



GRADE 10 INTRODUCTION TO
APPLIED AND PRE-CALCULUS
MATHEMATICS (20S)

Midterm Practice Exam

GRADE 10 INTRODUCTION TO APPLIED
AND PRE-CALCULUS MATHEMATICS

Midterm Examination A-M-000

Name: _____

Student Number: _____

Attending Non-Attending

Phone Number: _____

Address: _____

For Marker's Use Only

Date: _____

Final Mark: _____ /100 = _____ %

Comments:

Instructions

The midterm examination will be weighted as follows:

Modules 1-4	100%
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The format of the examination will be as follows:

Part A: Multiple Choice	20 marks
Part B: Definitions	10 marks
Part C: Graphs and Relations	27 marks
Part D: Number Sense	7 marks
Part E: Measurement	26 marks
Part F: Trigonometry	10 marks

Time allowed: 2.5 hours

Note: You are allowed to bring a scientific calculator and your Midterm Exam Resource Sheet to the exam. Your Resource Sheet must be handed in with the exam. You will receive your Midterm Exam Resource Sheet back from your tutor/ marker with the next module work that is submitted for marking.

You will need a metric ruler and an imperial ruler. If required, a metric/imperial ruler is provided at the end of this exam for your use.

Part A: Multiple Choice ($20 \times 1 = 20$ marks)

Circle the letter of the correct answer for each question.

1. On a graph, the independent variable
 - a) is graphed along the y -axis
 - b) is graphed along the vertical axis
 - c) is graphed along the horizontal axis
 - d) is affected by changes in the other variable

2. An example of continuous data is
 - a) the number of pairs of shoes you own
 - b) the time it takes to run a race
 - c) how many pages in a textbook
 - d) the number of pizzas you order for a party

3. Calculate the slope of the line that passes through the points $(2, 5)$ and $(4, 8)$.
 - a) $\frac{-2}{3}$
 - b) $\frac{3}{2}$
 - c) $\frac{2}{3}$
 - d) $\frac{-3}{2}$

4. The slope of a vertical line is
 - a) $m = -1$
 - b) $m = 0$
 - c) $m = 1$
 - d) undefined

5. Given the equation of a line is $y = \frac{2}{3}x - 5$, what is the y -intercept?
- a) $2x$
 - b) 5
 - c) $\frac{2}{3}$
 - d) -5
6. An example of a composite number is
- a) 11
 - b) 23
 - c) 37
 - d) 51
7. The greatest common factor of 12 and 16 is
- a) 2
 - b) 4
 - c) 48
 - d) 192
8. A possible solution for $\sqrt{16}$ is
- a) 2
 - b) 8
 - c) -4
 - d) none of the above
9. $-\frac{5}{7}$ is best described as a(n)
- a) whole number
 - b) integer
 - c) rational number
 - d) irrational number

10. Find the product of $(2m^2n^3)(3mn^4)$.

- a) $6m^3n^7$
- b) $5m^2n^{12}$
- c) $6m^2n^{12}$
- d) $5m^3n^7$

11. Simplify $(59x^2y)^0$.

- a) -1
- b) 0
- c) 1
- d) $59x^2y$

12. $9^{\frac{1}{2}}$ is equivalent to

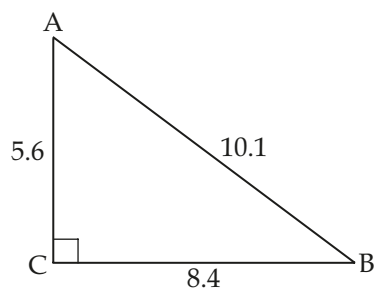
- a) $\sqrt{9}$
- b) $\frac{1}{9^2}$
- c) 4.5
- d) -3

13. $\left(\frac{x}{y}\right)^{-3}$ is equivalent to

- a) $\frac{y^3}{x^3}$
- b) $-\left(\frac{x}{y}\right)^3$
- c) $-\left(\frac{y}{x}\right)^3$
- d) $\left(\frac{1}{xy^3}\right)$

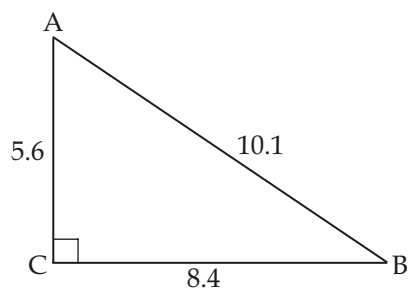
14. The best choice of units to measure the distance from your town to Toronto would be
- a) metres
 - b) yards
 - c) miles
 - d) decalitres
15. The surface area of a sphere with a radius of 5 inches is about
- a) 63 in.^2
 - b) 314 in.^2
 - c) 524 in.^2
 - d) 3948 in.^2
16. If a cone has a volume of 100 cubic units, a cylinder with the same height and radius will have a volume of how many cubic units?
- a) 10
 - b) 33
 - c) 300
 - d) 1000
17. If the two legs in a right triangle are 5 cm and 12 cm, the length of the hypotenuse is
- a) 11 cm
 - b) 13 cm
 - c) 17 cm
 - d) 169 cm
18. The sine ratio involves the lengths of which two sides of a right triangle?
- a) $\frac{\text{opposite}}{\text{adjacent}}$
 - b) $\frac{\text{adjacent}}{\text{hypotenuse}}$
 - c) $\frac{\text{opposite}}{\text{hypotenuse}}$
 - d) $\frac{\text{adjacent}}{\text{opposite}}$

19. Given triangle ABC, $\sin A = ?$



- a) $\frac{5.6}{10.1}$
- b) $\frac{8.4}{5.6}$
- c) $\frac{5.6}{8.4}$
- d) $\frac{8.4}{10.1}$

20. Given triangle ABC, the measure of angle A is



- a) 37°
- b) 34°
- c) 90°
- d) 56°

Part B: Definitions ($10 \times 1 = 10$ marks)

Match each definition with the correct term from the list below. Write the correct term on the blank line with each definition. Terms are used only once. Not all terms have a definition provided

Terms

adjacent side	greatest common factor	ordered pair	similar triangles
alternate interior angles	hypotenuse	perfect cube number	sine
angle of depression	imperial system	perfect square number	slope
angle of elevation	integer	prism	sphere
cone	inverse trigonometric ratio	pyramid	square root
cosine	irrational	range	tangent
cube root	lateral surface area	rational number	total surface area
cylinder	least common multiple	referent	volume
domain	natural number	SI	whole number
graph	opposite side	similar	

1. Visual representation used to show a numerical relationship. _____
2. A comparison of how far the line moves vertically as it moves horizontally.

3. Found when an integer is multiplied by itself three times. _____
4. The counting numbers and zero. _____
5. A system of measurement that uses prefixes and has a decimal structure.

6. 3-D object with two congruent, parallel bases and parallelogram faces.

7. 3-D object in which all points are equidistant from the centre. _____
8. Side directly across from the specified angle. _____
9. Ratio of the opposite side and hypotenuse in a right triangle. _____
10. Congruent angles formed on opposite sides of a line that cuts diagonally through parallel lines. _____

Part C: Graphs and Relations (27 marks)

Show all calculation and formulas used for short and long answer questions. Use all decimal places in your calculations and round the final answers to the correct number of decimal places. Include units when appropriate. Clearly state your final answer.

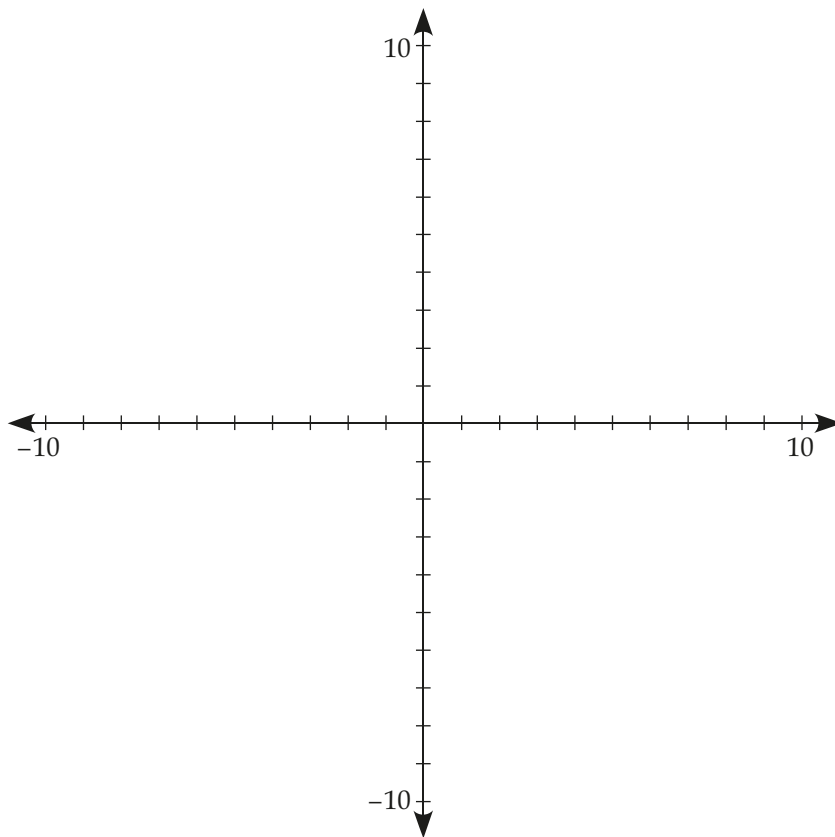
1. Given the linear equation $y = \frac{4}{3}x - 9$

a) State the y -intercept as a value. (1 mark)

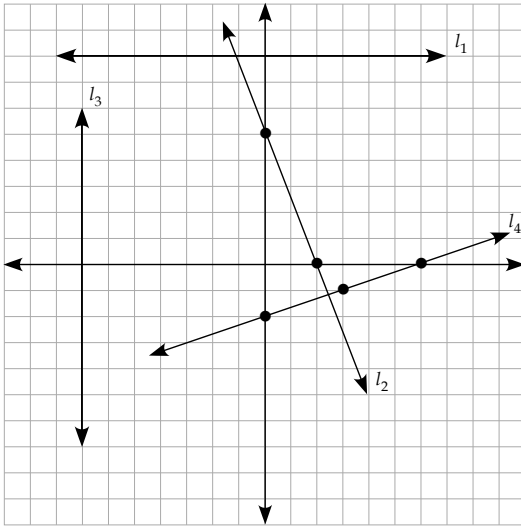
b) State the slope of the line. (1 mark)

c) Explain how you would graph the line. (2 marks)

d) Sketch a graph of the line. (1 mark)



2. State the slope of each of the following lines. (4 marks)



$l_1 =$ _____

$l_2 =$ _____

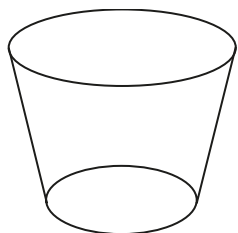
$l_3 =$ _____

$l_4 =$ _____

3. Given the equation $y = \frac{1}{3}x - 5$, state the equation of a different line that is parallel to the given line, and explain how it is parallel. (2 marks)

4. In line AB, A $(-5, 21)$ and B $(x, -6)$. Use the slope formula to find the value of x if the slope of line AB is $m = -3$. (4 marks)

5. The container below is being filled with water at a constant rate. The time (t) and height (h) of the water is graphed.

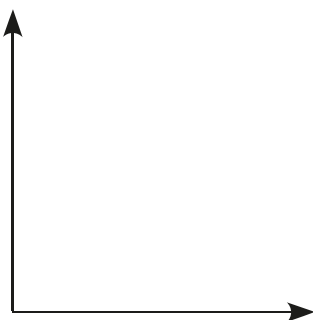


a) State the independent and dependent variables in this situation. (1 mark)

independent _____

dependent _____

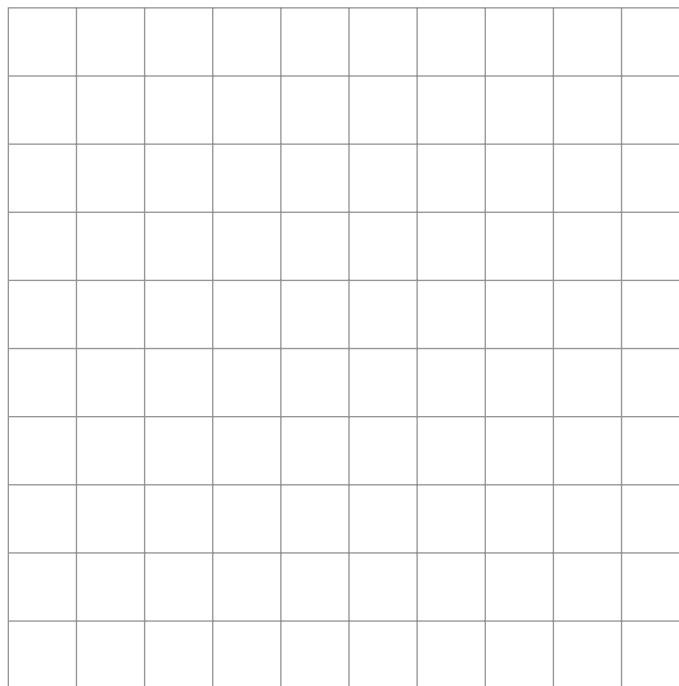
b) Sketch a possible graph for this situation. (1 mark)



6. A study was undertaken to compare the age of cash registers to the cost of maintenance required on them. Nine cash registers in a department store were examined. The results were as follows.

Register #	Age (in years)	Maintenance costs in dollars
1	6	99
2	7	161
3	1	23
4	3	40
5	6	126
6	2	35
7	5	86
8	4	72
9	3	51

- a) Which is the independent variable? (0.5 mark)
- _____
- b) Which is the dependent variable? (0.5 mark)
- _____
- c) Plot the points on the grid provided, include the components of a good graph as described in Module 1. (4 marks)



d) What is a reasonable domain and range for this situation? Explain your answer. (2 marks)

e) Is this data linear? Explain why or why not. (2 marks)

f) Is this data continuous? Explain why or why not. (1 mark)

Part D: Number Sense (7 marks)

Show all calculation and formulas used for short and long answer questions. Use all decimal places in your calculations, and round the final answers to the correct number of decimal places. Include units when appropriate. Clearly state your final answer.

1. Determine the prime factors of 450 using a factor tree diagram. Include your diagram. (2 marks)

2. Determine the prime factors of 225 and 400. Write them using exponents to indicate repeated multiplications, and use that to find the greatest common factor and least common multiple. (4 marks)

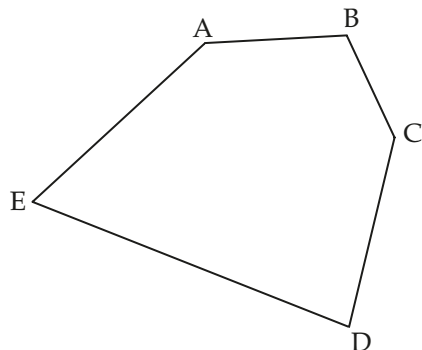
3. Write $\sqrt{252}$ as a mixed radical in simplest form. (1 mark)

Part E: Measurement (26 marks)

Show all calculations and formulas used for short and long answer questions. Use all decimal places in your calculations, and round the final answers to the correct number of decimal places. Include units when appropriate. Clearly state your final answer.

1. Explain how you could use a referent to estimate the circumference of a circular dining table. Describe your referent and measurement strategy. (3 marks)

2. Measure the length of each side in the following polygon to the nearest tenth of a centimetre and calculate its perimeter. (3 marks)



$$AB = \underline{\hspace{2cm}}$$

$$BC = \underline{\hspace{2cm}}$$

$$CD = \underline{\hspace{2cm}}$$

$$DE = \underline{\hspace{2cm}}$$

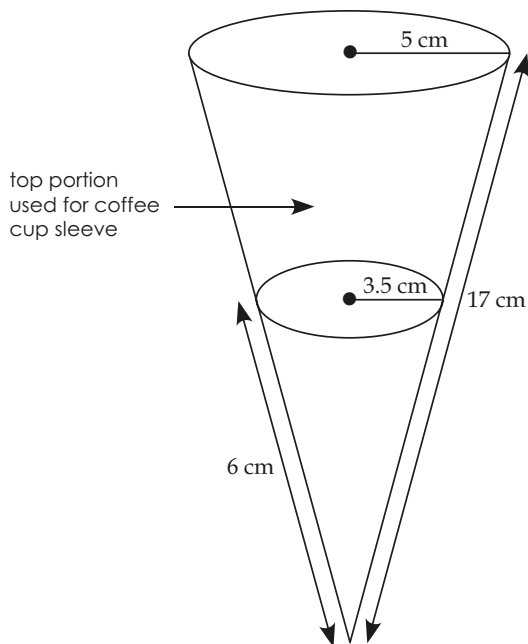
$$EA = \underline{\hspace{2cm}}$$

$$\text{Perimeter} = \underline{\hspace{2cm}}$$

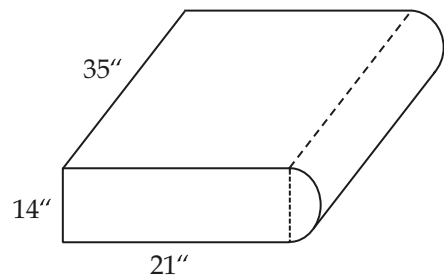
3. Convert the following measurements into the units indicated. (Round to 3 decimal places) (8 marks)

92 inches = _____ feet
19 cm = _____ mm
4.5 yards = _____ inches
11 miles = _____ km
5 gallons _____ litres
33 kg = _____ lb.
82 ft.² = _____ yd.²
25 000 000 cm³ _____ m³

4. A take-out coffee cup has a protective paper sleeve to make it easier to hold when filled with a hot beverage. The sleeve is made by cutting the bottom off of a paper cone and using the top portion of it. Determine the lateral surface area of the part of the cone used to make the sleeve. (4 marks)



5. Determine the volume of this 3-D object. Its base is composed of a rectangle and a semi-circle. State your final answer in cubic feet, rounded to the nearest tenth. (4 marks)



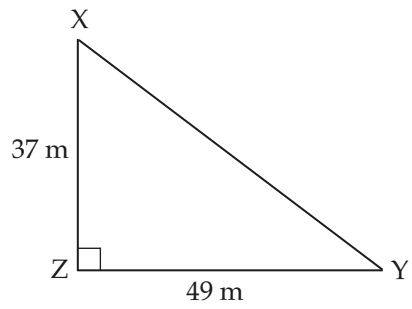
6. A beach ball has a surface area of 572.6 sq. in. Determine its diameter to the nearest $\frac{1}{2}$ inch. (4 marks)

Part G: Trigonometry (10 marks)

Show all calculations and formulas used for short and long answer questions. Use all decimal places in your calculations, and round the final answers to the correct number of decimal places. Include units when appropriate. Clearly state your final answer.

1. Calculate $\tan 65^\circ$ to 4 decimal places and explain what this means using a diagram of a right triangle. (3 marks)

2. Solve the triangle. Find all angles and side lengths. Round your answers to 1 decimal place. (3 marks)



3. Find the length of QR to the nearest tenth. (4 marks)

