Name: _____   Date: _____

MathLinks 9 Adapted
Final Exam Multiple Choice and Numerical Response

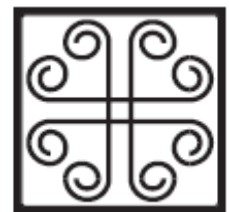*Record your answers on the answer sheet provided.*

Sports Events
Sports events 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 is where officials and trainers stay
during the Olympic Games.
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?
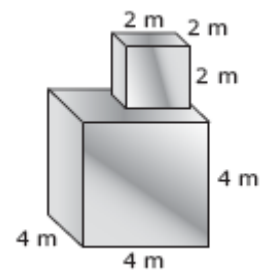
Name: _____   Date: _____

Juan will win a free ticket to a sporting event if he answers this skill-testing question correctly. $(10 - 8)^2 \times 3 + 10$

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

A 16   **B** 22
C 52   **D** 118

The diagram shows a metal sculpture in the Olympic Village.

2 m 2 m
2 m
4 m
4 m
4 m

5. How much paint is needed to cover the surface area of the sculpture? The bottom will not be painted.

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

6. A company selling food 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 100 employees who enter the workplace.
These employees represent a

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

Name: _____   Date: _____

Use this information to answer #7–#8.

Terri attended the Olympic Games. She stayed for 4 nights.
The hotel cost her $79 per night.
She spent $350 for food and the flight cost her $612.

7. Which expression shows the amount she spent in total?

A $-79 \times 4 - 350 - 612$ **B** $(4 \times 79) - (350 - 612)$
C $4 \times (79 - 350 - 612)$ **D** $4 \times 79 - 350 - 612$

Ask yourself, "Is *spent* a negative or a positive word?"

Numerical Response

8. Before paying for these expenses, the balance in Terri's account is $1542. Find Terri's new bank balance.

Use this information to answer #9–#10.

A plane begins to descend to an airport.
The table shows the altitude after each minute.

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

9. 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

10. What is the plane's altitude after 10 min?

Numerical Response

11. 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?

Name: _____ Date: _____

Use this information to answer #12–#13.

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

12. Which table of values that represents the distance travelled after 5 s?

A

Time, t	0	1	2	3	4	5
Distance, d	0	5	10	15	20	25

B

Time, t	0	1	2	3	4	5
Distance, d	4	7	10	13	16	19

C

Time, t	0	1	2	3	4	5
Distance, d	0	8	16	24	32	40

D

Time, t	0	1	2	3	4	5
Distance, d	0	8	16	32	64	128

13. In the equation, $d =$ _____ $t +$ _____, d represents distance and
t represents time. The value 3 in 3 m/s is the

A constant **B** variable, d
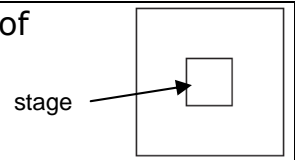**C** numerical coefficient for t **D** variable, t

Name: _____   Date: _____

Use this information to answer #14–#16.

A model of an arena set up for an awards ceremony is made of
2 squares. The audience will be seated in the large square,
which has an area of 324 cm^2.   stage
The small square is the stage. It has an area of 16 cm^2.

Numerical Response

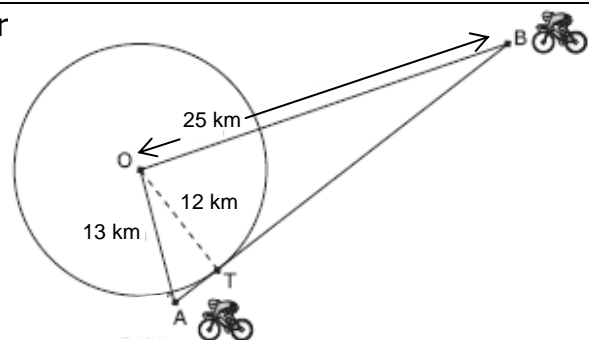**14.** What is the length of each side of the stage?

Numerical Response

15. What is the length of the large square?

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

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

Use this information to answer #17–#19.

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

25 km

O

12 km

13 km

T

A

B

Numerical Response

17. AB is tangent to the circle. What is the distance AT?   ΔAOT is a right triangle.
                                                                    $c^2 = a^2 + b^2$

Numerical Response   ΔOTB is a right triangle.
                                      OB = 12 + _____
18. What is the distance, TB?   = _____

19. If AB joins the cyclists, how far apart are the cyclists?

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

Use this information to answer #20–#22.

A Vancouver radio station took a survey at 11 p.m. about attendance at the Olympic Games. They asked people to call in their response to this question: "How many outdoor events did you attend at the Olympics this week?" After collecting and averaging the responses, the radio announcer reported, "Most Canadians do not attend the Olympics!"

20. 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 favourite 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?

21. A possible influencing factor in the survey conducted by the radio station is

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

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

    A convenience sample   **B** random sample
    C stratified sample   **D** voluntary response sample

Use this information to answer #23–#24.

A shop selling souvenir water bottles has 4 colours available:
red, blue, green, and yellow.

23. 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%

24. After 1 day, 42% of shoppers bought red water bottles. If 3200 people visited the shop, how many people bought a red water bottle?

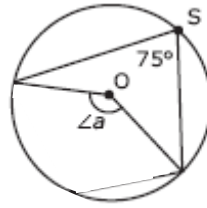   **A** 1856   **B** 1344
    C 420   **D** 42

Use this information for #25.
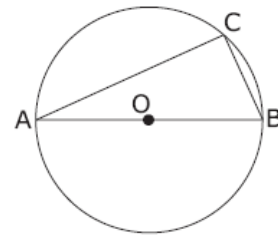
Point O is the centre of the circle.

Numerical Response

25. What is the measure of ∠a?

Use this information to answer #26.

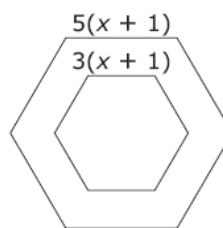Point O is the centre of the circle. AB is the diameter.

26. What is the measure of ∠C?

A 70°   **B** 80°
C 90°   **D** 110°

Use this diagram to answer #27.

The two hexagons are regular. $5(x + 1)$
                                    $3(x + 1)$

27. 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** $(30x + 30) - (18x + 18)$

Use this information to answer #28.

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

28. Rose made her first mistake in

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

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

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

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

    A $\dfrac{x^3}{y^{12}}$ **B** $\dfrac{x^4}{y^{12}}$

    C $\dfrac{x}{y^{27}}$ **D** $\dfrac{x^3}{y^{27}}$

31. Which value falls between $\dfrac{1}{2}$ and 1?
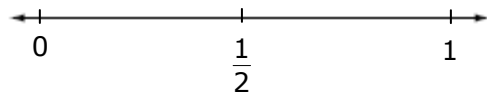
    A $\sqrt{\dfrac{1}{49}}$ **B** $\sqrt{\dfrac{9}{16}}$

    C $\sqrt{\dfrac{9}{4}}$ **D** $\sqrt{\dfrac{81}{25}}$

Numerical Response

32. List the rational numbers in ascending order. Use the numerals 1, 2, 3, 4 on the answer sheet.

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

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

33. Which expression is equivalent to $\dfrac{(n \times n \times n \times n \times n) \times (n \times n \times n)}{n \times n \times n}$?
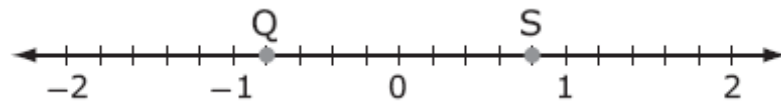
A $\dfrac{n^{15}}{n^3}$ **B** $\dfrac{n^8}{n^3}$

C n^6 **D** n^3

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

A 2   **B** 3

C 6   **D** 9

Use this diagram to answer #35.

The number line shows points Q and S.

35. Which rational number correctly matches each point?

A Q = −1.2 and S = 0.8   **B** Q = −1.2 and S = 1.2
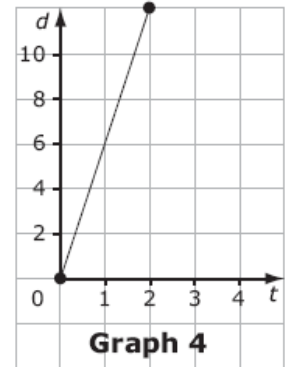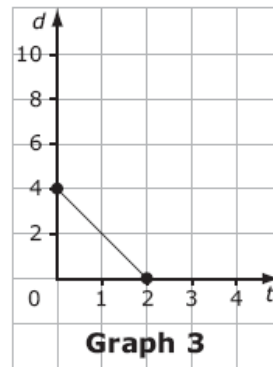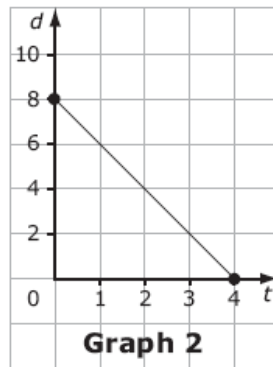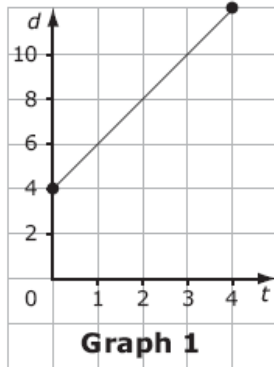**C** Q = −0.8 and S = 0.8   **D** Q = −0.4 and S = 0.4

Name: _____   Date: _____

Use the graphs to answer #36.

Each graph shows a linear relation between distance and time.

Graph 1   Graph 2   Graph 3   Graph 4

36. Choose the graph number that matches the linear equation $d = 6t$.

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

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

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

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

Solve for *x*.

A

x	y
1	6
2	9
3	12
4	15
5	18

B

x	y
1	6
2	9
3	9
4	10
5	11

C

x	y
1	20
2	18
3	17
4	15
5	16

D

x	y
1	34
2	35
3	36
4	37
5	38

39. 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 #40.

Shannon used algebra tiles
to model an expression.

= positive x^2-tile

= positive x-tile

= negative x-tile

= positive 1-tile

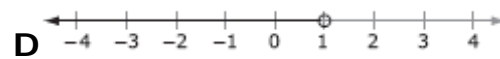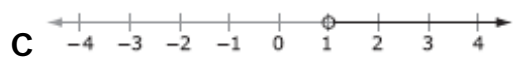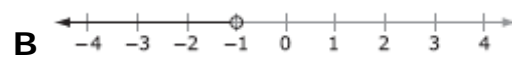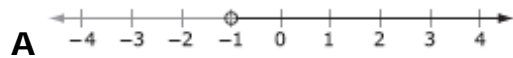**40.** Which algebraic expression do the algebra tiles represent?

A $x^2 + 8x + 12$ **B** $x^2 + 6x + 12$
C $x^2 - 4x + 12$ **D** $x^2 - 6x + 12$

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

A
B

C
D

42. Which polynomial has a degree of 1?

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

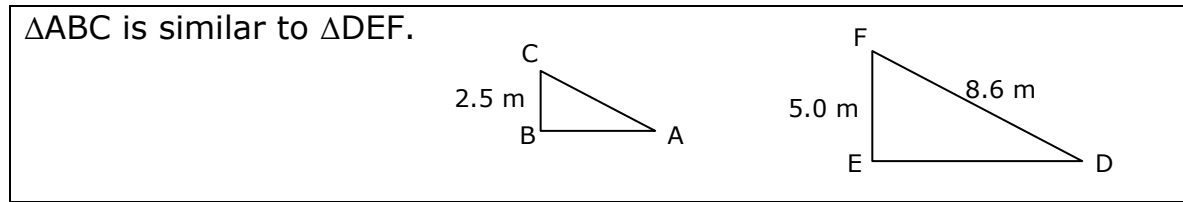**43.** What is the constant term in $6y^2 - 3 - 4y$?

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

Name: _____   Date: _____

Name: _____   Date: _____

Use this diagram to answer #47.

ΔABC is similar to ΔDEF.
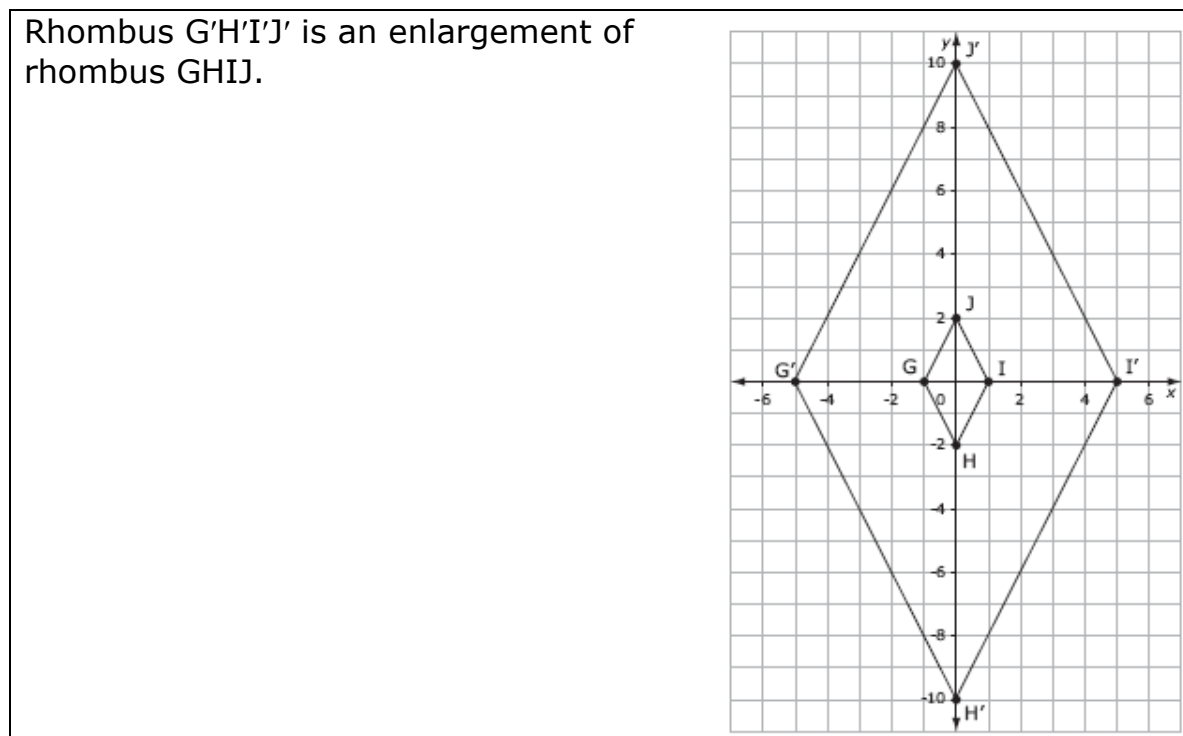
C
2.5 m
B ___ A

F
8.6 m
5.0 m
E ___ D

Numerical Response

47. What is the length of AC to the nearest tenth?

Numerical Response

48. What is the solution to $2(x-3) = 4(x-5)$?

Use this diagram to answer #49.

Rhombus G′H′I′J′ is an enlargement of rhombus GHIJ.

49. What scale factor was used to create the enlargement?

A $\dfrac{1}{4}$ **B** $\dfrac{1}{5}$

C 4   **D** 5
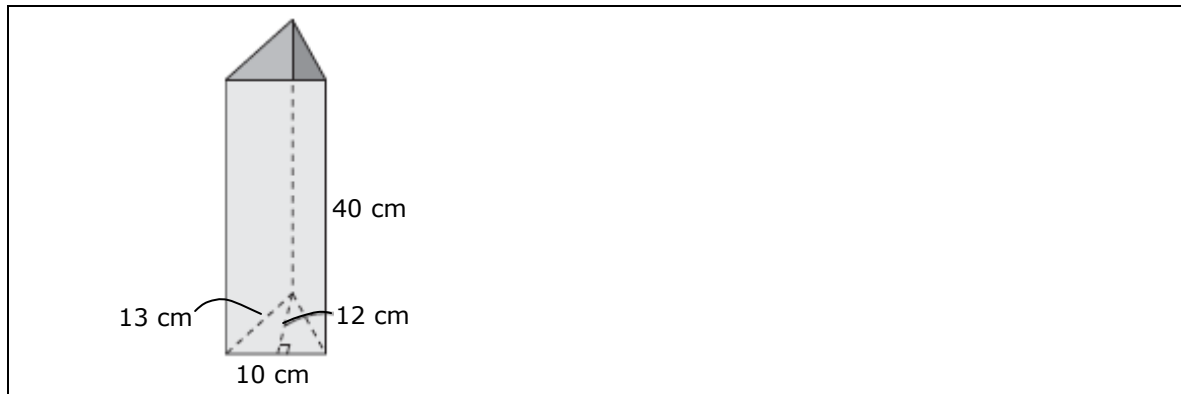
Use this diagram to answer #50.

50. What is the surface area of the right triangular box? There is no lid on the box.

A 460 cm^2 **B** 1040 cm^2
C 1200 cm^2 **D** 1500 cm^2