3 ✓

y-int = 5 ✓

6) State if the following equations are Linear, Non-linear or neither. (3)

A) $x^2 + 3x = 9$ Non-Linear ✓

B) $4x + 7 = 18$ neither ✓

C) $5y - 4x - 8 = 0$ Linear ✓

(3)

7) What are the x and y intercepts of the following equation.(2)

$5x - 3y = 30$

$x = (6)$ ✓

$y = (-10)$ ✓

(2)

(9)

Part 5 : **ALGEBRA (20 Marks)**

1) Expand and simplify. (4)

Remove the y

A) $(4x+3y)(4x-5y)$

$16x^2 - 20xy + 12xy - 15y^2$

$16x^2 - 8xy - 15y^2$ ✓ ✓

B) $(x+6)^2$

$x^2 + 12x + 36$ ✓ ✓

4

2) Factor the following (2) (Find the GCF)

A) $3x^2 - 9x + 12$

$3(x^2 - 3x + 4)$

✓ ✓

2

3) Expand and simplify (2)

$4(2a-3b)+5(-a-4b)-7(4a-5b)$

$8a - 12b - 5a - 20b - 28a + 35b$

$-25a + 3b$

✓ ✓

2

10

4) Factor the following trinomial.(3)

A) $x^2 - 7x + 12$

$\_ + \_ = -7$

$\_ \times \_ = 12$

$(x-4)(x-3)$ ✓

✓ ✓

3

5) Solve the following quadratic equation by factoring. (3)

A) $x^2 - 12x + 27 = 0$ ✓

$\_ + \_ = -12$

$\_ \times \_ = 27$

3

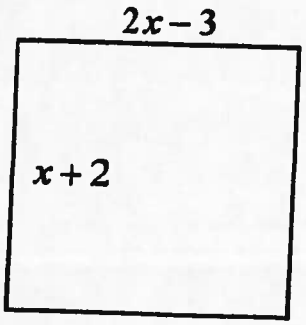
$(x-9)(x-3)=0$

$x=9 \quad x=3$

✓ ✓

6) Write an expression for the area of this rectangle by multiplying the binomials that represent the length and width. Then, evaluate your expression and find the area in cm if you know $x = 5$. (6)

6



✓ $(2x-3)(x+2)$

$2x^2 + 4x - 3x - 6$

$2x^2 + 1x - 6$

✓ ✓ ✓

✓

$2(5)^2 + 1(5) - 6$

$50 + 5 - 6$

$55 - 6$

$49\ cm^2$ ✓