Grade 9 Mathematics Online Practice Test - 1998

(Adapted from the 1998 Grade 9 Mathematics Achievement Test)

Grade 9 Mathematics Online Practice Test – 1998
(Adapted from the 1998 Grade 9 Mathematics Achievement Test)

This test has two sections:
- one section has 44 multiple-choice questions, each with a value of one mark
- the other section has 6 numerical response questions, each with a value of one mark

The sections may be done in whatever order you choose.

This test is designed to be completed in 90 minutes; however, you may have an additional 30 minutes to complete the test, if you need it.

Instructions
- Read each question carefully.
- You are expected to provide your own scientific calculator.
- Be sure that your calculator is in degree (DEG) mode.
- Manipulatives may be used for this test.
- Try to answer all the questions. If you cannot answer a question, go on to the next one. Click on the "Score Test!" button on the last page to get your score.

Multiple Choice
- Each question has four possible answers from which you are to choose the **correct** or **best** answer.
- Locate the circle next to the letter that corresponds to your choice and click on it with your mouse's left button. The circle will fill in. In order to change your answer, click on a different circle. Try the example below.

Example
This examination is for the subject of
- ⦿ **A.** mathematics
- ◯ **B.** science
- ◯ **C.** language arts
- ◯ **D.** social studies

Numerical Response
- Record your answer in the numerical-response box next to the question.

Example
Evaluate 3^5.
$3^5 = 3 \times 3 \times 3 \times 3 \times 3 = 243$
Answer: 243
Record 243 in the answer box:

$$\boxed{243}$$
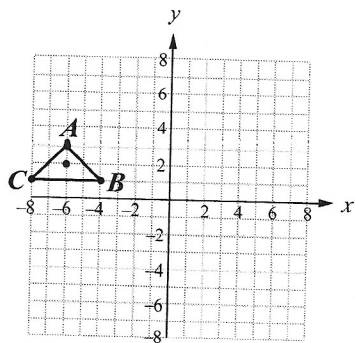
Connections within Mathematics

Use the following information to answer question 1.

A triangular shape is displayed on a computer, as shown below. This triangular shape rotates around the point shown within the triangle.
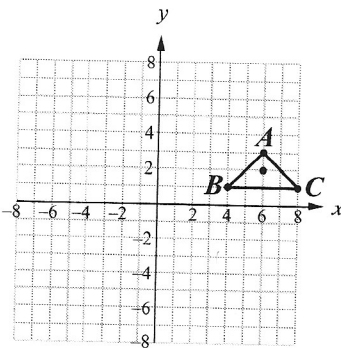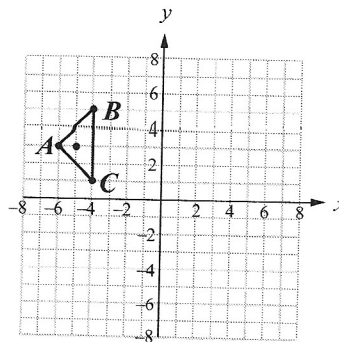

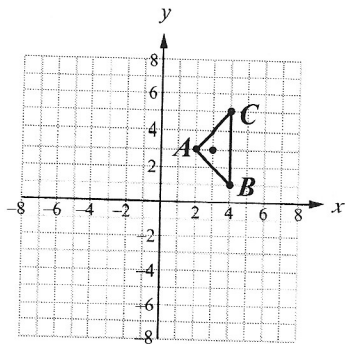1. Which of the following diagrams represents a 180° rotation of the triangular shape shown above?

○ **A.**

○ **B.**

○ **C.**

○ **D.**
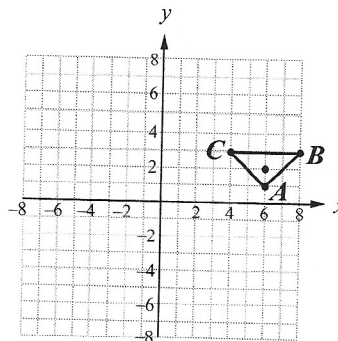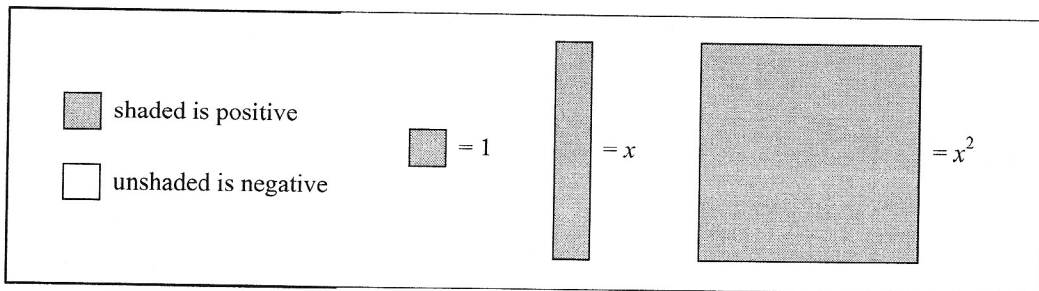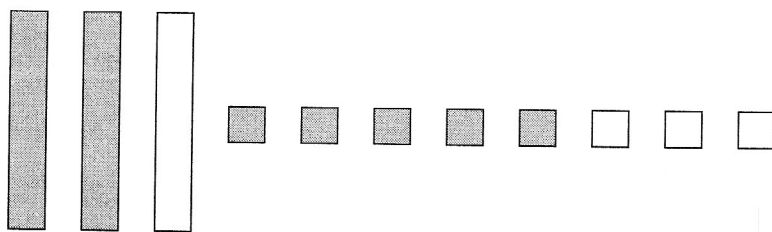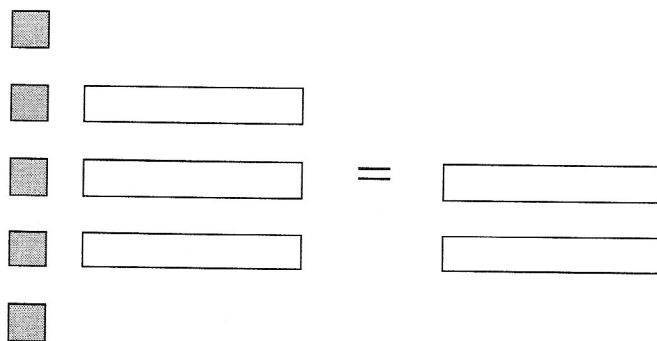
Use the following legend when answering questions 2 to 4.

2. Which expression describes the diagram below?
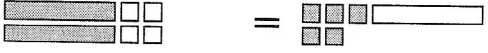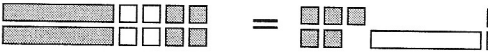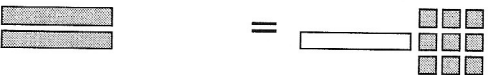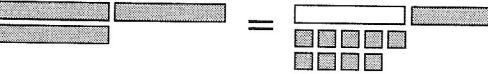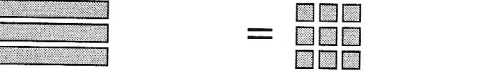
- ○ **A.** $3x + 8$
- ○ **B.** $2x + 5$
- ○ **C.** $x + 3$
- ○ **D.** $x + 2$

3. What equation is represented by the diagram below?

- ○ **A.** $-5 + 3x = 2x$
- ○ **B.** $5 - 3x = -2x$
- ○ **C.** $-5 - 3x = -2x$
- ○ **D.** $5 + 3x = -2x$

2

Use the following additional information to answer question 4.

Angie's and Joe's math teacher asked them to solve the equation $2x - 4 = 5 - x$. Angie used algebra tiles, and Joe used symbols.

Steps	Angie	Joe
1. Add 4 to both sides		$2x - 4 = 5 - x$ $2x - 4 + 4 = 5 - x + 4$
2. Simplify		$2x = 9 - x$
3. Add x to both sides		$2x + -x = 9 - x + -x$
4. Simplify		$x = 9$
5. Sharing Principle		

4. A mistake was made by

○ **A.** Joe in step 1

○ **B.** Angie in step 1

○ **C.** Joe in step 3

○ **D.** Angie in step 3

3

5. The area of the rectangle at the right, in square units, is

    A. $x^2 + 7x + 12$

    B. $x^2 + 7x + 7$

    C. $x^2 + 12$

    D. $x^2 + 7x$

$(x + 3)$ units

$(x + 4)$ units
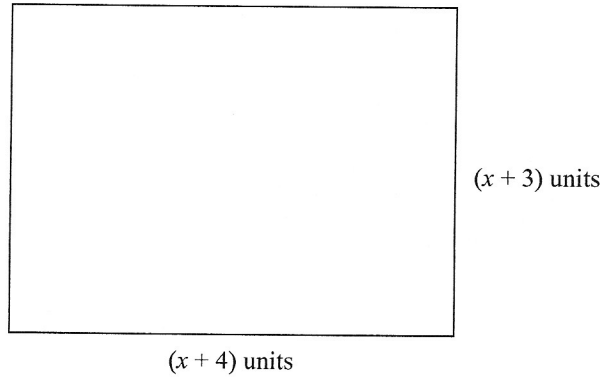
6. One factor of $x^2 - 9x + 8$ is

    A. $(x - 8)$

    B. $(x + 8)$

    C. $(x - 4)$

    D. $(x + 4)$

7. If $x^2 = 64$, then x equals

    A.   32 and –32

    B.   8 and –8

    C.   8 only

    D.   32 only

8. If $x = -2$, then $2x + 3x^2$ is equal to

    A.   12

    B.   8

    C.   –8

    D.   –12

9. The expression $9x^2y^2 \div (-3xy)$ is equivalent to

○ A. $-3x^2y$
○ B. $3xy^2$
○ C. $3xy$
○ D. $-3xy$

Use the following diagram to answer question 10.

When a square piece of paper is folded in half vertically, the resulting figure has a perimeter of 12 cm.

fold line
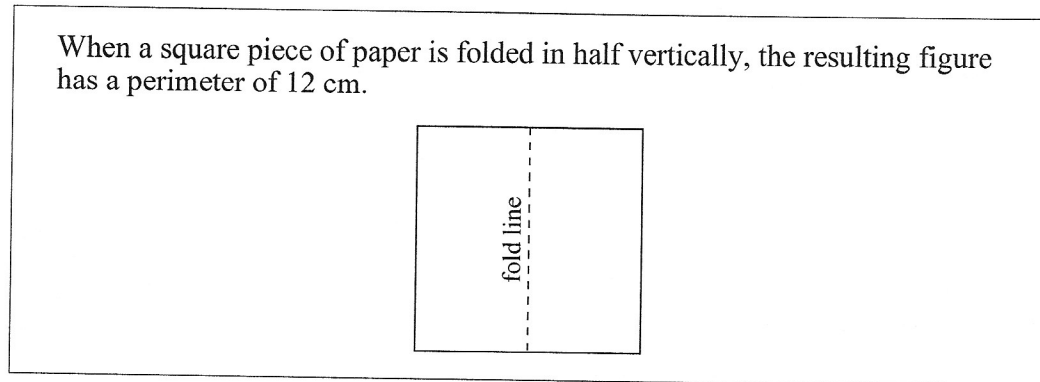
10. What is the area of the piece of paper?

○ A. 10 cm^2
○ B. 16 cm^2
○ C. 18 cm^2
○ D. 24 cm^2

At the end of the day, Pat relaxes in a hot tub that is the shape of a cylinder. The hot tub has a radius of 2 m and depth of 1 m. The formula for the volume of a cylinder is $V = \pi r^2 h$.
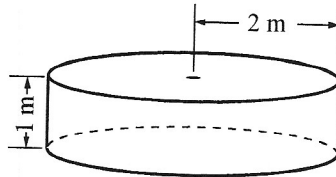
11. If the radius of the tub is doubled, then the volume will be

     ○ **A.** halved
     ○ **B.** doubled
     ○ **C.** increased four times
     ○ **D.** increased eight times

---

12. Which of the following transformations does **not** maintain congruency between the object and its image?

     ○ **A.** Reflection
     ○ **B.** Rotation
     ○ **C.** Translation
     ○ **D.** Dilatation

13. The formula $V = \frac{1}{3}\pi r^2 h$ is used to determine the volume of a cone-shaped paper cup. To what set of numbers does π belong?

     ○ **A.** Natural numbers
     ○ **B.** Irrational numbers
     ○ **C.** Decimal numbers
     ○ **D.** Imaginary numbers
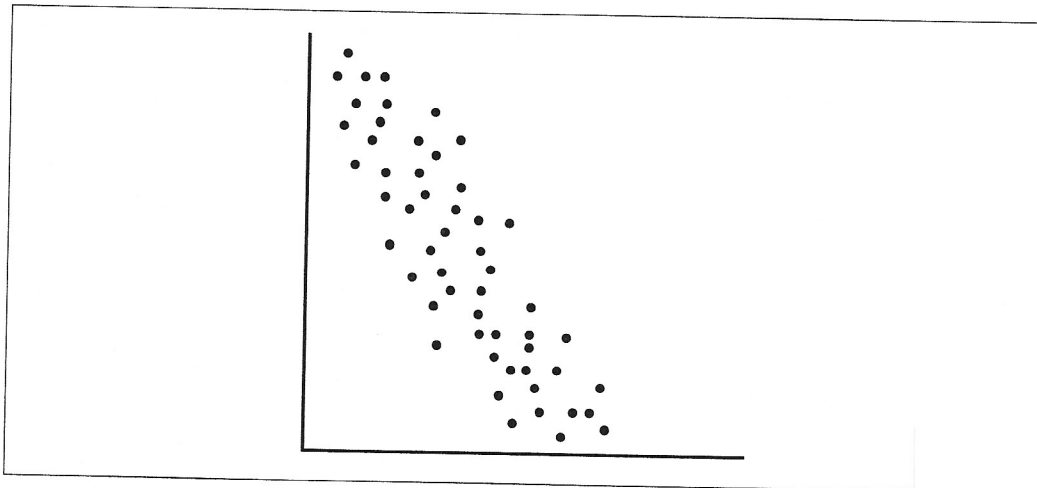
14. Which relationship would **most likely** result in a scatter plot like the one shown?

○ **A.** The longer you study, the better your grades.
○ **B.** The lower your earnings, the less you spend.
○ **C.** The longer you drive, the further you travel.
○ **D.** The less you spend, the more savings you have.

---

15. To determine lane position in a race, 8 runners put their name in a hat. There are 3 runners from the same team. What is the probability that the first name pulled from the hat will be that of a runner from this team?

○ **A.** $\dfrac{1}{3}$

○ **B.** $\dfrac{1}{8}$

○ **C.** $\dfrac{5}{8}$

○ **D.** $\dfrac{3}{8}$

Anne is playing a game with a die that has a different number on each face and a spinner that has 4 colours.

	Red	Blue
	Green	Yellow
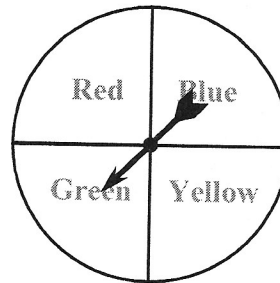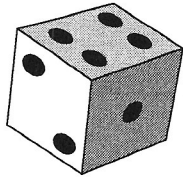
16. What is the probability that Anne will roll a four and that the spinner will stop on green?

○ **A.** $\dfrac{1}{10}$

○ **B.** $\dfrac{2}{10}$

○ **C.** $\dfrac{1}{24}$

○ **D.** $\dfrac{2}{24}$

---

17. One of Joe's drawers contains ten identical red socks and ten identical blue socks. If Joe does not look in the drawer, what is the least number of socks he must remove from the drawer before he is certain of getting a matched pair?

○ **A.** 2
○ **B.** 3
○ **C.** 10
○ **D.** 11

Driving/Travel

18. It takes Kristy $\frac{3}{4}$ of an hour to study 5 pages of a driver's manual. If the manual has x pages, which expression can be used to calculate the number of hours (T) that Kristy must set aside to study for the test?

    A. $T = \frac{3}{4}(x \div 5)$

    B. $T = \frac{3}{4}(5 \div x)$

    C. $T = \frac{3}{4}(x - 5)$

    D. $T = \frac{3}{4}(5 - x)$

19. Kristy was one of 70 people to write a learner's permit test. One-half of all the people who wrote the test passed. If all the people who failed rewrite the test and three-fifths of them pass, how many of the 70 people will have passed after two writings?

    A.   21
    B.   35
    C.   42
    D.   56

One of the questions on the learner's permit test required Kristy to determine at what speeds she would be allowed to travel on a highway with the following posted sign.

MAXIMUM

100

km/h
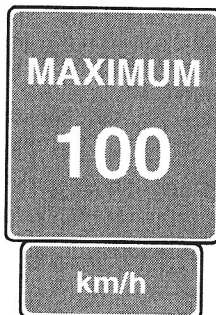
20. The equation or inequality that shows the answer is

   A. $s \leq 100$ km/h

   B. $s = 100$ km/h

   C. $s \geq 100$ km/h

   D. $s < 100$ km/h

---

21. To calculate the speed of a motorcycle, if d = distance a motorcycle travels in metres, r = speed in m/s, and t = time in seconds, the formula $d = rt$ would have to be rewritten as

   A. $r = d - t$

   B. $r = dt$

   C. $r = \dfrac{d}{t}$

   D. $r = \dfrac{t}{d}$

Stopping Distances Under Normal Conditions

	12 m	27 m	59 m	87 m	103 m
Distance travelled after brakes applied (skid marks)	6 m	17 m	42 m	66 m	80 m
Distance travelled while reacting	6 m	10 m	17 m	21 m	23 m
	30 km/h	50 km/h	80 km/h	100 km/h	110 km/h

Distance travelled after brakes applied (skid marks)

Distance travelled while reacting (based on average reaction time of 3/4 second)
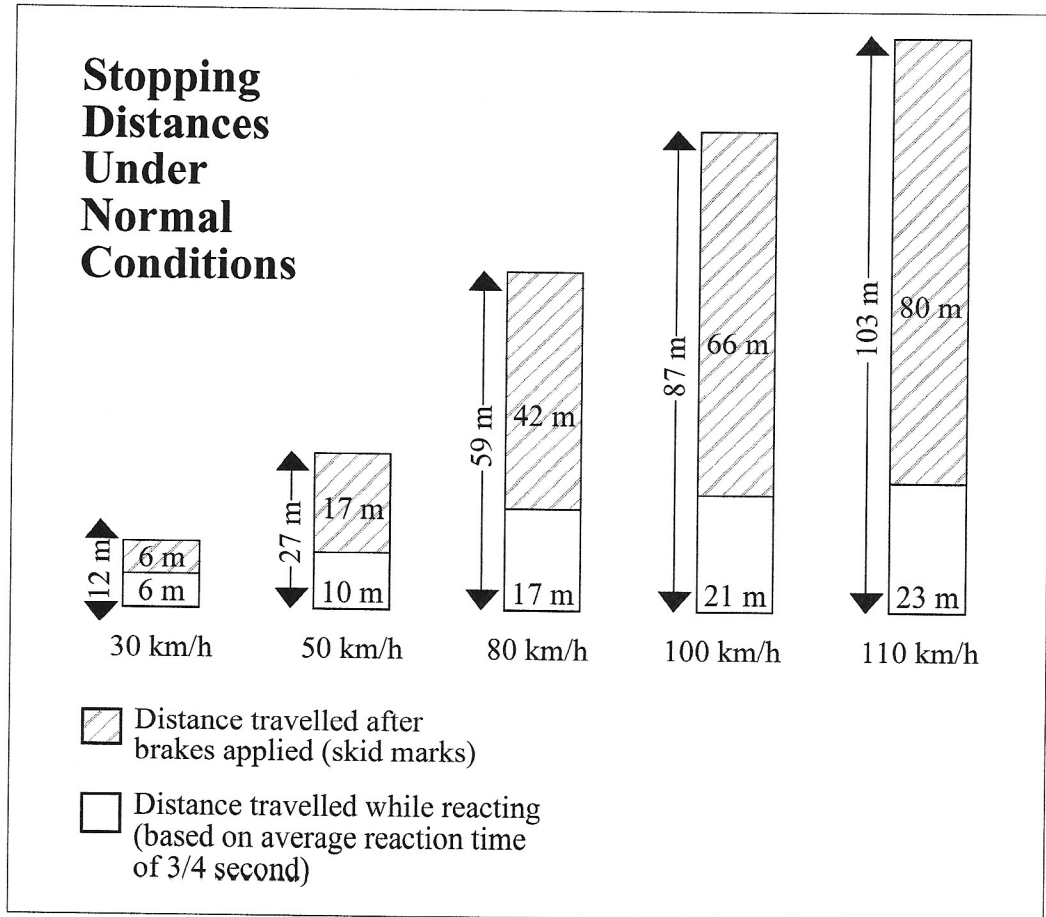
22. At the scene of an accident, the police measured the length of the skid marks as 87 m. According to the graph above, the **best** estimate of the speed of the car before the driver applied the brakes is

○ A. 100 km/h

○ B. 110 km/h

○ C. less than 100 km/h

○ D. more than 110 km/h

23. During a recent price war, gas prices dropped from 56.9¢/L to 39.5¢/L. If you bought 55 L of gas, how much did you save by filling up at the lower price?

    ○ A. $9.57
    ○ B. $17.40
    ○ C. $21.73
    ○ D. $31.30

24. Two cars leave from a particular gas station at the same time. One car travels east at 90 km/h. The other travels west at 100 km/h. How long will it take before the cars are 570 km apart?

    ○ A.   6 h
    ○ B.   5.7 h
    ○ C.   3 h
    ○ D.   1.5 h

25. While on a vacation, you decide to rent a bike. The cost of renting a bike is $3.75 for the first hour and $3.25 for each additional hour. What is the cost to rent a bike for 5 hours?

    ○ A. $18.75
   ○ B. $16.75
    ○ C. $16.45
    ○ D. $13.00

School Activities

26. Advertising posters for a school play will be drawn on posterboard. A large piece of posterboard measures 3.0 m × 1.2 m, and the size of each poster will be 60 cm × 80 cm. What is the greatest number of posters that can be cut from one piece of posterboard?

    ○ A.   3
    ○ B.   6
    ○ C.   7
    ○ D.   8

27. Students sold 330 tickets for the school play, for a total amount of $1 410. If student tickets cost $3 and adult tickets cost $5, how many student tickets were sold?

- A. 120
- B. 165
- C. 176
- D. 210

Use the following information to answer question 28.

The seating for the play is arranged in three sections.
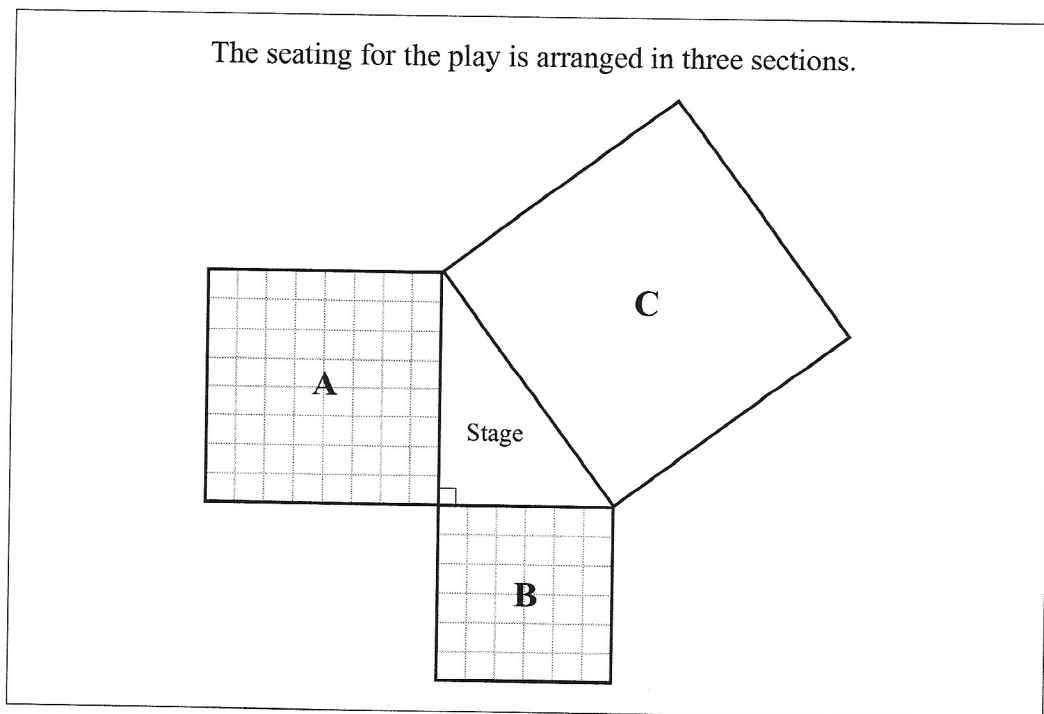
28. If each square in sections A and B of the diagram represents one seat, how many seats are there in section C?

- A. 36
- B. 64
- C. 100
- D. 196

One of the props needed for the play is a sphere that will be hung from a ceiling. The surface area of the sphere is 5 024 cm^2.

29. If the surface area of a sphere can be found by using the formula $A = 4\pi r^2$, where r is the radius, what is the radius of the sphere, to the nearest centimetre?

- ◯ **A.** 20 cm
- ◯ **B.** 40 cm
- ◯ **C.** 400 cm
- ◯ **D.** 1 256 cm

---

30. To win tickets to the school play, Joshua entered a contest by answering a skill-testing question. His answer of –3 is a solution for the equation

- ◯ **A.** $7 - 2x = 1$
- ◯ **B.** $\dfrac{7x}{9} = \dfrac{-7}{3}$
- ◯ **C.** $2(x - 2) = 2 - 3(x - 3)$
- ◯ **D.** $-3x + 2 = -7$

31. On the day of the play, Michael went to the mall with $45.00. He spent $\dfrac{2}{3}$ of his money on a new shirt. He spent $\dfrac{1}{5}$ of his remaining money on a ticket for the play. How much money did Michael have left?
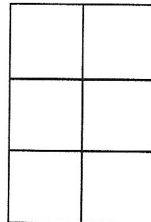
- ◯ **A.** $6.00
- ◯ **B.** $12.00
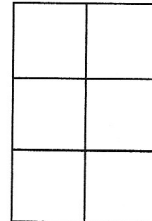- ◯ **C.** $24.00
- ◯ **D.** $30.00

You stack some newly arrived cube-shaped boxes of sports equipment in the school storage room. Three elevation views of your stack and its base plan are shown below.
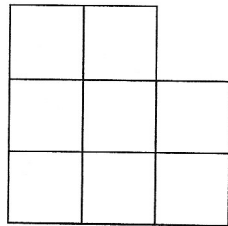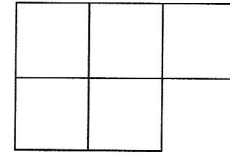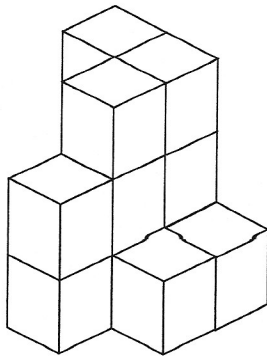

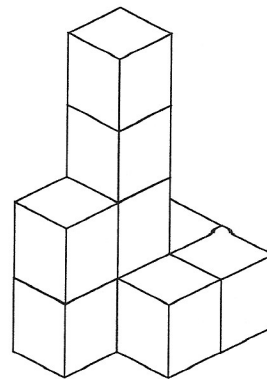| Front elevation view | Left elevation view | Right elevation view | Base plan |

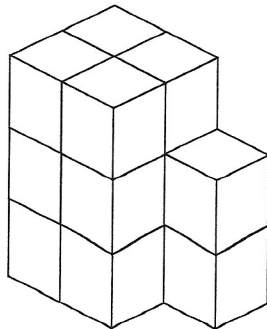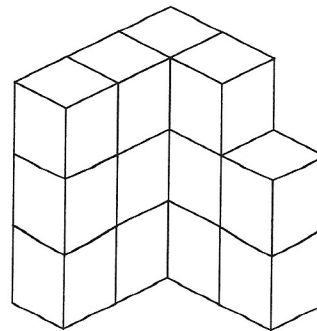32. Which of the following 3-D diagrams represents your stack of boxes?

A.

B.

C.

D.

33. In the school storage room, a tennis racket and a ski pole are both leaning against a wall at the same angle. The tennis racket's length is 60.0 cm, and it touches the floor 30.0 cm away from the wall. The ski pole touches the floor 67.5 cm away from the wall. What is the length of the ski pole?

- ○ **A.** 33.8 cm
- ○ **B.** 37.5 cm
- ○ **C.** 124 cm
- ○ **D.** 135 cm

34. The junior high school student council wants to survey students to determine the most popular DJ. The **best** group of students to survey would be

- ○ **A.** all of the student council members
- ○ **B.** 20 Grade 9 students from the basketball and track teams
- ○ **C.** all of the Grade 9 students
- ○ **D.** 20 students each from grades 7 to 9

35. The school cafeteria is going to be carpeted. The cafeteria blueprint is shown below. Which of the following expressions represents the area of the cafeteria?

- ○ **A.** $x^2 - 9$
- ○ **B.** $6x - 9$
- ○ **C.** $x^2 + 9x - 9$
- ○ **D.** $3x^2 + 9x - 27$
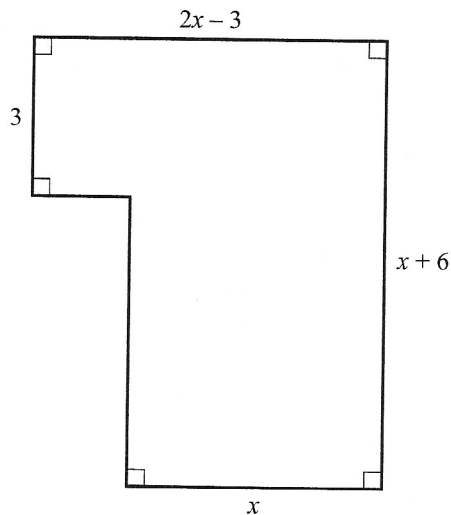
36. In the school cafeteria, you purchase a can of juice that has a height of 16 cm and a diameter of 6 cm. The formula for the volume of a cylinder is $V = \pi r^2 h$. How much juice could the can hold?

  - ○ A.   301 mL
  - ○ B.   452 mL
  - ○ C.   576 mL
  - ○ D.   1 809 mL

37. In the cafeteria, Amber sold an average of $32.50 worth of chocolates each day over a five-day period. In the first four days, her sales were $39.00, $12.75, $16.75, and $28.50. What were Amber's chocolate sales on the fifth day?

  - ○ A. $8.25
  - ○ B. $24.25
  - ○ C. $64.50
  - ○ D. $65.50

The Yearbook Club decided to cut costs for the yearbook by reducing the picture size of personal photos. The original pictures have dimensions of 3.5 cm × 4.0 cm.

|← 3.5 cm →|

4.0 cm
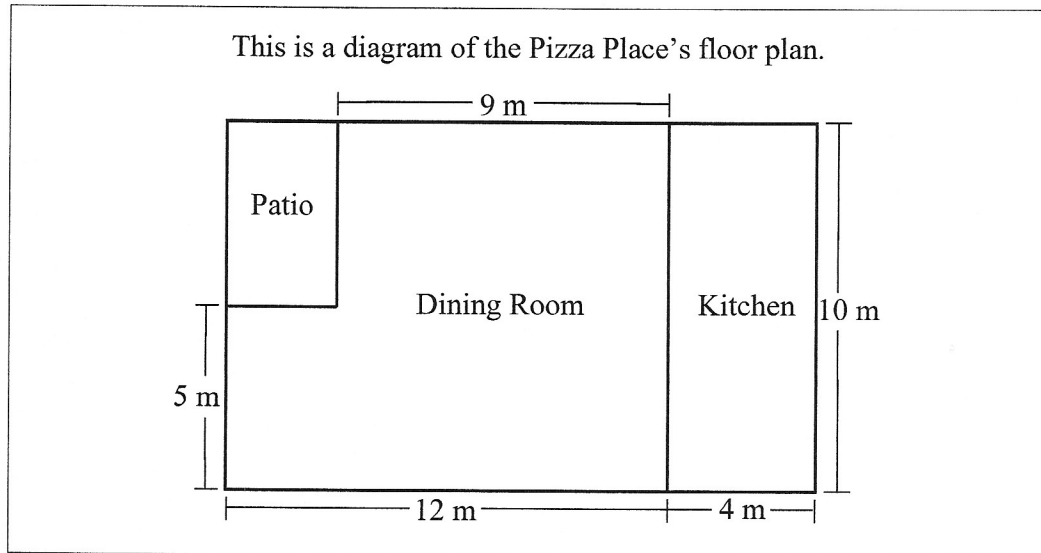
Coach Johnson

38. If **each dimension is reduced** by 15%, then the final reduced copy will have an area of

- ○ **A.** 14.0 cm^2
- ○ **B.** 11.1 cm^2
- ○ **C.** 10.1 cm^2
- ○ **D.** 16.1 cm^2

The Pizza Place

Use the following information to answer question 39.

This is a diagram of the Pizza Place's floor plan.

|← 9 m →|

Patio

Dining Room   Kitchen   10 m

5 m

|← 12 m →|← 4 m →|

39. Fire regulations state that each customer in a dining room must have a **minimum** of 2.2 m^2 of floor space. What is the maximum number of customers that can be seated in the Pizza Place's dining room?

○ A.   47
○ B.   54
○ C.   72
○ D.   116

---

40. Each pepperoni and bacon pizza must have a ratio of 4 pieces of pepperoni to 3 pieces of bacon. If a pizza has 35 pieces of pepperoni and bacon altogether, how many of these pieces are pepperoni?
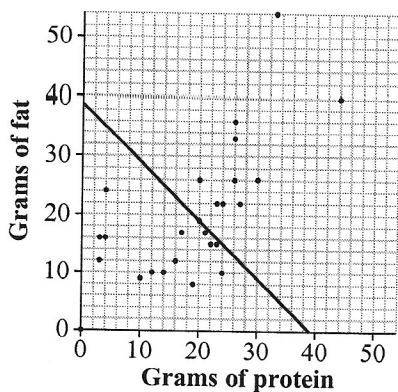
○ A.   12
○ B.   15
○ C.   20
○ D.   26

The following graph (scatterplot) represents information from a study of the protein and fat contents in popular food items sold at The Pizza Place.
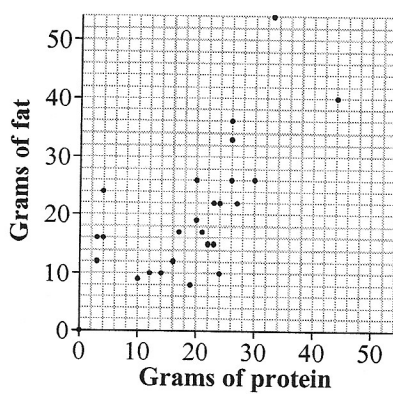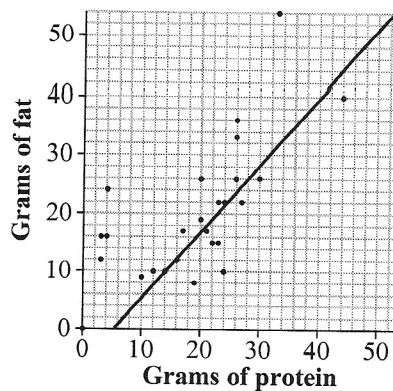

41. Which of the following graphs shows the **most reasonable** line of best fit for the information presented?
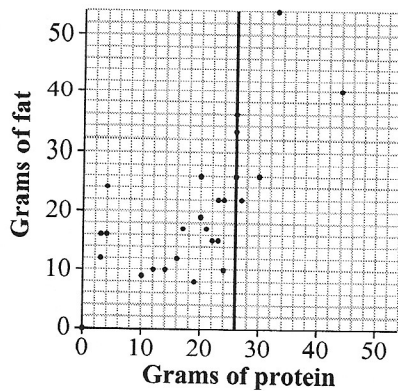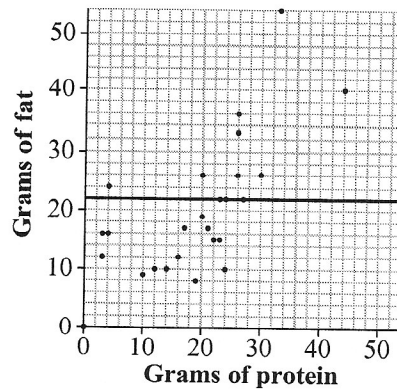
○ **A.**

○ **B.**

○ **C.**

○ **D.**

42. The thermostat on the pizza oven malfunctioned. First, the temperature dropped 5°C, then it increased 7°C, fell 12°C, and finally decreased a further 30°C before it stabilized at 185°C. What was the original temperature?

○A. 239°C

○B. 225°C

○C. 131°C

○D. 145°C

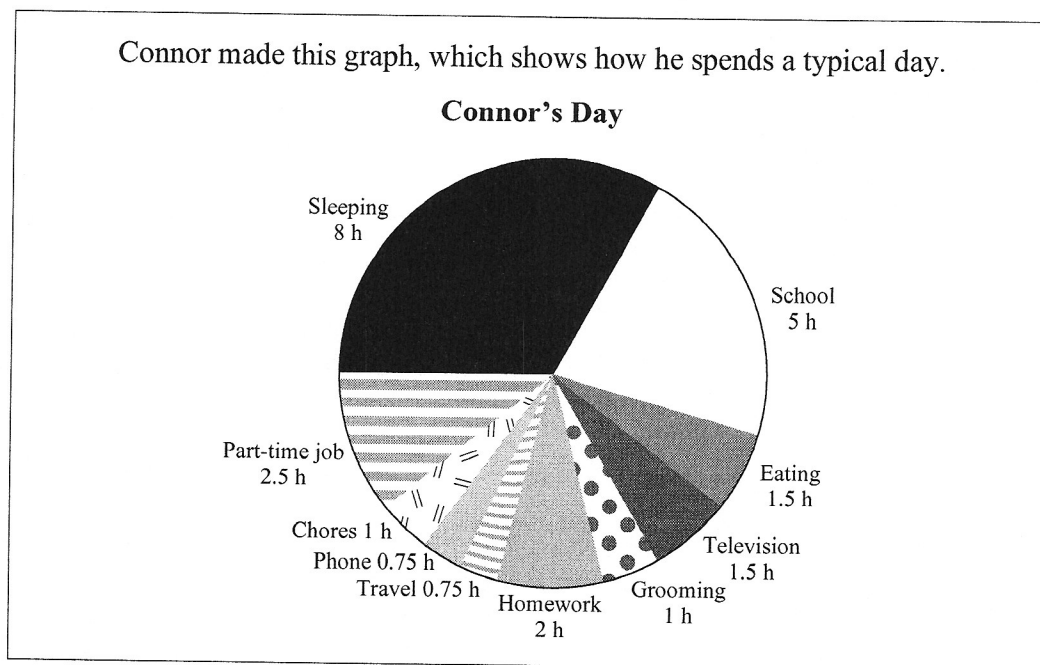*Use the following information to answer question 43.*

Connor, a part-time waiter at the Pizza Place, put the leftover slices of pizza in a take-home box for a customer. The shaded portions of the diagram below show the leftover slices.
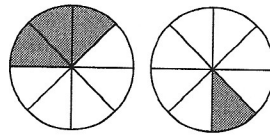
43. How much of a pizza was left over?

○A. $\frac{1}{2}$ of a pizza

○B. $\frac{3}{64}$ of a pizza

○C. $\frac{1}{4}$ of a pizza

○D. $\frac{4}{16}$ of a pizza

Connor made this graph, which shows how he spends a typical day.

Connor's Day

- Sleeping 8 h
- School 5 h
- Eating 1.5 h
- Television 1.5 h
- Grooming 1 h
- Homework 2 h
- Travel 0.75 h
- Phone 0.75 h
- Chores 1 h
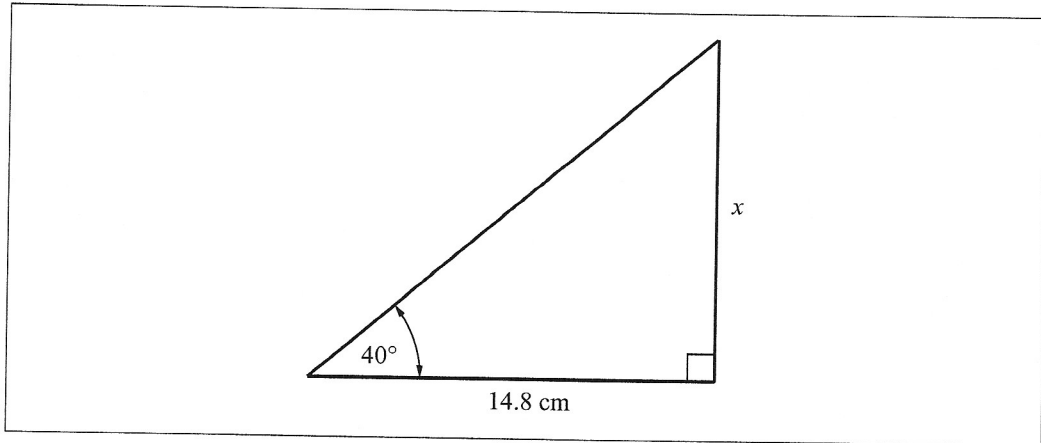- Part-time job 2.5 h

44. For what percentage of the day does Connor work at his part-time job?

- A. 2.5%
- B. 9.4%
- C. 10.4%
- D. 37.5%

You have now completed the multiple-choice questions.
Proceed directly to the numerical-response questions.

Use the following information to answer question 1.

1.   Correct to the nearest tenth of a centimetre, the length of *x* is _____ cm.

When cubes are placed side by side, the number of faces (f) of the cubes that can be seen as you walk around them is related to the total number of cubes (c), as shown in the table below.
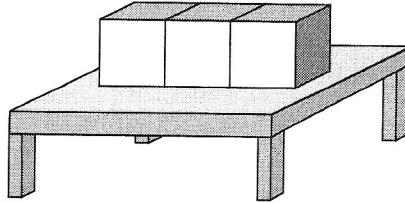
c	1	2	3	4
f	5	8	11	14

2. If 11 cubes are placed side by side, how many faces can be seen?

Use the following information to answer question 3.

The intramural results of four teams are shown below.

Team	Participation Points	Wins	Losses	Defaults (No Shows)	Total Points
9A	90	11	4	0	
9B	70	8	5	2	
9C	70	4	9	2	
9D	80	7	7	1	

Total points are calculated by adding participation points to the total of the points for Wins, Losses, and Defaults. The coach gives each win 5 points, each loss 0 points, and each default –5 points.

3. By how many points does Team 9A lead Team 9C? ☐

The members of a student council held a school dance. The DJ they hired charges a basic fee of $300 and an additional charge of $1.50 per student that attends the dance.

4. If the DJ charged the student council $487.50, how many students attended the dance?

5. The members of a student council are planning to make banners for a basketball tournament. They want to put ribbon around each banner. If each banner is square and has an area of 4 225 cm^2, what is the perimeter, in centimetres, of each banner? (Round your response to the nearest centimetre.)

A diver steps off a diving board. The time in seconds (t) that it takes her to hit the water is related to the distance in metres (d) from the diving board to the surface of the water. The formula that can be used to calculate the distance from the diving board to the surface of the water is

$$d = 4.9t^2$$

6. If it takes the diver 0.6 seconds to hit the water, the distance from the diving board to the surface of the water is _____ m. (Round your answer to the nearest hundredth of a metre.)

You have now completed the test.
If you have time, you may wish to check your answers.

Score Test !