

Relations Practice

Education
Quality and
Accountability
Office

## Directions

Make sure you have the following materials:

- Student Answer Sheet
- the Formula Sheet
- a pencil and an eraser
- a ruler
- a scientific or graphing calculator
- some paper for rough work for multiple-choice questions only

The diagrams in this booklet are not all drawn to scale.

## Answering Multiple-Choice Questions

When answering the multiple-choice questions, be sure you use Student Answer Sheet. The circles you will be filling in are lettered $\mathrm{a}, \mathrm{b}, \mathrm{c}, \mathrm{d}$.

1. Try to answer all of the multiple-choice questions. Be sure to read each question and its four answer
2. choices carefully. Do not spend too much time on any one question.
3. To indicate your answer, use a pencil to fill in the circle completely on Student Answer Sheet. Like this: Not like this: $\otimes$
4. If you fill in more than one answer to a question, the question will be scored zero.
5. If you leave a question blank, the question will be scored zero.
6. Cleanly erase any answer you wish to change and fill in the circle for your new answer.

## Answering Open-Response Questions

1. Do all of your work (even your rough work) in this booklet.
2. Present a complete and well-organized solution to each question. Give as much information as you can.
3. Write your solutions so that they can be understood by someone who does not know your work.
4. Make sure you follow the directions on the Key Words page.

For example, a question might ask you to "Show your work." Read the Key Words page. It says to record all calculations and steps. So, if you sketch a graph in the process of getting to your answer, show the sketch and label it.
5. When using a calculator, write down the numbers you use and the operations you carry out. For example, a question might ask you to "Find the area of a circle with a radius of 7 cm ." You need to write $A=\pi(7)^{2}$ as well as the answer you get on your calculator.

## Key Words

Throughout the assessment, key words are used to identify the type of response required from you. The key words are explained below. Refer to this sheet to make sure you are responding fully to each question.

## Compare:

Tell what is the same and what is different.

## Describe:

Use words to create a mental picture for the reader.
Determine:
Use mathematics to find a solution to the problem.

## List:

Use point form.

## Explain:

Use words and symbols to make your solution clear.

## Justify:

Give reasons and evidence to show your answer is correct.
Show your work:
Record all calculations and all the steps you went through to get your answer. You may use words, numbers, graphs, diagrams, symbols and/or charts.

1 Which of the following graphs represents a linear relation?
a

C

b

d


2
Consider the graph below.


Which relationship is most likely to be represented by this graph?
a height vs. weight
b pay vs. number of hours worked c gas remaining vs. distance travelled
d volume of water in a bucket vs. its mass

3 Nicole measures the heights of children at a child care centre and finds that the height of a child increases non-linearly as the child's age increases.

Which graph represents Nicole's findings?

A


B


C


D


4 The graph shows the shoe sizes of girls of various heights.

Shoe Size vs. Height


Which point represents a girl whose shoe size is smaller than expected for a girl of her height?
a W
b X
c Y
d Z

5 Malia records the number of ice cream cones she sells each day and the maximum daily temperature, as shown on the graph below.


According to this graph, approximately how many ice cream cones will Malia sell on a day when the maximum temperature is $36^{\circ}$ ?
a 80
b $\quad 110$
C 115
d 135

Sergio sells 7 models of CD players. The table shows the unit cost of each model and the number of CD players of that model sold in the past month.

| Model | Unit cost (\$) | Number sold |
| :---: | :---: | :---: |
| A | 55 | 11 |
| B | 70 | 14 |
| C | 90 | 17 |
| D | 100 | 21 |
| E | 120 | 24 |
| F | 150 | 29 |
| G | 200 | 41 |

Which statement about the relationship between the unit cost and the number of CD players sold is true?
a There is no relationship between the unit cost and the number sold.
b As the unit cost increases, the number sold decreases.
c As the unit cost increases, the number sold is constant.
d As the unit cost increases, the number sold increases.
$7 \quad$ Natasha works for a computer company. The table shows her annual salary in the last five years.

| Year | Annual salary (\$) |
| :---: | :---: |
| 1 | 32000 |
| 2 | 33600 |
| 3 | 35200 |
| 4 | 36800 |
| 5 | 38400 |

If the trend continues, what will Natasha's annual salary be in the 8th year?
a $\quad \$ 40000$
b $\quad \$ 43200$
C $\$ 46400$
d $\$ 49600$

8 March Temperatures
The average March temperatures for six Ontario communities are plotted according to their latitudes on the following scatter plot.


The city of Kenora has a latitude of $50^{\circ}$ and has an average March temperature of $-6.3^{\circ} \mathrm{C}$. Does the community of Kenora follow the trend of the data?

Justify your answer.

## 9 Wing Length

Wing length is a reliable method for determining the age of young birds. Below is an example of data for a particular species.

| Wing Length <br> (cm) | Age (days) |
| :---: | :---: |
| 1.5 | 4 |
| 3.1 | 8 |
| 3.2 | 10 |
| 4.1 | 12 |
| 5.2 | 16 |



Determine the age of a bird with a wing length of 3.6 cm .
You may use the grid if you wish.
Justify your answer.

## 10 Counting Pennies

Identical pennies are placed in a container and the total mass is recorded.
The table below gives information about the total mass of different numbers of pennies in the container.

| Number of Pennies | Total Mass (g) |
| :---: | :---: |
| 4 | 60 |
| 10 | 75 |
| 54 | 185 |

Use the data to determine the number of pennies in the container when the total mass is $\mathbf{1 2 5} \mathbf{~ g}$. Justify your answer. You may use the grid if you wish.

$\qquad$ pennies in the container.

## 11 <br> Line of Best Fit

The following graph shows the relationship between students' marks and the number of classes that they have missed.


Circle the graph below which shows the best line of best fit.




Justify your choice.

12 Yves records the time of day that a street light turns off for 9 mornings over 28 days. The graph shows his data from the first day of the month.

Time vs. Day


Which statement describes the relation above?
a The later in the month, the later the street light turns off.
b The later in the month, the earlier the street light turns off.

C The earlier in the month, the earlier the street light turns off.
d There is no relationship between the day and the time the street light turns off.

13 A submarine is submerging. The graph shows the distance below sea level the submarine has descended over time. Distance Below Sea Level vs. Time


How far below sea level has the submarine descended after 24 min ?
a $\quad 300 \mathrm{~m}$
b $\quad 325 \mathrm{~m}$
C $\quad 350 \mathrm{~m}$
d $\quad 375 \mathrm{~m}$

14 With $\$ 12.00$, Sam and a friend are buying lunch from the menu below.


Which of the following orders could they buy with their $\$ 12.00$ ?
a two soft drinks and two turkey sandwiches
b one tomato soup, one tea and two ham and cheese sandwiches
c one tomato soup, one juice, two green salads and one hamburger
d one soft drink, one tea, one turkey sandwich and one ham and cheese sandwich

The graph below illustrates the relationship between the distance driven and the amount of gasoline in the tank of a car.


How many litres of gasoline are in the car's tank when the distance driven is 300 km ?
a 10
b 20
C 40
d 50

16 The following graph shows the relationship between the mass and the cost of four different brands of strawberry jam.

Cost vs. Mass


Which statement is true?
A Brand A is the cheapest
B Brand D is the most expensive
C Brand B weighs the least
D Brand D weighs the most

17 Duncan records the outside temperature at noon each day. He also records the heating cost per day. The graph shows a scatter plot and a line of best fit for his data.

Heating Cost per Day vs. Outside Temperature


By approximately how much does the heating cost per day decrease when the outside temperature increases by $5^{\circ}$ ?
a $\quad \$ 1$
b $\quad \$ 3$
C $\quad \$ 5$
d $\quad \$ 7$

18 Consider the following chart and graph.

| Temperature <br> in degrees <br> Celsius, $\boldsymbol{C}$ | Temperature <br> in degrees <br> Fahrenheit, $\boldsymbol{F}$ |
| :---: | :---: |
| $5^{\circ}$ | $41^{\circ}$ |
| $15^{\circ}$ | $59^{\circ}$ |
| $25^{\circ}$ | $77^{\circ}$ |



What temperature in degrees Celsius is equivalent to $-20^{\circ} \mathrm{F}$ ?
a $-4{ }^{\circ} \mathrm{C}$
b $\quad-18^{\circ} \mathrm{C}$
C $-29^{\circ} \mathrm{C}$
d $-40^{\circ} \mathrm{C}$

|  |  | Answers |
| ---: | :--- | :--- |
| 1] | C |  |
| $2]$ | C |  |
| $3]$ | C |  |
| $4]$ | B |  |
| $5]$ | D |  |
| $6]$ | D |  |
| $7]$ | B |  |
| 8] | Yes, it follows the line of |  |
|  | best fit |  |
| $9]$ | 10.5 (Answers will vary) |  |
| $10]$ | 30 (Answers will vary) |  |
| $11]$ | Graph \#3. The line |  |
|  | follows the trend and is |  |
|  | in the middle of the |  |
|  | data. |  |
| $12]$ | B |  |
| $13]$ | A |  |
| $14]$ | C |  |
| $15]$ | B |  |
| $16]$ | D |  |
| $17]$ | B |  |
| $18]$ | C |  |
|  |  |  |

Grade 9 Assessment of Mathematics Relations Practice

## Student Answer Sheet: Academic

- Enter your multiple-choice answers on this sheet
- To indicate your answer, use an HB pencil to fill in the circle completely, as shown below:

Like this: $\quad$ Not like this: $\otimes \varnothing$ (

- If you fill in more than one answer to a question, the question will be scored incorrect.
- Cleanly erase any answer you wish to change and fill in the circle for your new answer.

1. (a) (b) (c) (c)
2. (a) (b) (c) (c)
3. (a) (b) (c) (c)
4. (a) (b) (c) (d)
5. (a) (b) (c) (d)
6. (a) (b) (c) (c)
7. (a) (b) (c) (d)
8. Respond in booklet.
9. Respond in booklet.
10. Respond in booklet.
11. Respond in booklet.
12. (a) (b) (c) (d)
13. (a) (b) (c) (d)
14. (a) (b) (c) (d)
15. (a) (b) (c) (d)
16. (a) (b) (c) (a)
17. 

(a) (b) (c) (d)
18. (a) (b) (c) (d)

Print Student Name: $\qquad$
Student Signature: $\qquad$

