Intermediate Mathematics
Provincial Assessment 2005

GOVERNMENT OF
NEWFOUNDLAND
AND LABRADOR
Department of Education

Last Name: _____ First Name: _____ MI: ____

Teacher: _____

School Name: _____ School District: _____

IMPORTANT

You will have to complete your name and school information in three places:
  (1) On this sheet (above)
  (2) On the bubble sheet
  (3) On the cover of your Student Booklet

Please ensure the information in each of these places is completed correctly and clearly. Your bubble sheet will be placed inside this Section 1 Insert for mailing so pay particular attention that the bubble sheet and Insert information are correct.

Section 1: Non-Calculator Section

You will need a pencil, paper, and ruler for this section but you are <u>not permitted the use of a calculator</u>.

Questions, 1, 2, 3, 5, and 10 require you to write your answer in a numbered blank, or draw on a numbered diagram. Do not use your bubble sheet for these questions; they will be scored later. Questions 4, 6, 7, 8, and 9 are multiple-choice and require you to record A, B, C, or D on your bubble sheet using **a lead pencil only**. Erase carefully with a good quality eraser if you need to change an answer. Please circle the letter of your answer in this booklet as well as shade the appropriate bubble on the bubble sheet just in case an answer sheet is misplaced.

Section 1 should take about 15-20 minutes. Your teacher will collect section 1 when everyone is finished (or after about 30 minutes) and will then give you Section 2 (a larger booklet containing the rest of the questions). You will need your bubble sheet throughout the assessment.

| **Tips For Answering Multiple-Choice Questions**	
✓ Always read each question carefully. Think about what the information is telling you.	✓ Re-read the question and any accompanying text or diagrams if necessary.
✓ For graphs, study the axes and determine the purpose of the information before attempting an answer.	✓ For diagrams, study the diagram paying particular to measures, markings and relationships before attempting an answer.
✓ Work out the solution. From the alternatives given, choose the one that best matches your answer.	✓ If your answer does not closely match the given answers, work out your solution again (you may have made a mistake). It can also help to look at each answer choice and eliminate those that are incorrect or not the best possible answer.
✓ If you get stuck on a question, go on to the next question (you might remember how to do the other question later). Come back to any skipped questions at the end.	✓ Colour only one circle for each question on your ANSWER SHEET. If you colour two circles, the question is not scored.
✓ Answer every question, even if you are not sure. It will help if you can eliminate those responses you know are incorrect or not possible.	✓ Use any extra time to check your answers.

Section 1 Insert

1.   Sketch the line of best fit on the scatterplot shown.

#1 Ans.:
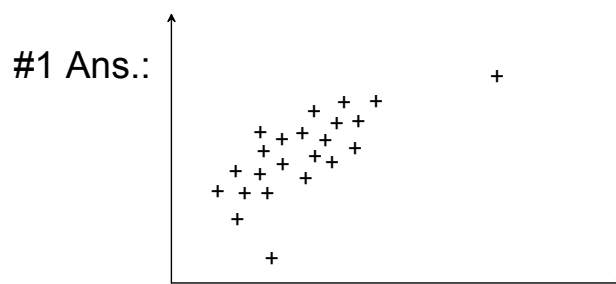
2.   A salesperson that earns salary and additional money with each sale has $ of income as shown. What does the y-intercept represent on the graph?

$ of Income

60000
50000
40000
30000
20000
10000

5   10   15   20

# of Sales
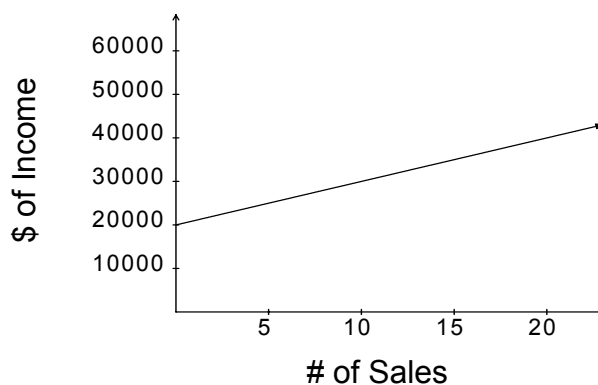
#2 Ans.:

_____

_____

_____

3.   Solve: $3x - 8 = -2x + 7$.

#3 Ans.: $\{$_____$\}$

4. If $A = \begin{bmatrix} -3 & 2 \\ 1 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & -2 \\ 3 & 1 \end{bmatrix}$, what is twice A minus B?

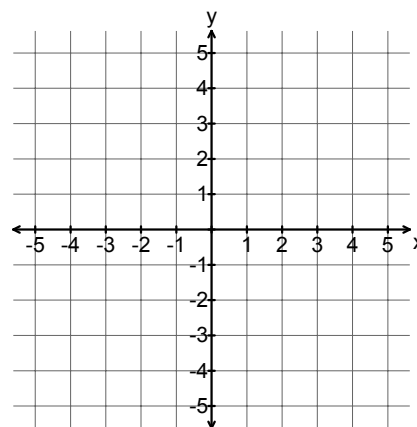(A) $\begin{bmatrix} 15 & -6 \\ 5 & -5 \end{bmatrix}$

(B) $\begin{bmatrix} -9 & 4 \\ -2 & -3 \end{bmatrix}$

(C) $\begin{bmatrix} 0 & 2 \\ 5 & -3 \end{bmatrix}$

(D) $\begin{bmatrix} -12 & 6 \\ -1 & -5 \end{bmatrix}$

5. Using the axes provided, graph the line having slope 2 and *y*-intercept 1.

#5 Ans.:

6. Calculate: $\left(-2\frac{1}{6} + 1\frac{1}{3}\right) \div {}^{-}0.25$

(A) $\frac{3}{10}$
(B) $3\frac{1}{3}$
(C) $4\frac{2}{3}$
(D) 14

7. Calculate: $\left(15^2\right)^6 \div 15^{11}$.
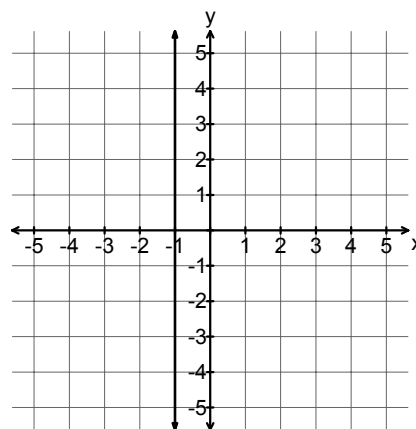
    (A) 15^{-3}
    (B) 15^1
    (C) 15^{19}
    (D) 15^{23}

8. Calculate: $6.1 + \frac{-2}{5} \times 10 - 1$.

    (A)   1.1
    (B)   2.5
    (C)   51.3
    (D)   56

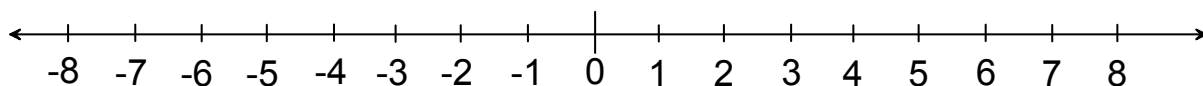9. What is the equation of the line shown?

    (A) $y = x - 1$
    (B) $x = y - 1$
    (C) $y = -1$
    (D) $x = -1$

10. Using the number line provided, graph the solution set for:

$$\{x \mid 3x - 2 < 13, x \in \mathbb{R}\}.$$

#10 Ans.:

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This Student Booklet contains the remaining questions for the Intermediate Mathematics Provincial Assessment 2005.

You will need a pencil and paper, and a ruler for these questions and you are also permitted the use of a four-function calculator (or a scientific calculator). No question requires the use of a calculator but you may use one if necessary. No graphing calculator is permitted.

Section 2: Calculators Permitted

Section 2 begins on page 3 and contains 40 multiple-choice questions (#11-50) all having A,B,C,D choices. You are to shade the appropriate bubble (having the same number as the question) on the bubble sheet **using a lead pencil only**. Do not shade more than one bubble or the question is scored as incorrect. Erase carefully with a good quality eraser if you need to change an answer. Since the first question in this section is #11, start with the bubble with #11. The last bubble you should shade in this assessment is #50 since the last multiple choice question you answer is #50.

Please circle the letter of your answer in this booklet as well as shade the appropriate bubble on the bubble sheet just in case an answer sheet is misplaced.

The *Tips for Answering Multiple Choice Questions* are the same as you saw in Section 1. You can find them again on the next page in this booklet.

11. Which letter best locates $-\sqrt{8}$ on the number line shown?
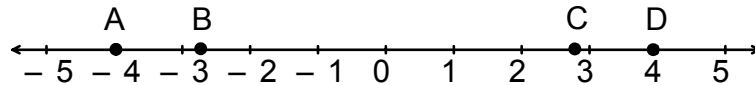

(A)   A
(B)   B
(C)   C
(D)   D

12. Which set notation represents this graph?


-2
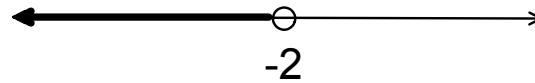
(A) $\{x \mid x > -2, x \in R\}$

(B) $\{x \mid x < -2, x \in R\}$

(C) $\{x \mid x \geq -2, x \in R\}$

(D) $\{x \mid x \leq -2, x \in R\}$

13. Which is **FALSE**?

(A)   All real numbers are irrational.
(B)   All integers are rational numbers.
(C)   All natural numbers are whole numbers.
(D)   All rational and irrational numbers are real numbers.

14. Squares with areas 36 m^2 and 16 m^2 are shown inside a larger square. What is the area of rectangle ABCD in m^2?

(A) 18

(B) 24

(C) 32

(D) 36

A   D

B   C

36m^2

16m^2
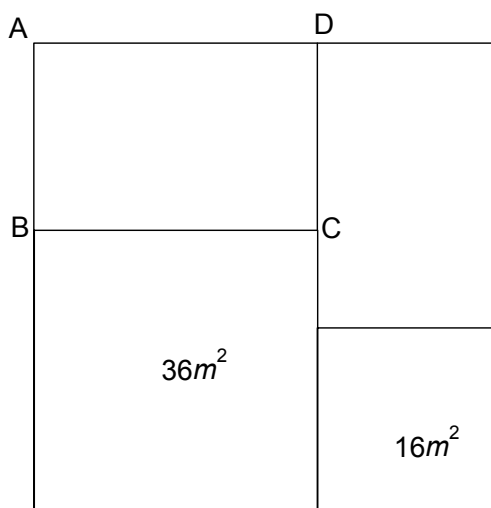
15. A piece of rope $7\frac{1}{2}$ metres long is used to make a clothesline between two vertical poles. If the clothesline stretches tightly between the two poles as shown, and $\frac{5}{8}$ metres of rope is used to make each knot around a pole, how many meters apart are the two poles?
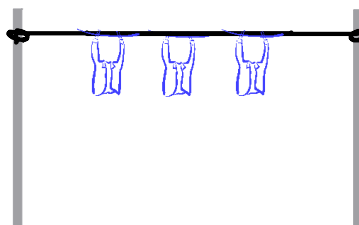
(A) $2\frac{13}{16}$
(B) $6\frac{1}{4}$
(C) $6\frac{7}{8}$
(D) $8\frac{3}{4}$

16. A four metre ladder leans against a 5 m vertical wall. If the base of the ladder is 1.4 m from the wall, how many metres is it from the top of the ladder to the top of the wall?

5m
4m
1.4m

   (A)   1
   (B)   1.3
   (C)   3
   (D)   3.6
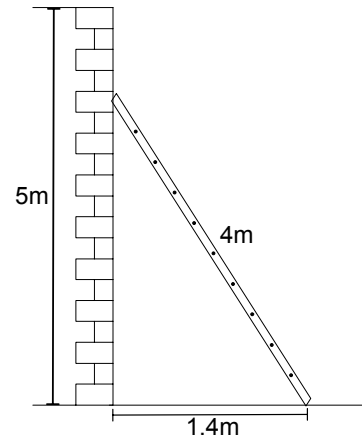
17. Simplify: $\dfrac{2a^{-3}b^5}{\left(2a^{-1}b\right)^3}$.

   (A) $\dfrac{b^2}{4}$

   (B) $\dfrac{b^2}{3}$

   (C) b^2

   (D) $\dfrac{b^2}{4a^5}$

18. The speed of light is about 3.0×10^8 m/s. How many metres will light travel in 2.0×10^{-4} seconds?
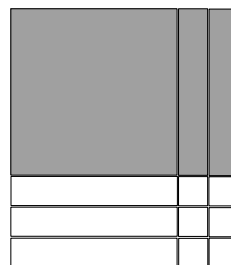
   (A) 1.5×10^{12}
   (B) 6.0×10^4
   (C) 6×10^{32}
   (D) 1.5×10^{-2}

19. For the expression $x^2 - \boxed{?}x - 12$ to be factorable, give the value for $\boxed{?}$.

    (A) 2
    (B) 3
    (C) 4
    (D) 6

20. A polynomial is represented by the tiles shown below. What are the factors of the polynomial?

    (A) $(x + 3)(x - 2)$

    (B) $(x + 3)(x + 2)$

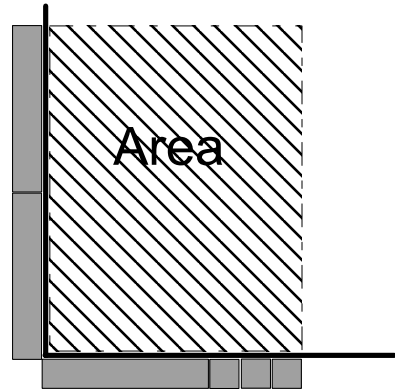   (C) $(x - 3)(x - 2)$

    (D) $(x - 3)(x + 2)$

21. Factor completely: $8a^3b^6c^2 - 12ab^4$.

    (A) $4ab^4\left(2a^2b^2c^2 - 3\right)$
    (B) $4\left(2a^3b^6c^2 - 3ab^4\right)$
    (C) $4a^3b^6\left(c^2 - 3\right)$
    (D) $4ab\left(2a^2b^5c^2 - 3b^3\right)$

22. Two students set up some algebra tiles to help model a product. Which expression represents the modeled area?

(A) $x^2 + 6x$

(B) $2x^2 + 3x$

(C) $x^2 + 3x$

(D) $2x^2 + 6x$

23. Multiply: $(2x - 3)(3x + 4)$.

(A) $6x^2 - x - 12$
(B) $6x^2 - 12$
(C) $6x^2 - 17x - 12$
(D) $6x^2 + 2x - 12$

24. Evaluate $2x^3 + 1 - (x + 1)$ for $x = -2$.

(A) -12
(B) -14
(C) -16
(D) -18

25. Divide $(12x^2 + 8x^3 - 4x)$ by $-4x$.

   (A) $8x + 4x^2$
   (B) $-3x - 2x^2 + 1$
   (C) $-3x - 2x^2$
   (D) $3x + 2x^2 - 1$

26. The perimeter of rectangle ABCD is $(10x - 4)$. If $AD = (2x + 1)$, which expression represents the length of AB?

   (A) $8x - 5$
   (B) $6x - 6$
   (C) $3x - 3$
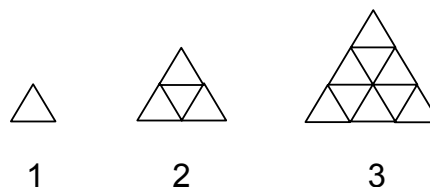   (D) $4x - \frac{5}{2}$

27. Solve the inequality: $6x - 5 < 8x + 1$.

   (A) $x > 3$

   (B) $x < 3$

   (C) $x > -3$

   (D) $x < -3$

28. Which equation below has the same solution as $2(x-5) = \frac{1}{2}(6x+2)$?

    (A) $-16 = 2x + 6$
    (B) $-8 = 2x + 6$
    (C) $-3 = 5x + 6$
    (D) $-1 = 5x + 6$

29. Which represents the type of relationship between the diagram number and the number of small equilateral triangles in each figure.

    (A) linear
   (B) parabolic
    (C) exponential
    (D) other

    1   2   3

30. This table provides three data points from a linear data set. Where would the line containing this data cross the y-axis?

 | x | $\cdots$ 6 $\cdots$ | 8 | $\cdots$ 10 $\cdots$ |
    |---|---|---|---|
    | y | $\cdots$ 9 $\cdots$ | 13 | $\cdots$ 17 $\cdots$ |

    (A) -3
    (B) -1
    (C) 0
    (D) 11

31. The diagram below shows a path up, over and down a pattern of towers made with identical cubes measuring 1 unit by 1 unit by 1 unit. For the tower in this pattern that would be made with 25 cubes, how many units is the total path up over and down the tower?

(A)   15
(B)   16
(C)   19
(D)   23
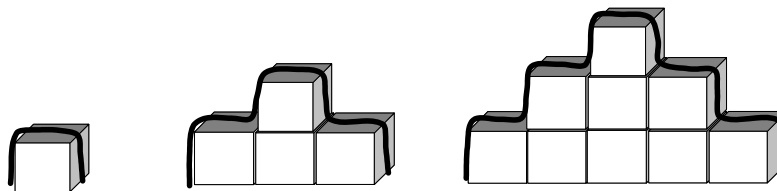
32. A ball is dropped from a 1 metre height. The maximum height of the ball during successive bounces is shown on the graph and is an exponential relationship. Which value best predicts the maximum height the ball will reach in centimetres on the 4th bounce?

(A)   17
(B)   24
(C)   28
(D)   34
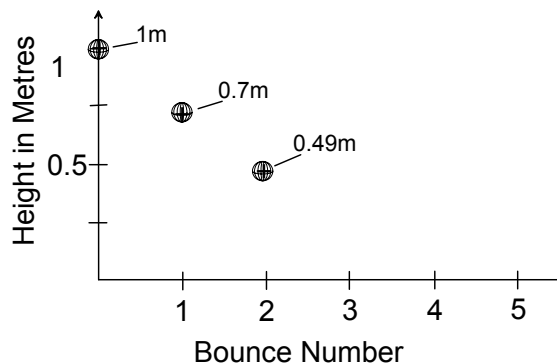
33. Josie noticed a rainwater barrel read 18 L at 2:00pm. At 3:00pm it read 14 L and was leaking water at a constant rate. Josie got back at 3:30pm with a 5 L bucket to catch the water until she could fix the leak. There was 12 L left in the barrel then. How long, in minutes, will Josie have to fix the leak if she works until her bucket fills up?

(A)   30
(B)   60
(C)   75
(D)   125

34. A rectangular prism has volume $24x^3$ cubic units. A rectangular pyramid has the same length, width and height as the prism. What is the volume of the rectangular pyramid in cubic units?

    (A) $8x^3$
    (B) $24x^3$
    (C) $3x$
    (D) $8x$

35. A spherical water tank has a radius of 7 metres. Approximately how many litres of paint would be required to paint this tank if each litre covers 12 square metres?

    (A) 13
    (B) 52
    (C) 90
    (D) 120

36. Gravel is being dumped to the ground from a raised conveyor belt at a rate of 3.5 m^3 per hour. The cone-shaped pile formed was later measured to have a radius of 4 m and a height of 250 cm. Approximately how many hours was the conveyor belt running?

    (A) 12.0
    (B) 35.9
    (C) 76.6
    (D) 1196.8

37. Which is the correct congruence relation for the triangles shown?

(A) $\triangle ABC \cong \triangle DEF$
(B) $\triangle ABC \cong \triangle DFE$
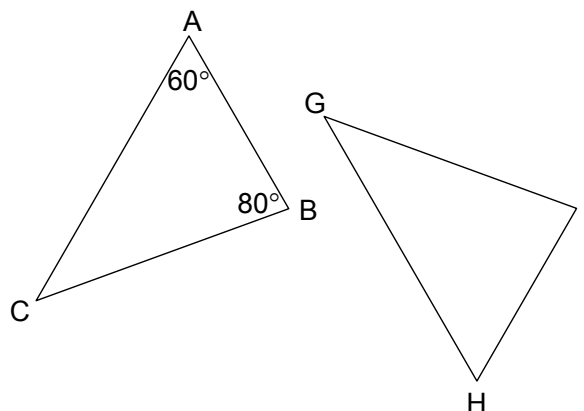(C) $\triangle ABC \cong \triangle FED$
(D) $\triangle ABC \cong \triangle FDE$
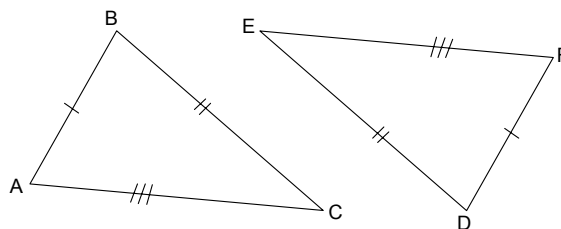
38. Which statement is **TRUE**?

(A) If two triangles are congruent, they are never similar.
(B) If two triangles are congruent, they are always similar.
(C) If two triangles are similar, they are never congruent.
(D) If two triangles are similar, they are always congruent.

39. Given $\triangle ABC \cong \triangle HIG$, what is the measure of $\angle G$ in degrees?
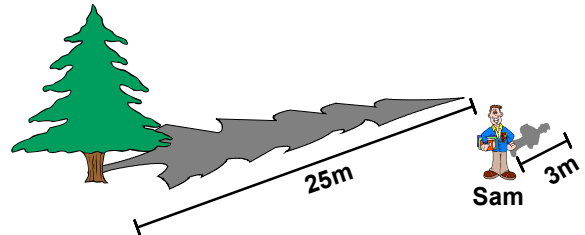
(A) 40

(B) 50

(C) 60

(D) 140

40. Sam, who is 1.7 m tall, casts a shadow of 3 m. Calculate the approximate height of a tree in metres if the tree casts a shadow of 25 m at the same time of day.
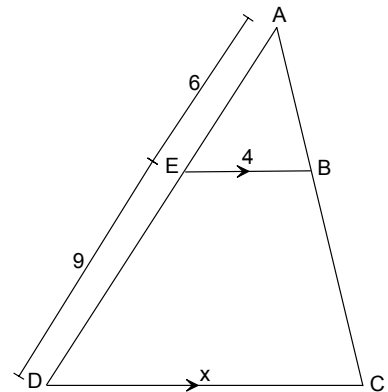
    (A)   0.2
    (B)   4.9
    (C)   14.2
    (D)   15.9

41. Using the diagram, determine the value of *x*.

    (A)   2.4
    (B)   6
    (C)   7
    (D)   10

42. For which transformation is the image **NOT** congruent to the pre-image?

    (A)   dilatation
    (B)   reflection
    (C)   rotation
    (D)   translation

43. Which of the transformations given would result in a 90° CCW rotation about the origin?

    (A) $(x, y) \rightarrow (-x, y)$
    (B) $(x, y) \rightarrow (-y, x)$
    (C) $(x, y) \rightarrow (-x, -y)$
    (D) $(x, y) \rightarrow (-y, -x)$

44. The reflection $(x, y) \rightarrow (x, -y)$ is applied to a figure and is followed by the translation $(x, y) \rightarrow (x - 3, y + 2)$. Which mapping rule describes the two transformations combined?

    (A) $(x, y) \rightarrow (y - 3, -x + 2)$
    (B) $(x, y) \rightarrow (y + 2, -x - 3)$
    (C) $(x, y) \rightarrow (x - 3, -y + 2)$
    (D) $(x, y) \rightarrow (x - 3, -y - 2)$

45. Which mapping rule will produce $\triangle A'B'C'$ from $\triangle ABC$?
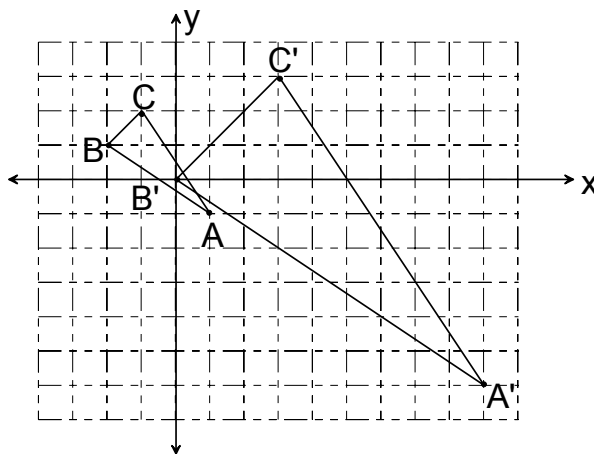
    (A) $(x, y) \rightarrow (-x + 3, y + 1)$
    (B) $(x, y) \rightarrow (3x + 6, 3y - 3)$
    (C) $(x, y) \rightarrow (x + 2, y - 1)$
    (D) $(x, y) \rightarrow (3x, 3y)$

46. Twenty car drivers were surveyed about oil changes and repair costs for their cars. Which statement is supported by the scatterplot shown?

# of Oil Changes Per Year
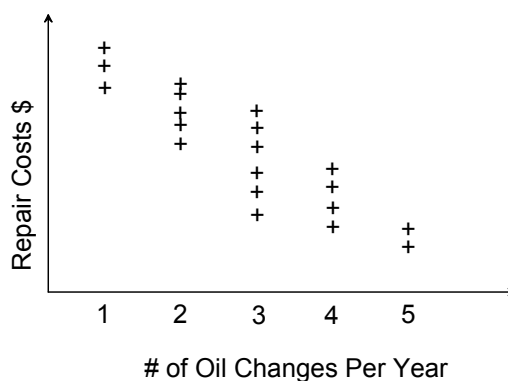
(A)   Older cars use more oil.
(B)   Frequent oil changes result in lower repair costs.
(C)   Oil changes are getting cheaper.
(D)   More oil changes causes repair costs to increase.

47. Which equation best represents the line of best fit that would apply to this scatterplot relating $°C$ (for degrees Celsius), and h (for hours)?
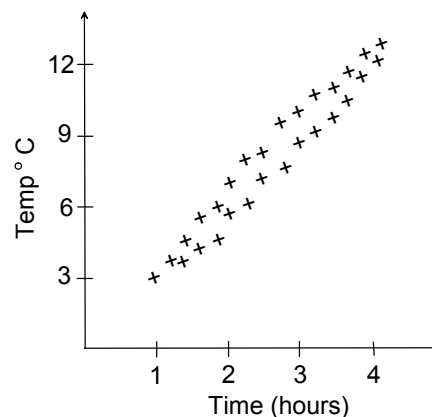
(A) $°C = h + 3$
(B) $°C = 3h$
(C) $°C = h - 3$
(D) $°C = -3h$

Time (hours)

48. The relationship between amount of rain and atmospheric pressure has a strong negative correlation. Which statement is true?

(A) Higher atmospheric pressure means more rain.
(B) More rain happens when atmospheric pressure is lower.
(C) Lower atmospheric pressure means less rain.
(D) Less rain happens when atmospheric pressure is lower.

49. In which situation will the experimental probability most closely match the theoretical probability of flipping heads half the time on a fair coin? Flipping the coin…

(A) 10 times.
(B) 100 times.
(C) 1000 times.
(D) 10 000 times.

50. The word 'PROBABILITY' is spelled out with one letter on each card from the 11 card deck shown. If the first card is replaced, what is the probability of picking two B cards in a row from that deck?

(A) $\frac{1}{121}$
(B) $\frac{2}{121}$
(C) $\frac{4}{121}$
(D) $\frac{2}{11}$

End of the Assessment