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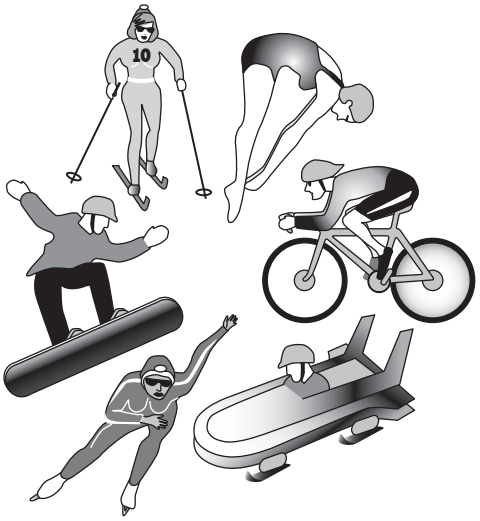
MathLinks 9 Option 1
Final Exam Multiple Choice and Numerical Response

Record your answers on the answer sheet provided.

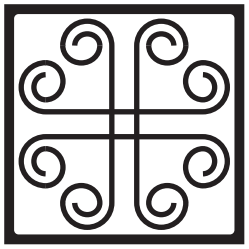
Sports Events

Sports events, such as the Olympic Summer and Winter Games, make use of mathematics. Apply your knowledge and skills of mathematics to solve problems related to sports events.



Use this information to answer #1–3.

The Olympic Village houses athletes, as well as officials and trainers. A railing at the Olympic Village had this design.



1. What is the order of rotation of the design?

A 1 **B** 2 **C** 3 **D** 4

2. What is the angle of rotation of the design?

A 45° **B** 90° **C** 180° **D** 360°

Numerical Response

3. How many lines of symmetry does the design have?

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Use this information to answer #4.

Juan will win a free ticket to a sporting event if he answers this skill-testing question correctly.

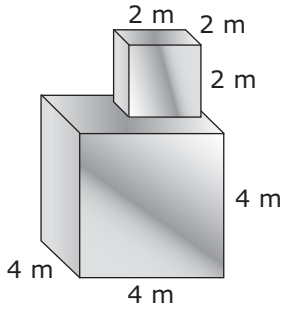
$(10 - 4)^3 \div 9 \times 3 \div 6 + 10$

4. What is the answer to the skill-testing question?

A 13 **B** 14 **C** 22 **D** 24

Use this diagram to answer #5.

The diagram shows a metal sculpture in the Olympic Village.



5. How much paint is needed to cover the exposed surface area of the sculpture?

A 120 m^2 **B** 100 m^2 **C** 96 m^2 **D** 80 m^2

6. A food services company at the Olympic Games wants to know if their employees prefer working four 10-h shifts or five 8-h shifts. They plan to survey the first hundred employees who enter the workplace. These employees represent a

A population **B** proportion **C** ratio **D** sample

Use this information to answer #7–8.

Terri attended the Olympic Games. During her four-night stay, her share of the hotel was $79 per night. She spent $350 for food and the flight cost $612. She was repaid $20 in shared taxi costs. Before paying for these expenses, the balance in Terri's account is $1542.12.

7. Which expression represents the transactions?

A $(4 \times -79) - 350 - 612 + 20$ **B** $(4 \times 79) - (350 - 612) + 20$

C $4 \times (79 - 350 - 612) + 20$ **D** $4 \times 79 - 350 - 612 + 20$

Numerical Response

8. Determine Terri's new bank balance, to the nearest dollar.

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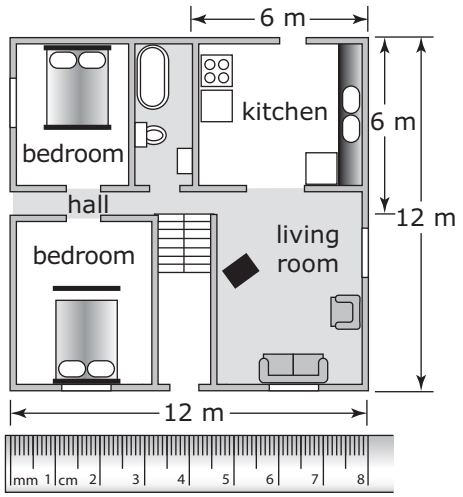
Use this diagram to answer #9.

The diagram shows the floor plan of a cabin for officials at a sports event.



9. What is the most appropriate scale for the drawing?

A 1 cm = 0.5 m **B** 1 mm = 1 m **C** 1 cm = 1.5 m **D** 1 mm = 2 m

Use this information to answer #10–11.

A plane begins its descent to an airport. The table shows the altitude of the plane after each minute.

Time (min)	Altitude (m)
0	12 000
1	11 600
2	11 200
3	10 800

10. An expression for the altitude of the plane after t minutes is

A $a = -12\,000t + 400$ **B** $a = 12\,000 + 400t$

C $a = 12\,000 - 400$ **D** $a = 12\,000 - 400t$

Numerical Response

11. What is the plane's altitude after 28 min?

Numerical Response

12. Dale estimates that he spends 20¢ in fuel to warm up his car and 8¢ per kilometre to drive it. He travels 692 km to watch a hockey game. What did Dale spend on fuel, to the nearest dollar?

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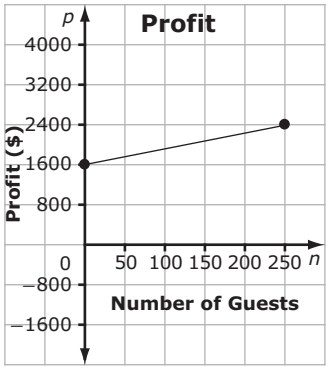
Use this information to answer #13.

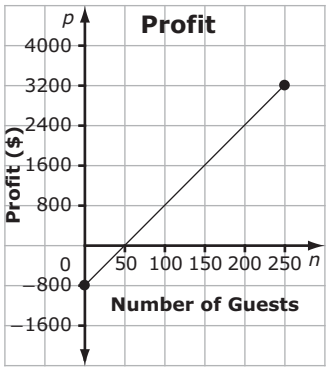
The organizers of a sports event plan to offer a dinner in the arena. The rental cost of the arena is $800. The food has been donated by local sponsors. The organizers plan to charge $16 per person for dinner.

13. Which graph best represents the profit?

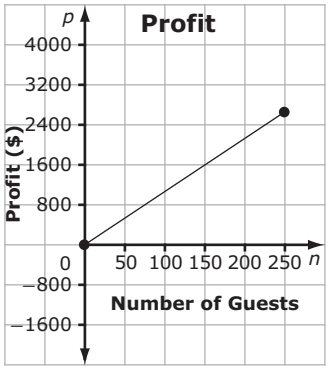
A



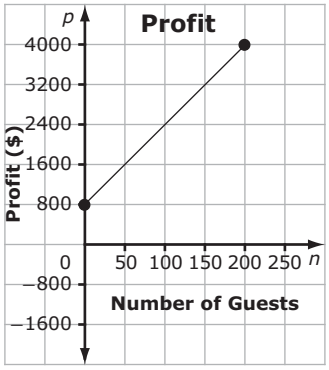
B



C

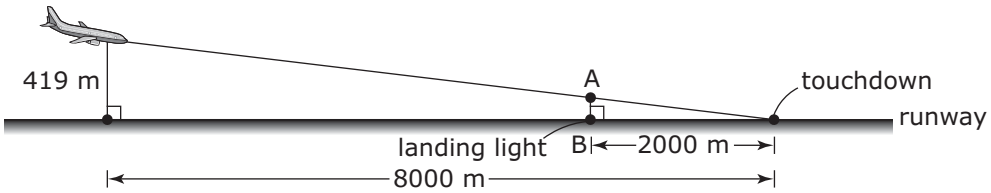


D



Use this information to answer #14.

A plane carrying several sports teams approaches the runway for a landing.



14. When the plane flies over the landing light located at point B, what is the vertical height of AB? Express the answer to the nearest metre.

A 101 m **B** 105 m **C** 119 m **D** 127 m

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Use this information to answer #15–17.

A runner gets a 4-m head start and then maintains a constant pace of 3 m/s.

15. The table of values that represents the distance travelled after 5 s is

A

Time, *t*	1	2	3	4	5
Distance, *d*	5	10	15	20	25

B

Time, *t*	1	2	3	4	5
Distance, *d*	7	10	13	16	19

C

Time, *t*	1	2	3	4	5
Distance, *d*	8	16	24	32	40

D

Time, *t*	1	2	3	4	5
Distance, *d*	8	16	32	64	128

16. If the coach decided to determine the runner's distance at 10 s, she could use

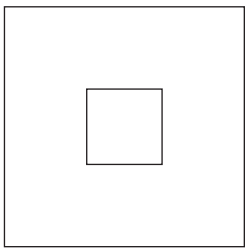
A estimation **B** extrapolation **C** interpolation **D** interpretation

17. In the equation that represents the distance, d, at any time, t, the value 3 in 3 m/s is the

A constant **B** linear equation **C** numerical coefficient **D** variable

Use this information to answer #18.

A model of an arena set up for an awards ceremony consists of two squares. The audience will be seated in the large square, which has an area of 324 cm^2. The square stage located in the middle of the audience has an area of 16 cm^2.



18. In the model, how far is the edge of the stage from the extreme edge of the audience area?

A 4 cm **B** 7 cm **C** 14 cm **D** 18 cm

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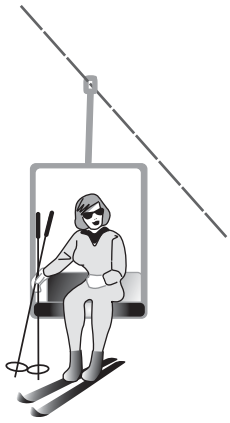
Use this information to answer #19.

The chairs on a ski chairlift are carried by a cable loop that is strung between two end terminals. The cable adjusts for the load on the chairs. The amount that a cable extends (e) depends on the load (k) that it supports.

Load, k, (kg)	0	1.2	2.0	3.2	4.8
Extension, e, (cm)	0	0.9	1.5	2.4	3.6



19. Which equation shows the relationship between extension and load?

A $e = \frac{4}{3}k$ **B** $e = k - 1.2$ **C** $e = k - 0.3$ **D** $e = \frac{3}{4}k$

Use this information to answer #20–21.

To calculate the number of hits a baseball player needs to get in order to attain a certain batting average, statisticians use $n = [a \times (b + c)] - h$. In the equation,
n = the number of hits needed to get a certain batting average
a = the desired batting average
b = the present number of times at bat
c = the number of times at bat to come
h = present number of hits

20. Maylin has 30 hits in a total of 70 times at bat. She still has 38 times to bat. Assuming she makes 19 more hits, what is Maylin's batting average, to the nearest thousandth?

$19 = [a(70 + 38)] - 30$

A 0.505 **B** 0.454 **C** 0.246 **D** 0.157

Numerical Response

21. If all the values in #20 remained the same, except that Maylin's batting average was 0.5, how many hits would she need?

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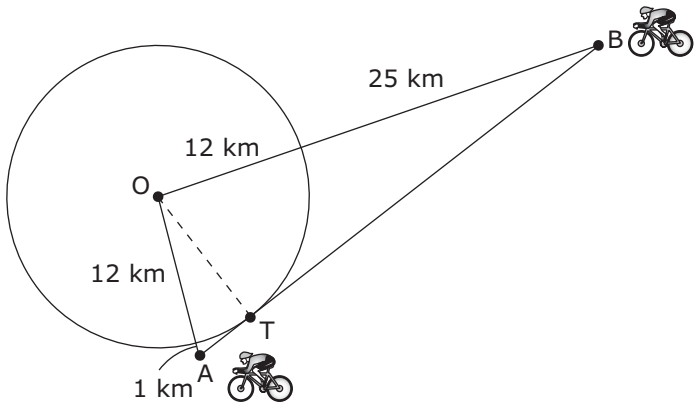
Use this information to answer #22.

Two cyclists leave the centre of a circular area and ride along separate straight paths.



22. If AB joins the cyclists and is tangent to the circle, how far apart are the cyclists?

A 50 km **B** 40 km **C** 37 km **D** 35 km

Use this information to answer #23–25.

A Vancouver radio station took a poll at 11:00 p.m. about attendance at the Olympic Games. The poll asked people to call in their response to the following question: "How many outdoor events did you attend at the Olympics this week?"

After tallying and averaging the responses, the radio announcer reported, "Most Canadians do not attend the Olympics!"

23. Which survey question would collect more accurate data about attendance at Olympic Games events?

A How many events did you attend at the Olympic Games this week?

B What is your favorite outdoor event?

C How much time did you spend at events during the Olympic Games?

D What mode of transportation did you use to get to the Olympic Games?

24. A possible influencing factor in the poll conducted by the radio station is

A cost **B** cultural sensitivity **C** ethics **D** timing

25. What type of sample did the radio station use?

A convenience sample **B** random sample

C stratified sample **D** voluntary response sample

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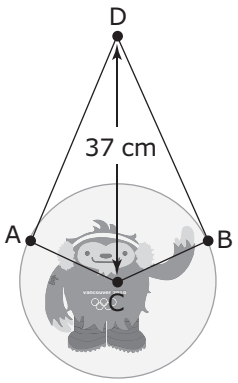
Use this information to answer #26.

A souvenir stand at the Olympics has glass plates for sale. A chain is attached at points A and B such that the segments AD and BD are tangent to the circle.



26. If the diameter of the plate is 24 cm, what is the total length of chain needed to hang the plate on a nail at point D? The chain connects to the plate at points A and B.

A 70 cm **B** 50 cm **C** 35 cm **D** 25 cm

Use this information to answer #27–28.

A shop selling souvenir water bottles at a sports event has four colours available: red, blue, green, and yellow.

27. The bottles are displayed in a large bin with the same number of bottles of each colour. What is the theoretical probability that the first shopper randomly picks a green water bottle from the bin?

A 25% **B** 50% **C** 75% **D** 100%

28. After one day of sales, the owner determined that 42% of shoppers purchased red water bottles. If 3200 people visited the shop, how many people bought a red water bottle?

A 1856 **B** 1344 **C** 420 **D** 42

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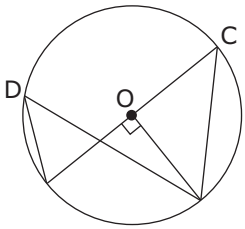
Connections

Many concepts and skills that you learn in mathematics can be applied to new situations. Connect the concepts and skills you have learned in *MathLinks 9* to solve problems.

Use this information to answer #29.

Point O is the centre of the circle.



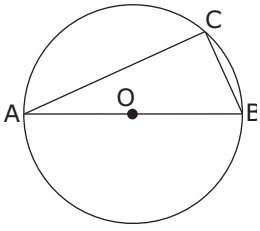
29. What are the measures of ∠C and ∠D?

A ∠C = 50° and ∠D = 45° **B** ∠C = 45° and ∠D = 50°

C ∠C = 45° and ∠D = 45° **D** ∠C = 50° and ∠D = 50°

Use this information to answer #30.

Point O is the centre of the circle. AB is the diameter.



30. What is the measure of ∠C?

A 70° **B** 80° **C** 90° **D** 110°

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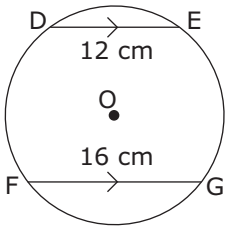
Use this information to answer #31.

Chord DE is parallel to chord FG. The diameter of the circle is 20 cm long.

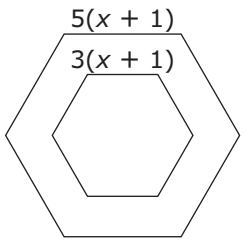


31. What is the shortest distance between DE and FG?

A 4 cm **B** 8 cm **C** 10 cm **D** 14 cm

Use this diagram to answer #32–33.

The two hexagons are regular.



32. Which expression represents the difference in the perimeter between the two hexagons?

A $6(x + 1) - 6(3x + 1)$ **B** $(30x - 18x) - (30 - 18)$

C $(30x + 6) - (18x + 6)$ **D** $(30x + 30) - (18x + 18)$

Numerical Response

33. The ratio of the small hexagon to the large hexagon is 3 : 5. To the nearest tenth of a unit, what scale factor was used to reduce the large hexagon?

Use this information to answer #34.

Rose solved the expression $(4 + 5)^2(4 - 6)^3$. Her work was as follows:

$(4 + 5)^2(4 - 6)^3$

$= (4^2 + 5^2)(-2)^3$ Step 1

$= (9 + 25)(-2)^3$ Step 2

$= (34)(-8)$ Step 3

$= -272$ Step 4

34. Rose made her first mistake in

A Step 1 **B** Step 2 **C** Step 3 **D** Step 4

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35. In the expression $2x^3$, the 2 is the

A base **B** coefficient **C** exponent **D** power

36. When simplified, the expression $\left(\frac{x}{y^9}\right)^3$ is

A $\frac{x^3}{y^{12}}$ **B** $\frac{x^4}{y^{12}}$ **C** $\frac{x}{y^{27}}$ **D** $\frac{x^3}{y^{27}}$

37. Which value falls between $\frac{1}{2}$ and 1?

A $\sqrt{\frac{1}{49}}$ **B** $\sqrt{\frac{9}{16}}$ **C** $\sqrt{\frac{9}{4}}$ **D** $\sqrt{\frac{81}{25}}$

Use this information to answer #38.

Compare the following rational numbers.

$\frac{2}{5}$ -0.777 0.25 $-\frac{5}{8}$

1 **2** **3** **4**

Numerical Response

38. Using the numerals 1, 2, 3, and 4, list the rational numbers in ascending order.

39. Which expression is equivalent to $\frac{(n \times n \times n \times n \times n) \times (n \times n \times n)}{n \times n \times n}$?

A $\frac{n^{15}}{n^3}$ **B** $\frac{n^8}{n^3}$ **C** n^6 **D** n^3

40. In the expression "three squared," what is the base?

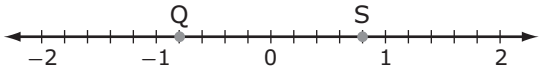
A 2 **B** 3 **C** 6 **D** 9

41. If $2304 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3$, which expression is equal to $\sqrt{2304}$?

A $2 \times 2 \times 3$ **B** $2^4 \times 3$ **C** $3 \times 3 \times 2 \times 2 \times 2 \times 2$ **D** $2^8 \times 3^2$

Use this diagram to answer #42.

The number line shows points Q and S.



42. Which rational number correctly matches each point?

A Q = −1.2 and S = 0.8 **B** Q = −1.2 and S = 1.2

C Q = −0.8 and S = 0.8 **D** Q = −0.4 and S = 0.4

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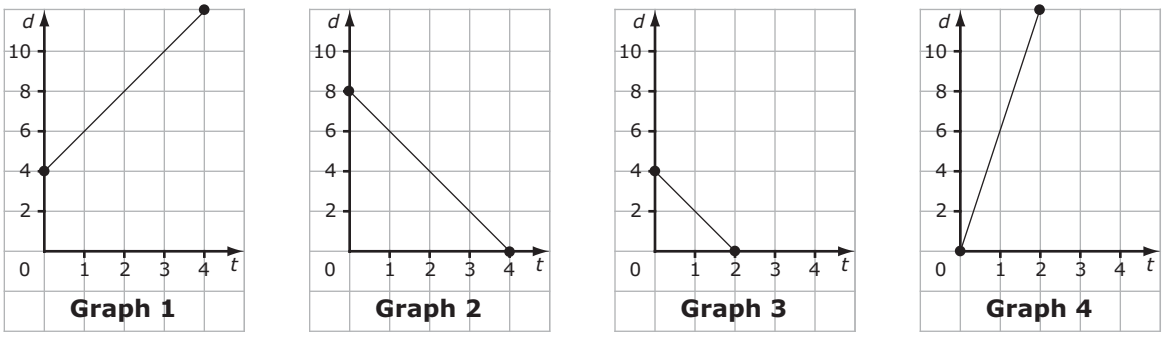
Use this diagram to answer #43.

Each graph shows a linear relation between distance and time.



Numerical Response

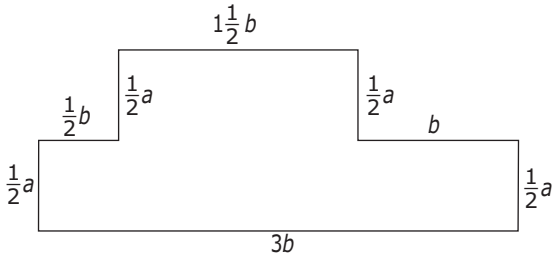
43. Choose the graph number that matches each linear equation shown below. Write the graph numbers in the same order as the equations.

$d = 2t + 4$
$d = 6t$
$d = 8 - 2t$
$d = -2t + 4$

44. The solution to $5 + \frac{1}{3}r \leq 2 + \frac{2}{3}r$ is

A $r \geq 9$ **B** $r \leq 9$ **C** $r \geq -3$ **D** $r \leq -3$

Use this figure to answer #45.



45. What is the expression for the perimeter of the figure?

A $7a$ units **B** $7b$ units **C** $2a + 5b$ units **D** $2a + 6b$ units

46. Which expression is equivalent to $\frac{6x^2 + 8x - 4}{2}$?

A $5x^2$ **B** $7x - 2$ **C** $3x^2 + 4x - 2$ **D** $3x^2 + 8x - 4$

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47. Which table of values could represent $y = 3x + 3$?

A

x	y
1	6
2	
3	
4	
5	18
6	21
7	
8	

B

x	y
1	6
2	9
3	
4	
5	11
6	
7	
8	

C

x	y
1	
2	
3	
4	15
5	
6	
7	13
8	14

D

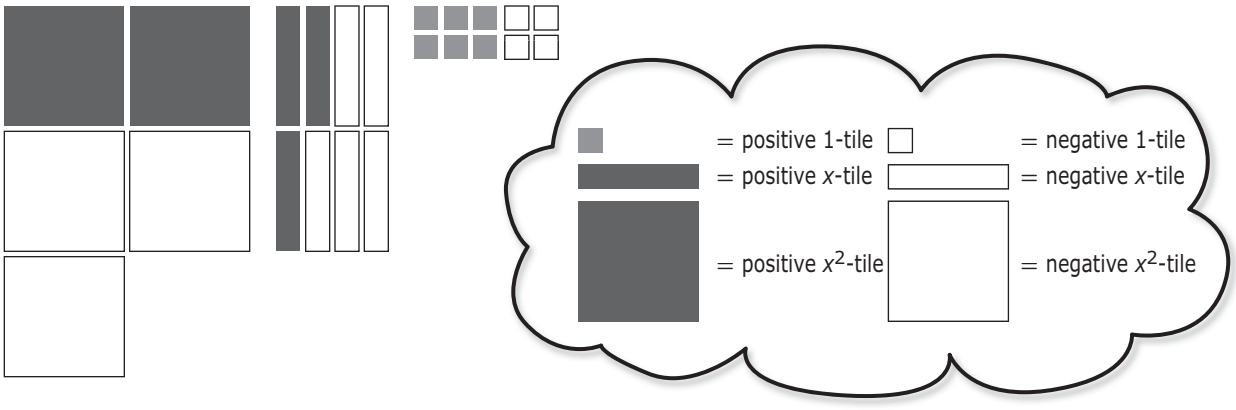
x	y
1	
2	
3	36
4	37
5	
6	
7	40
8	

48. The simplified form of $-3(p + 6) + 2(2p - 5)$ is

A $p - 28$ **B** $p - 18$ **C** $p + 1$ **D** $p + 8$

Use this information to answer #49.

Rick used algebra tiles to model an expression.



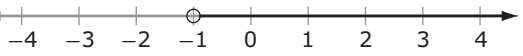
49. Which algebraic expression do the algebra tiles represent?

A $x^2 + 2x - 2$ **B** $x^2 - 2x + 2$ **C** $-x^2 + 2x - 2$ **D** $-x^2 - 2x + 2$

Name: _____ Date: _____

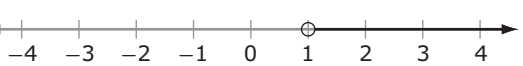
50. Which number line expresses the solution to $-3x + 2 < 5$?

A

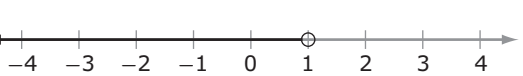


B

C



D



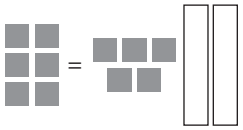
51. Which polynomial does *not* have a degree of 2?

A $p(p + 5)$ **B** $2 + 4x^2 + 6x$ **C** $xy + 3$ **D** $2x - 1$

52. What is the constant term in $6y^2 - 3 - 4y$?

A 6 **B** 2 **C** -3 **D** -4

Use these algebra tiles to answer #53.

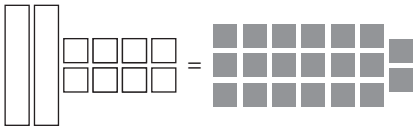


Shaded tiles are positive and white tiles are negative.

53. Which equation is represented by the algebra tiles?

A $6x = 5x - 2$ **B** $6 = 5 - 2x$ **C** $11x = -2$ **D** $-x = 11$

Use these algebra tiles to answer #54.



Shaded tiles are positive and white tiles are negative.

54. What is the last step in solving the equation represented by the algebra tiles?

A Multiply both sides by -2.
B Divide both sides by -2.
C Add 8 to both sides.
D Subtract 8 from both sides.

55. Which equation does *not* have $x = 3$ as a solution?

A $7x - 5 \leq -2x + 22$
B $2x + 1 = x + 4$
C $2x - 21 = 9x$
D $\frac{x + 7}{2} = 5$

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Numerical Response

56. What is the value of a in $\frac{a}{2} + \frac{a}{3} = 2$, to the nearest tenth?

57. Which equation has the largest value for x in the solution?

A $\frac{4}{5}x = 12$

B $\frac{x+1}{3} = 7$

C $2(2x - 5) = 5(2 - 6)$

D $3(2x - 5) = 2(x + 3)$

58. If n is a negative integer, the value of $-\frac{3}{4} \div n$ is a

A positive value greater than n

B positive value less than n

C negative value greater than n

D negative value less than n

59. Which type of sample gives every individual an equal chance of being chosen to participate in a survey?

A clustered sample

B convenience sample

C population sample

D random sample

Numerical Response

60. What is the value of $\left(\frac{3}{2}\right)^2$, to the nearest hundredth?