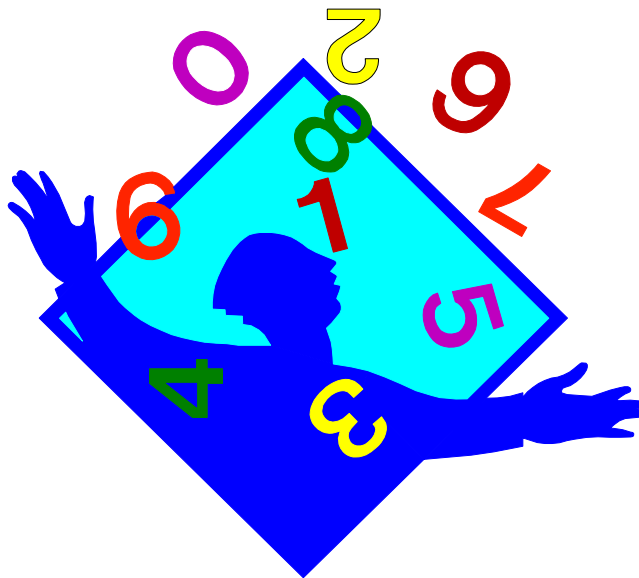


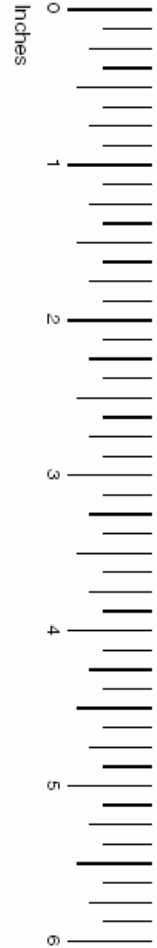
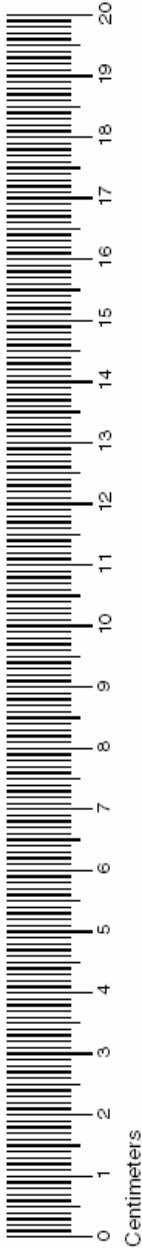
**MATHEMATICS**  
**8<sup>th</sup> GRADE**  
**BENCHMARK TEST**



**Third Testing Period**  
**March 3-7, 2003**

# Grade 8

## Mathematics Chart



<b>LENGTH</b>	
<b>Metric</b>	<b>Customary</b>
1 kilometer = 1000 meters	1 mile = 1760 yards
1 meter = 100 centimeters	1 mile = 5280 feet
1 centimeter = 10 millimeters	1 yard = 3 feet
	1 foot = 12 inches
<b>CAPACITY AND VOLUME</b>	
<b>Metric</b>	<b>Customary</b>
1 liter = 1000 milliliters	1 gallon = 4 quarts
	1 gallon = 128 ounces
	1 quart = 2 pints
	1 pint = 2 cups
	1 cup = 8 ounces
<b>MASS AND WEIGHT</b>	
<b>Metric</b>	<b>Customary</b>
1 kilogram = 1000 grams	1 ton = 2000 pounds
1 gram = 1000 milligrams	1 pound = 16 ounces
<b>TIME</b>	
1 year = 365 days	
1 year = 12 months	
1 year = 52 weeks	
1 week = 7 days	
1 day = 24 hours	
1 hour = 60 minutes	
1 minute = 60 seconds	

**Continued on next page**

## Grade 8 Mathematics Chart

<b>Perimeter</b>	square	$P = 4s$
	rectangle	$P = 2l + 2w$ or $P = 2(l + w)$
<b>Circumference</b>	circle	$C = 2\pi r$ or $C = \pi d$
<b>Area</b>	square	$A = s^2$
	rectangle	$A = lw$ or $A = bh$
	triangle	$A = \frac{1}{2}bh$ or $A = \frac{bh}{2}$
	trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$ or $A = \frac{(b_1 + b_2)h}{2}$
	circle	$A = \pi r^2$
<b>Surface Area</b>	cube	$S = 6s^2$
	cylinder (lateral)	$S = 2\pi rh$
	cylinder (total)	$S = 2\pi rh + 2\pi r^2$ or $S = 2\pi r(h + r)$
	cone (lateral)	$S = \pi rl$
	cone (total)	$S = \pi rl + \pi r^2$ or $S = \pi r(l + r)$
	sphere	$S = 4\pi r^2$
<b>Volume</b>	prism	$V = Bh^*$
	cylinder	$V = Bh^*$
	pyramid	$V = \frac{1}{3}Bh^*$
	cone	$V = \frac{1}{3}Bh^*$
	sphere	$V = \frac{4}{3}\pi r^3$
<i>*B represents the area of the Base of a solid figure.</i>		
<b>Pi</b>	$\pi$	$\pi \approx 3.14$ or $\pi \approx \frac{22}{7}$
<b>Pythagorean Theorem</b>		$a^2 + b^2 = c^2$
<b>Simple Interest Formula</b>		$I = prt$

Direction: Read each problem and select the best answer. use any available space for scratch work.

1. A train traveled 390 miles in 6 hours. What was the average speed of the train on that trip?

- (A) 55 miles per hour
- (B) 60 miles per hour
- (C) 65 miles per hour
- (D) 70 miles per hour

2. A baseball pitcher gave up an average of 3.3 runs for every 9 innings pitched. About how many runs did the pitcher give up in 27 innings pitched?

- (A) 90
- (B) 89
- (C) 12
- (D) 10

3. Which is true for all pairs of values in this table?

$x$	-1	0	1	2
$y$	-3	1	5	9

- (A)  $y = 4x + 1$
- (B)  $y = 4x - 2$
- (C)  $y = 2x + 1$
- (D)  $y = x + 4$

4. The table below shows the marketing research that Maria has done for a juice company to find out which of their juices are most popular.

Juice Flavor	People Who Prefer Flavor
Grape	56
Apple	35
Cranberry	23
Grapefruit	21
Orange	67
Mixed Berry	78

Maria wants to display the information in a circle graph. Which step must she do first before she can draw the graph accurately?

- (A) Convert the data into fractions, decimals, or percentages.
- (B) Use a protractor to find the angles.
- (C) List the juices alphabetically.
- (D) Find the range of the data.

5. Which statement is true of the number in the box?

$$\sqrt{5}$$

- (A) It is an integer.  
(B) It is an irrational number.  
(C) It is an odd number.  
(D) It is a whole number.
6. Tara needs to put a brace on the frame for a rectangular wall of the shed she is building. The brace will go from the top left corner of the wall to the bottom right corner, and the wall is 7 feet by 8 feet. She calculates that the brace will need to be about 10.6 feet long. Which formula can be used to confirm Tara's calculations?

- (A) Area of a triangle  
(B) Pythagorean Theorem  
(C) Perimeter of a rectangle  
(D) Perimeter of triangle

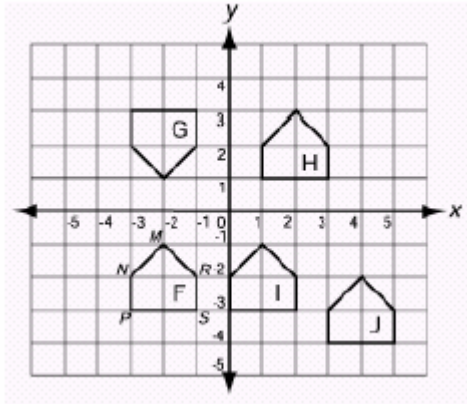
7. William buys two different-sized boxes full of the same kind of candy. The boxes are rectangular prisms and both have the same proportions, but one holds 16 ounces while the other holds only 2. William measures the sides of the boxes and finds that the dimensions of the large box are twice as large as dimensions of the small box. Which property could he use to validate his measurements?

- (A) If the dimensions are doubled, the the volume should be 8 times as large.  
(B) If the dimensions are doubled, then the volume should be 4 times as large.  
(C) If the dimensions are doubled, then the volume should increase by a power of 4.  
(D) If the dimensions are doubled, then the volume should increase by a power of 3.

8. The Carlson Kennel has a rectangular dog pen that is 42 meters long and 14 meters wide. The Rosebud Kennel's rectangular dog pen has the same proportions but is twice as long. What are the dimensions of the Rosebud Kennel?

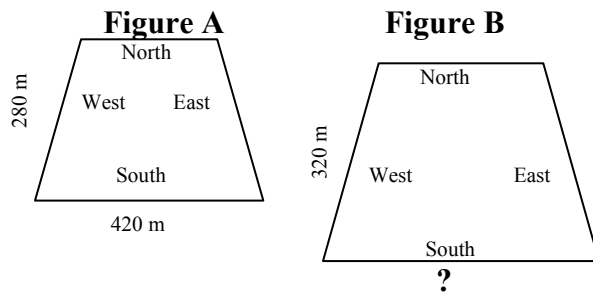
- (A) 42 m  $\times$  28 m  
(B) 84 m  $\times$  14 m  
(C) 24 m  $\times$  42 m  
(D) 84 m  $\times$  28 m

9. Figure F is rotated  $90^\circ$  counterclockwise around Point P. Where should Point M' be located?



- (A)  $(-2, -1)$   
 (B)  $(-2, -5)$   
 (C)  $(-4, -1)$   
 (D)  $(-5, -2)$

10. An architect has designed a city park with the measurements shown in Figure A. The city mayor wants the shape of the park to be similar but larger, as shown in Figure B.



Figures A and B are similar polygons. What will be the length of the south side of the park in Figure B?

- (A) 440 m  
 (B) 460 m  
 (C) 480 m  
 (D) 560 m

11. The Chesapeake Bay-Bridge Tunnel is 17.6 miles long. Mr. Chen wants to build a scale model of the tunnel for his geography class. He plans to use the scale 1 inch =  $\frac{1}{4}$  mile. How long should his model be?

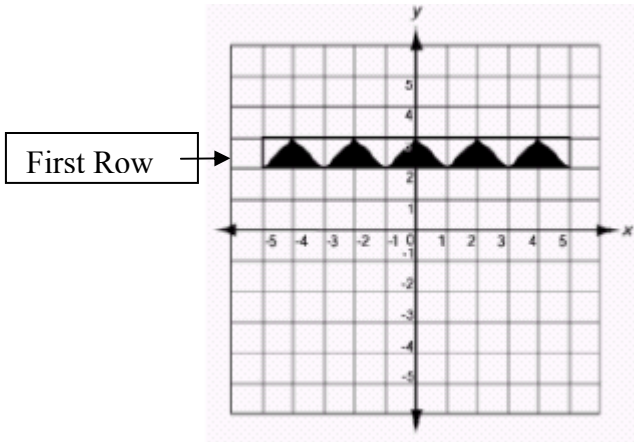
Record your answer and fill in the bubbles on your answer document. Be sure to use the Correct place value.

				●			
0	0	0	0		0	0	0
1	1	1	1		1	1	1
2	2	2	2		2	2	2
3	3	3	3		3	3	3
4	4	4	4		4	4	4
5	5	5	5		5	5	5
6	6	6	6		6	6	6
7	7	7	7		7	7	7
8	8	8	8		8	8	8
9	9	9	9		9	9	9

12. The temperature of a substance in a science experiment rose  $2^\circ\text{C}$  every minute for 17 minutes. What was the total change in the temperature of the substance?

- (A)  $34^\circ\text{C}$   
 (B)  $26^\circ\text{C}$   
 (C)  $19^\circ\text{C}$   
 (D)  $15^\circ\text{C}$

13. Maria is drawing a sketch of a tile design she wants to use on her bathroom wall. She wants to do a mirror image of this pattern under the first row.



In the mirror image, where will the midpoint of the base of the center dark triangle be located?

- (A) (0, 2)  
 (B) (1, 0)  
 (C) (2, 0)  
 (D) (0, 1)
14. Moira lives in the city, and for exercise she likes to walk 16 blocks in one direction, turn left, walk another 12 blocks, and then complete the rectangle to get home. On days when she has to work late, she only walks  $\frac{3}{4}$  of that distance in each direction. How many blocks long is her walk on days when she works late?
- (A) 21 blocks  
 (B) 30 blocks  
 (C) 40 blocks  
 (D) 42 blocks

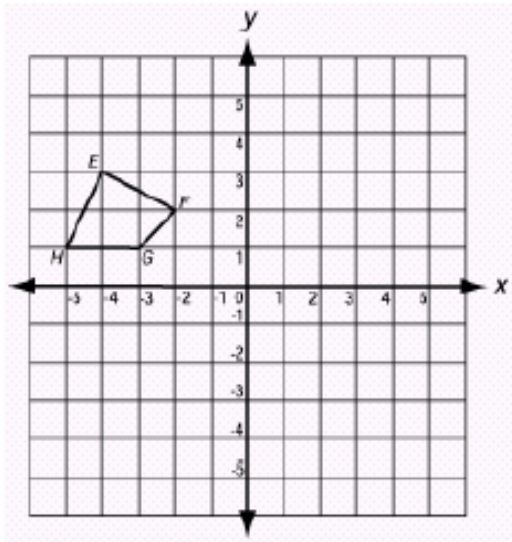
15. Designers of a theme park company made a model of the park they plan to build. The model was made at a scale of 1 cm = 100 meters. On the model, the distance between the park entrance and the Klondike roller coaster is 10.75 cm. What is the actual distance between the park entrance and the Klondike?

Record your answer and fill in the bubbles on your answer document. Be sure to use the Correct place value.

				•			
Ⓐ	Ⓐ	Ⓐ	Ⓐ		Ⓐ	Ⓐ	Ⓐ
Ⓑ	Ⓑ	Ⓑ	Ⓑ		Ⓑ	Ⓑ	Ⓑ
Ⓒ	Ⓒ	Ⓒ	Ⓒ		Ⓒ	Ⓒ	Ⓒ
Ⓓ	Ⓓ	Ⓓ	Ⓓ		Ⓓ	Ⓓ	Ⓓ
Ⓔ	Ⓔ	Ⓔ	Ⓔ		Ⓔ	Ⓔ	Ⓔ
Ⓕ	Ⓕ	Ⓕ	Ⓕ		Ⓕ	Ⓕ	Ⓕ
Ⓖ	Ⓖ	Ⓖ	Ⓖ		Ⓖ	Ⓖ	Ⓖ
Ⓗ	Ⓗ	Ⓗ	Ⓗ		Ⓗ	Ⓗ	Ⓗ
Ⓘ	Ⓘ	Ⓘ	Ⓘ		Ⓘ	Ⓘ	Ⓘ

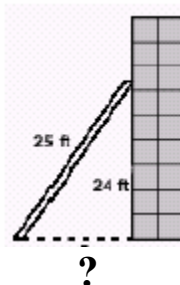
16. A scientist heated water to its boiling point at 212°F. Now he plans to freeze the same water. The freezing point of water is 32°F. By how many degrees must the temperature of the boiling water drop before it will freeze?
- (A) 244°F  
 (B) 212°F  
 (C) 180°F  
 (D) 32°F

17. If the polygon below is moved using the translation  $(4, -2)$  where will Point  $F'$  be located?



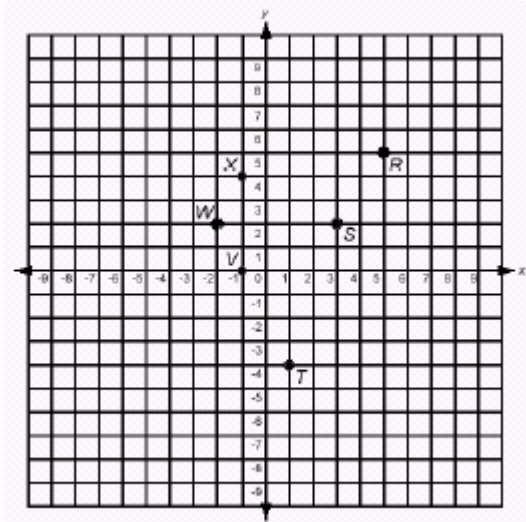
- (A)  $(2, 0)$
- (B)  $(2, 4)$
- (C)  $(0, -2)$
- (D)  $(4, -2)$

18. Mark has a 25-foot ladder. If he leans the ladder so that it reaches 24 feet up the wall, as shown in the figure below, how far is the base of the ladder from the wall?



- (A) 5 ft
- (B) 6 ft
- (C) 7 ft
- (D) 8 ft

19. If you connect points  $W$ ,  $R$ , and  $S$  on the coordinate graph with straight lines, what shape will be created?



- (A) rectangle
- (B) square
- (C) trapezoid
- (D) triangle

20. Maggie has been hired to paint a mural on two adjoining walls of a rectangular room. The room is 12 feet wide and 14 feet long. The ceiling is 8 feet high. What is the total area of the two walls where Maggie will paint the mural?

- (A)  $112 \text{ ft}^2$
- (B)  $208 \text{ ft}^2$
- (C)  $376 \text{ ft}^2$
- (D)  $416 \text{ ft}^2$

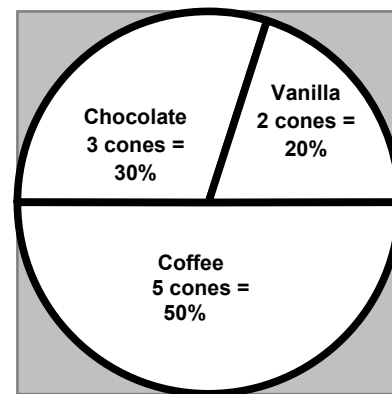
21. The table below shows the number of bathing suits sold each month at a department store.

Month	Bathing Suits Sold
January	15
February	69
March	73
April	123
May	145
June	177

Maria is in charge of ordering clothing for the department store. She uses the table to find the average number of swimming suits sold per month for January to June was 97 suits a month. She predicts that she will probably sell about 100 swimming suits in July. Which is the best explanation for why her prediction might NOT be valid?

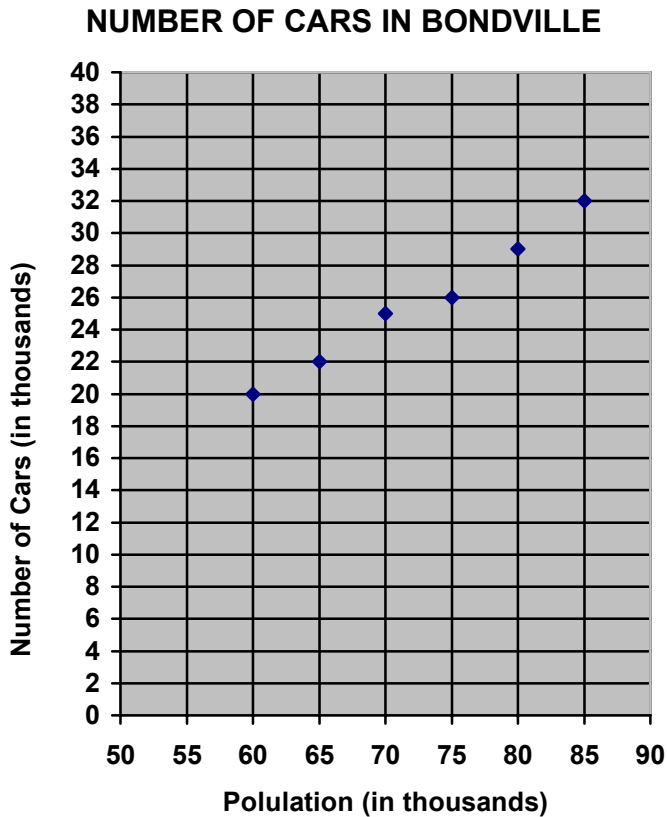
- (A) She should have rounded 97 down to 95 because that is the closer multiple of 5.
- (B) It is impossible to predict sales of items such as swimming suits.
- (C) She did not find the average correctly.
- (D) Swimming suits are a seasonal item and she has used both colder months and warmer months to find the average.

22. Casey's Convenience Store just got a soft-serve ice cream machine. The manager recorded the sales of each flavor for the first two hours and made the circle graph below so that he can use it as a model whenever he needs to restock the flavors. Is his use of the data valid? Why or why not?



- (A) His use of the data is valid because he has calculated the percentages correctly.
- (B) His use of the data is valid because a circle graph is a good way to illustrate percentages.
- (C) His use of the data is not valid because he should have made a different type of graph.
- (D) His use of the data is not valid because the sample is too small and might not accurately represent ice cream sales.

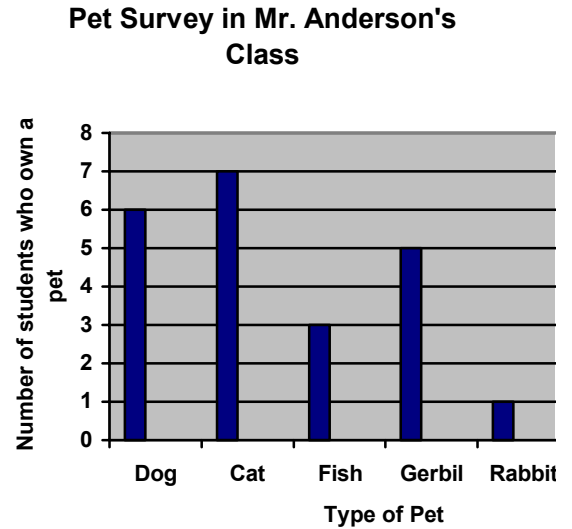
23. Bondville is a rapidly growing city. As the population has increased, so has the number of cars in the city. The scatterplot below shows the number of cars in the city as the population has changed.



Based on the data in this scatterplot, how many cars will there be in Bondville when the population reaches 100,000?

- (A) Between 30,000 and 32,000
- (B) Between 33,000 and 35,000
- (C) Between 36,000 and 38,000
- (D) Between 39,000 and 41,000

24. The graph below shows the results of a pet survey conducted in Mr. Anderson's class.



Which of these conclusions could NOT be made from the graph above?

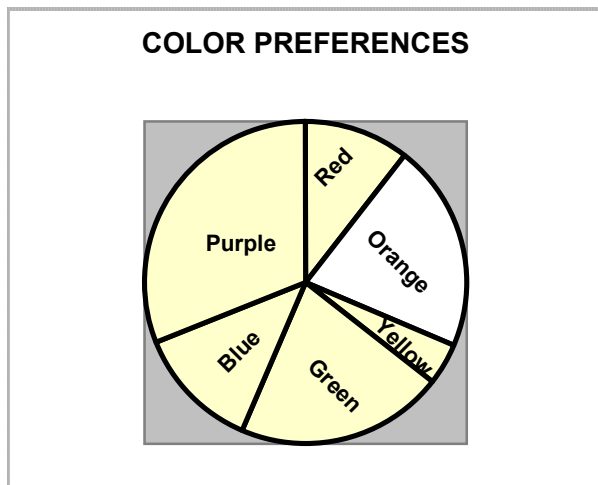
- (A) In Mr. Anderson's class, more students own dogs than rabbits.
- (B) The same number of students in Mr. Anderson's class own as many dogs as gerbils and fish combined.
- (C) Rabbits are not as popular as dogs and cats for pets.
- (D) Three students in Mr. Anderson's class own fish.

25. Samantha did a survey of 50 people to find out what their favorite colors were. The table below shows her findings.

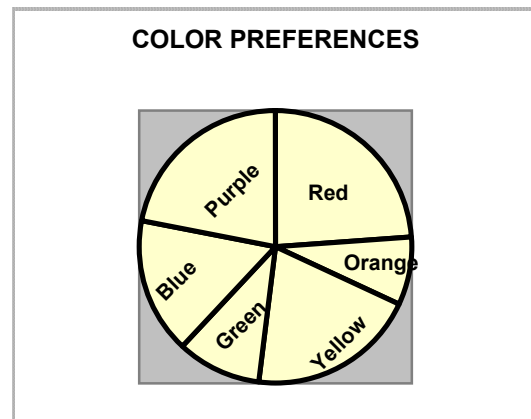
<b>Favorite Color</b>	<b>Number of People</b>
Red	12
Orange	4
Yellow	10
Green	5
Blue	8
Purple	11

Which circle graph best represents the data in the table?

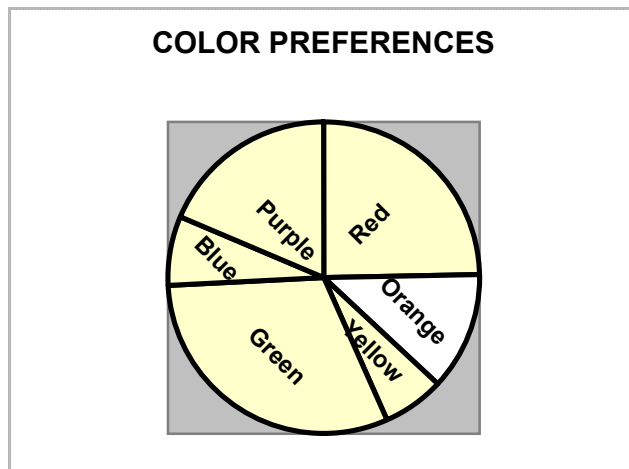
(A)



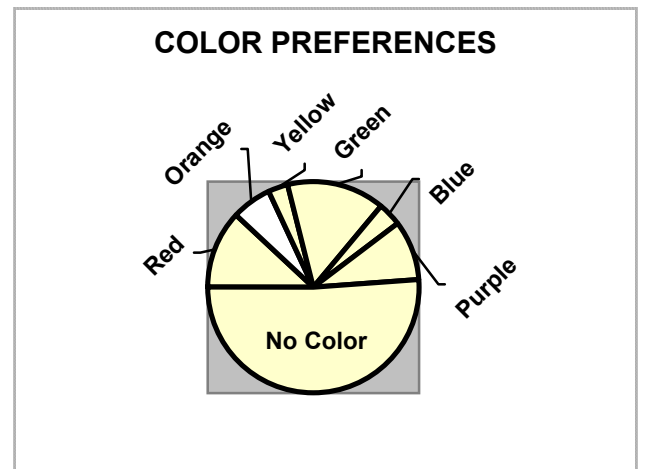
(B)



(C)



(D)



**END OF EXAMINATION**