GRADE 9 MATH (mpm1d) FINAL EXAM

Instructions: There is a 1.5 hour minimum, 2 hour maximum time limit for writing this exam.

Note: Number of Pages (including cover): 15

Total Marks: 107

Make sure that you round your answer to the proper decimal place indicated in each question.

Please check over your solutions!

Do your best! Do the questions in any order. Don't get stuck on one. Leave it and come back to it later. I know you can do it!

Topic of Study	Points
Multiple Choice	36
Unit 1: Algebra	26
Chapter 2: Linear Relations	33
Chapter 3: Geometry	12
Total	**107**

KTAC breakdown	Knowledge	Application	Thinking	Communication
% of exam	**36%**	**31%**	**24%**	**12%**

Section 1: Multiple Choice [36 marks]

____ **1.** 87^0 is equal to:

A) 87

B) 0

C) 1

D) 71

____ **2.** $a^{10} \times a^5$ written as a single power is

A) a^5

B) a^{50}

C) a^{15}

D) $\frac{1}{a^5}$

____ **3.** $(3x^4)^2$ simplified is

A) $3x^6$

B) $6x^6$

C) $9x^8$

D) $9x^6$

____ **4.** $7^5 \times 7 \div 7^3$ written as a single power is

A) 7^3

B) 7^2

C) 7^9

D) 7^1

____ **5.** Simplify $\frac{18m^6n}{6m^2n}$

A) $12m^4$

B) $3m^3n$

C) $3m^8n^2$

D) $3m^4$

____ **6.** Which fraction is equal to $\left(\frac{1}{4}\right)^2$

A) $\frac{1}{16}$

B) $\frac{1}{8}$

C) $\frac{1}{4}$

D) $\frac{1}{2}$

_____ **7.** Which pair of terms are **not** like terms

A) $4a$ and $7a$

B) $2mn$ and mn^2

C) $3p^2q$ and $-p^2q$

D) $-x$ and $3x$

_____ **8.** The expression $-2b^4d + bd^3 + b^6$ is a

A) Monomial

B) Binomial

C) Trinomial

D) Robonomial

_____ **9.** The degree of $-2b^4d + bd^3 + b^6$ is

A) 2

B) 3

C) 15

D) 6

_____ **10.** 5^{-2} is equal to

A) $\frac{1}{25}$

B) $\frac{1}{10}$

C) -10

D) -25

_____ **11.** What value of m makes the equation $\frac{6a^m}{2a^3} = 3a^5$ true?

A) 2

B) 8

C) 15

D) 18

_____ **12.** Which is the correct solution for $x - 2 = -4$

A) $x = -6$

B) $x = -2$

C) $x = 2$

D) $x = 6$

_____ **13.** The formula for area of a triangle is $A = \dfrac{bh}{2}$. Which is the formula rearranged to isolate h?

A) $h = \dfrac{A}{2} + b$

B) $h = \dfrac{b}{2A}$

C) $h = \dfrac{A+2}{b}$

D) $h = \dfrac{2A}{b}$

_____ **14.** If $\dfrac{3x+2}{4} = \dfrac{4x-1}{6}$, find the value of x

A) 8

B) -8

C) 11

D) -11

_____ **15.** Expand and simplify $x(x-2) - 4(x+1)$

A) $2x + 6$

B) $x^2 + 2x - 7$

C) $-3x + 7$

D) $x^2 - 6x - 4$

_____ **16.** $y = 66x$ represents a:

A) Direct Variation

B) Partial Variation

C) Both a direct variation and a partial variation

D) Neither

_____ **17.** $y = 68x + 99$ represents a:

A) Direct Variation

B) Partial Variation

C) Horizontal line

D) Vertical line

_____ **18.** Which of the following is a primary source of data?

A) Looking up the NHL's leading scorers on NHL.com

B) Getting information about your stocks from the newspaper

C) Surveying the students in your class to determine what the most popular type of music is

D) Using data collected by Statistics Canada to determine what is the most popular sport in Canada is.

_____ **19.** Estimating the values **beyond** the known data for a relation is

A) Extrapolation

B) Interpolation

C) A line of best fit

D) Discarding outliers

_____ **20.** The graph below represents the relationship between Rena's distance from home and time. In which section is Rena moving the fastest?

A) p

B) q

C) r

D) w
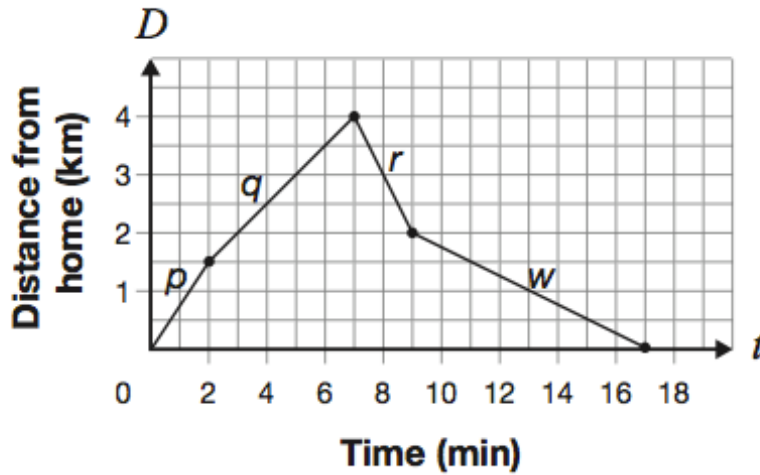
_____ **21.** The following graphs show a person's distance from home. Which graph shows an acceleration away from home?
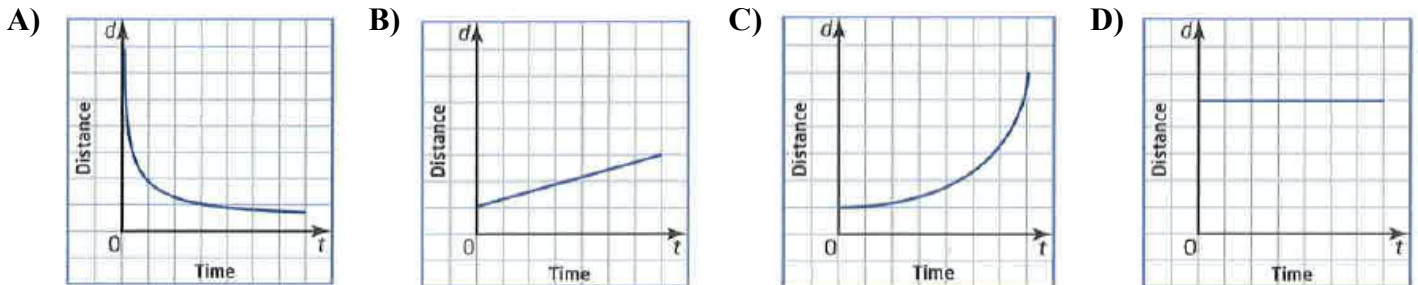
_____ **22.** Graph D) from the previous question shows:

A) A person moving at a constant rate away from home

B) A person moving at a constant rate towards home

C) A persons accelerating

D) No movement

_____ **23.** Super Hot Fire's earnings vary directly with the number of rap battles he wins. If he earns $250 for winning 5 battles, what is the constant of variation?

A) 1250

B) 50

C) 5

D) 0.2

24. Calculate the slope of the following line segment

A) $\frac{4}{5}$

B) $\frac{-4}{5}$

C) $\frac{5}{4}$

D) $\frac{-5}{4}$
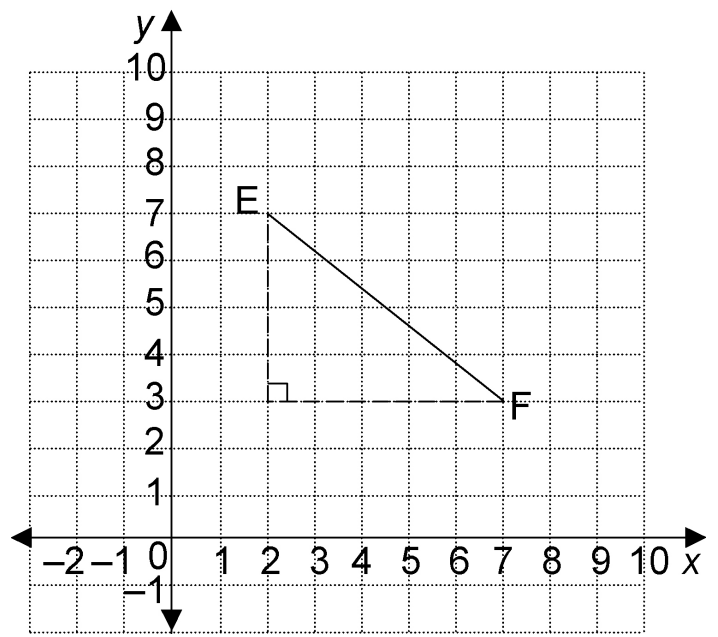
_____ **25.** Identify the slope and y-intercept of $y = -3x + 4$

A) $m = -4; b = 3$

B) $m = 4; b = -3$

C) $m = 3; b = 4$

D) $m = -3; b = 4$

_____ **26.** What is the slope of the line that passes through the points A(2,-6) and B(7,8)?

A) $m = \frac{14}{5}$

B) $m = \frac{5}{14}$

C) $m = \frac{2}{5}$

D) $m = -\frac{2}{5}$

_____ **27.** Which of the following pairs of lines are parallel?

A) $y = 2x + 4$ and $y = 3x + 4$

B) $y = 5x - 2$ and $y = 5x + 7$

C) $y = \frac{1}{2}x + 4$ and $y = -2x + 9$

D) $y = 3x - 7$ and $y = -3x + 7$

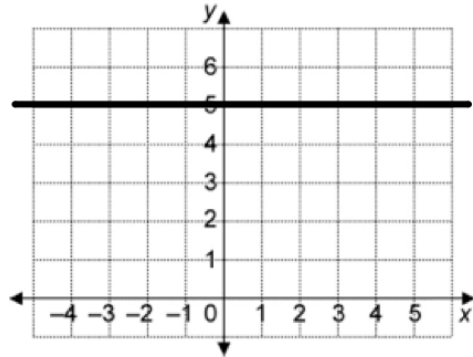_____ **28.** What is the slope of a line perpendicular to the line $y = \frac{2}{3}x + 5$

A) $\frac{3}{2}$

B) $\frac{-3}{2}$

C) $\frac{-2}{3}$

D) $-\frac{1}{5}$

_____ **29.** What is the slope of a vertical line?

A) 0

B) 1

C) Undefined

D) Impossible to know without knowing the x-intercept

_____ **30.** What is the equation of the following line

A) $y = 5$

B) $x = 5$

C) $y = x + 5$

D) $y = 5x$

_____ **31.** Use first differences to determine which table of values represents a linear relationship

A)
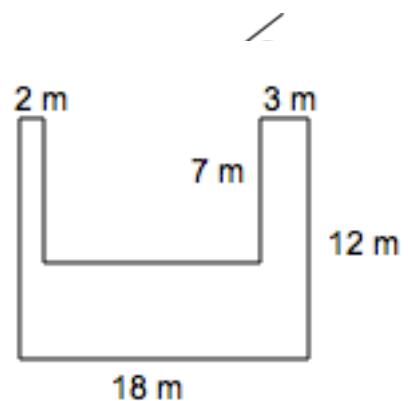
n	C
0	0
1	2
2	4
3	8

B)

n	C
0	0
1	1
2	4
3	9

C)

n	C
0	0
1	4
2	11
3	15

D)

n	C
0	0
1	3
2	6
3	9

_____ **32.** Calculate the perimeter and area of the figure below

A) P= 34 m; A= 32 m²

B) P= 64 m; A= 90 m²

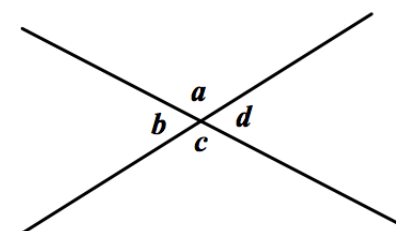**C)** P= 74 m; A=125 m²

D) P= 42 m; A=216 m²

_____ **33.** Based on the diagram, which of the following statements is correct

A) $\angle ABC = 40°$
B) $AB = BC$
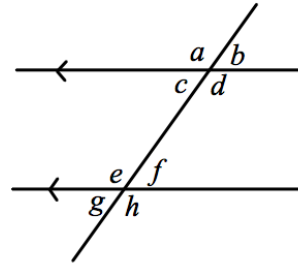**C)** $\triangle ABC$ is isosceles
D) all of the above
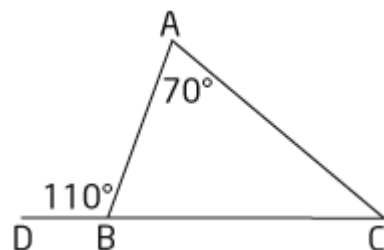
_____ **34.** Based on the intersecting lines, which of the following statements is NOT true

A) $\angle a = \angle c$
B) $\angle d = \angle b$
C) $\angle a + \angle b = 90°$
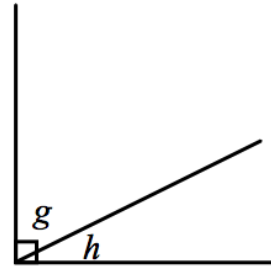**D)** $\angle d + \angle a = 180°$

35. Based on the diagram of two parallel lines cut by a transversal, which of the following statements is NOT true?

    A) $\angle d + \angle f = 180$

    B) $\angle b = \angle h$

    C) $\angle c = \angle f$

    D) $\angle g + \angle e = 180$

36. Angles g and h are complimentary. $\angle g = 3x + 6$, $\angle h = 2x - 11$, what is the measure of each angle?

    A) $\angle g = 63°, \angle h = 27°$

    B) $\angle g = 57°, \angle h = 23°$

    C) $\angle g = 60°, \angle h = 30°$

    D) $\angle g = 53°, \angle h = 37°$

Section 2: Algebra [26 marks]

37. Simplify the following expressions using exponent laws and then evaluate where possible   [5 marks]

a) $2a^6b \times 5a^3b^3$

b) $(3^2)^5 \div 3^7$

c) $\dfrac{5x^8y^8}{15x^3y^5}$

d) $\dfrac{4x^2}{2x^4}$

e) $\dfrac{(2x^3)^3}{4x^2 \cdot 2x^4}$

38. Expand and *simplify* the following.   [8 marks]

a) $3(x + 2)$

b) $(2x + 5) + (2x - 7)$

c) $4x(3x - 5) - 7(x^2 + 2x)$

d) $2[2x + 4(x + 3)]$

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39. *Solve* the following equations (don't forget that you can check your solutions!)   [10 marks]

a) $3x - 17 = 13$

b) $\frac{2x+5}{4} = 2$

c) $3(2p + 1) = 5(p + 1)$

d) $\frac{3x+2}{8} = \frac{3x-2}{4}$

e) $3(2x - 5) - x = 4 - (3x + 7)$

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40. Show a full algebraic solution to either part a) or b) NOT both. Make sure you clearly communicate your final answer.   [3 marks]

  a) The length of a rectangle is 3 cm more than double the width. The perimeter of the rectangle is 96 cm. What are the dimensions (the length and width) of the rectangle?

  b) In a triangle, the measure of the middle angle is double the measure of the smallest angle, and 15° less than the measure of the biggest angle. Find the measures of the angles. Use a labeled diagram to help.

Choice:

Section 3: Linear Relations [33 marks]

41. After each scenario, identify each sampling scenario as either: [4 marks]

  A) simple random sampling
  B) systematic random sampling
  C) stratified random sampling
  D) non-random sampling

Scenario 1: giving a survey to the tallest students in class. _____

Scenario 2: giving a survey to the 10 students whose names were drawn from a hat. _____

Scenario 3: giving a survey to 10% of the girls and 10% of the boys in class. _____

Scenario 4: giving a survey to every 4th person, alphabetically. _____

42. Based on the following table of values: [5 marks]

a) Is this a direct or partial variation?

x	y
0	3
1	7
2	11
3	15
4	
	31

b) Fill in the missing information in the table
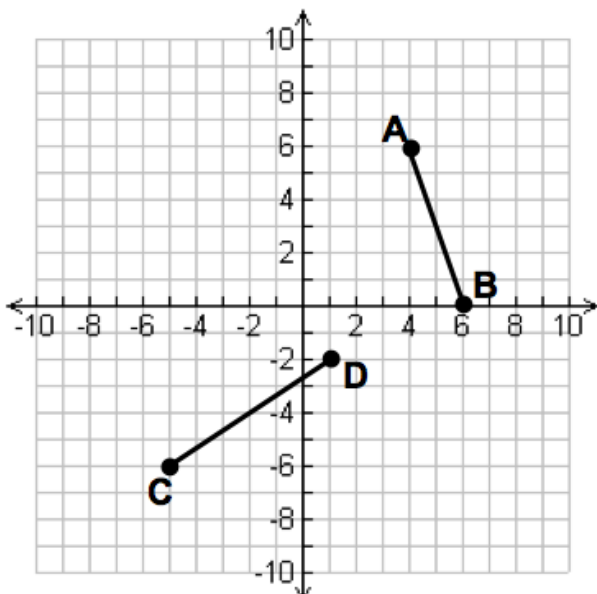
c) What is the constant of variation (m) ?

d) What is the initial value (b)?

e) Write an equation for the relation in the form $y = mx + b$.

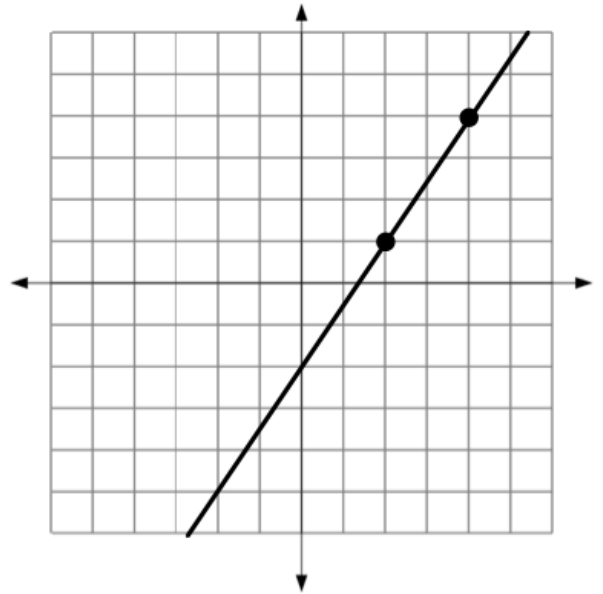**43.** Find the slope of each of the following lines [2 marks]

AB: _____

CD: _____

44. Use the graph to the right to answer the following questions: [3 marks]

a) What is the y-intercept of the line?

b) What is the slope of the line?

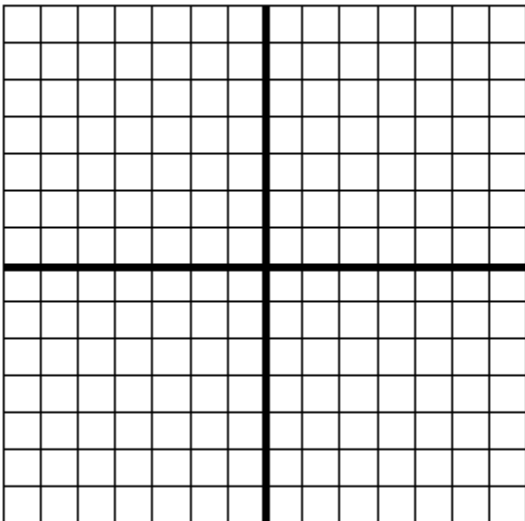**c)** Write an equation for the line in the form $y = mx + b$.

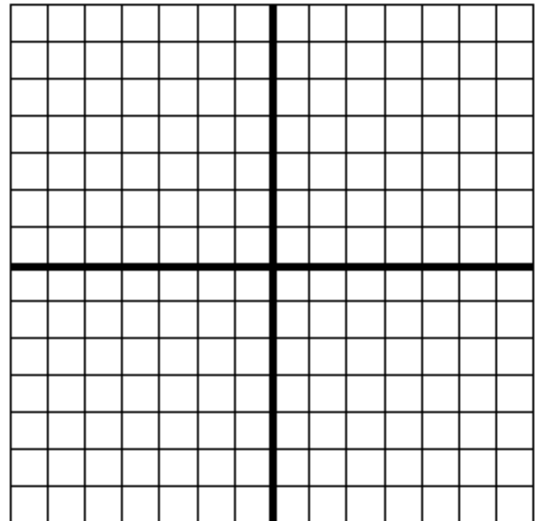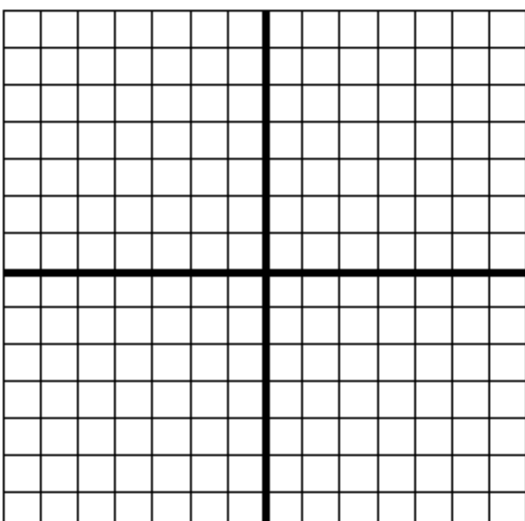**45.** Graph the following lines   [4 marks]
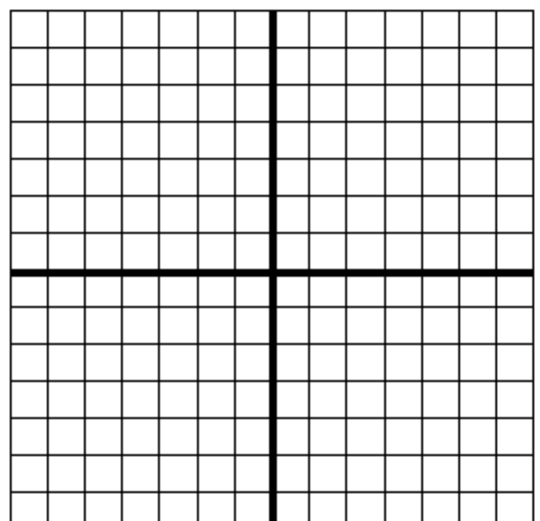
a) $y = \frac{1}{2}x - 4$ **b)** $y = -3x + 2$

c) $y = 4$ **d)** $x = -3$

46. Find the equation of the line passing through the points A(-5, 8) and B(-2, 2). [2 marks]

Equation:

47. Find the equation of a line with a slope of 2 that goes through the point (4,-3). [2 marks]

Equation:

48. Find the equation for a line that is parallel to the line $4x + 5y + 2 = 0$ and goes through the point (5,-3) [2 marks]

Equation:

49. Find the x- and y-intercepts of the line $4x + 5y = 20$ [2 marks]

$x - int$:
$y - int$:

50. Data has been collected from a basketball player. The following table shows the number of successful jump shots Michael Jensordan made at various distances from the basket. [7 marks]
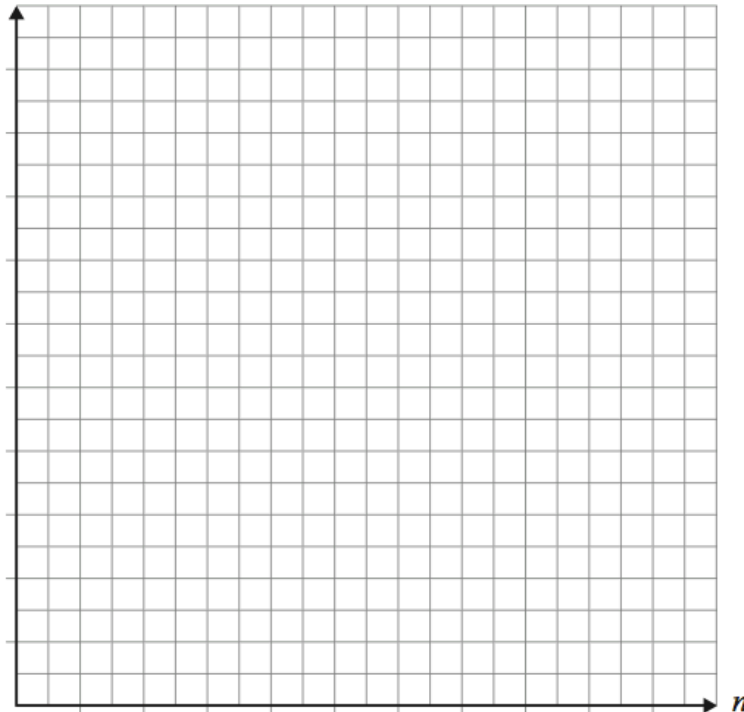
a) Identify the independent and dependent variables:

Independent: _____

Dependent: _____

Distance from Basket (m)	Shots Made
3	22
4	?
5	17
6	14
7	15
8	10
9	4
10	3
11	1

b) Graph the relation. Label the axes.

n

c) Draw a line or curve of best fit.

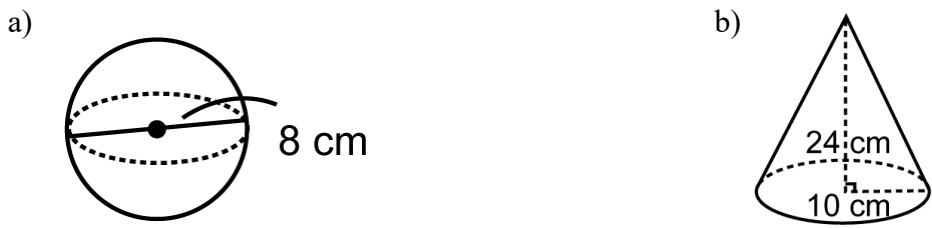**d)** Is the relationship linear or non-linear?

e) Predict the number of shots he would make if he were 4 meters from the basket. Is this interpolation or extrapolation?

Section 4: Geometry [12 marks]

51. Find the volume of the volume of either a) or b) but not both.

a)

6 cm

8 cm

9 cm

b)

3 cm

10 cm

4 cm

52. Find the surface area of either a) or b) but not both.
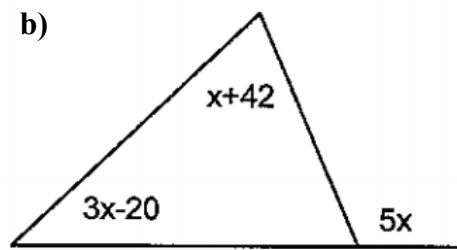
a)

8 cm

b)

24 cm

10 cm

53. Find the measures of the missing angles in **a) or b) but not both**   [2 marks]
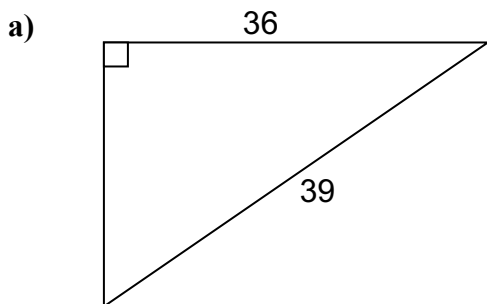
a)

y

68°

z x

130°

b)

65°   50°

y

z

74°

x

54. Solve for x in either **a) or b) but not both.** Show your work. [2 marks]

a)

$(11x+10)^o$

$(10x-40)^o$

b)

x+42

3x-20

5x
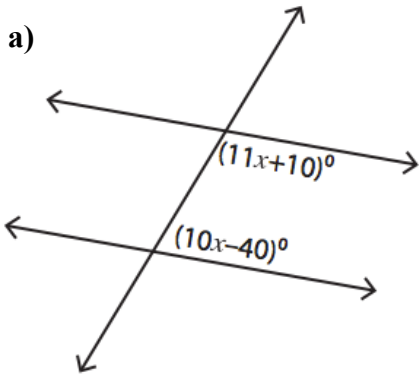
55. Solve for the missing side of each triangle [2 marks]

a)

36

39

b)

32 cm

26 cm
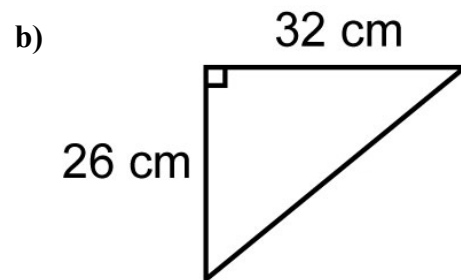
EXTRA FUN: Sidney is directly in front of Marc-Andre, who is playing goalie, as shown. Sidney is 5 m from both goal posts. He is also three times as far from Marc-Andre as Marc-Andre is from either post. How wide is the net?