

This test will tell you how well you understand the Common Core State Standards for Mathematics **after** using this book.

## Mastery Test

# Answer Key!

Directions: Read and answer each question.

- 1 Four friends split a restaurant bill equally. The total was \$28.40 and they left a 20% tip. How much was each person's share?

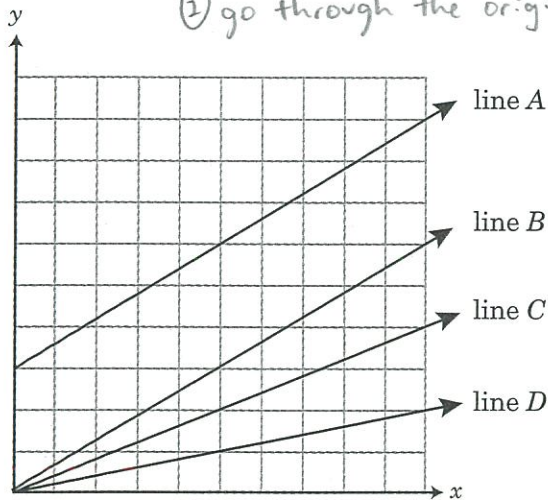
$$\frac{x}{28.40} = \frac{120}{100} \quad \frac{34.08}{4} =$$

Answer: \_\_\_\_\_

**\$8.52**

- 2 Which line on the graph represents a relationship that is NOT a direct proportion?

- ① needs to be straight  
② go through the origin



- Ⓐ line A                      Ⓒ line C  
Ⓑ line B                      Ⓓ line D

- 3 It takes 3,600 person-hours to complete a project. How many weeks will it take a team of 15 people to complete the job if each person works 8 hours, 5 days a week?

Answer: \_\_\_\_\_

$$15 \cdot 8 \cdot 5 = 600$$

$$\frac{3600}{600} = \text{6 weeks}$$

- 4 Kareem drives 140 miles to visit his cousin Abdul. The trip takes him  $2\frac{1}{2}$  hours. What was Kareem's average speed per hour if he drives continuously without stopping?

- Ⓐ 54 mph                      Ⓒ 56 mph  
Ⓑ 55 mph                      Ⓓ 60 mph

$$\frac{140}{2.5} = 56 \text{ mph}$$

- 5 Reynaldo is making purple paint using red and blue paint. The ratio of red paint to blue paint is 5 to 4. If Reynaldo has 6 quarts of blue paint, how much red paint does he need?

- Ⓐ  $3\frac{1}{3}$  quarts                      Ⓒ 7 quarts  
Ⓑ  $4\frac{4}{5}$  quarts                      Ⓓ  $7\frac{1}{2}$  quarts

$$\frac{5}{4} = \frac{x}{6}$$

$$4x = 30$$

$$x = 7.5$$

- 6 Michelle bought a sweater for \$24. The sweater was marked down 20%. What was the original price of the sweater before the sale?

$$\frac{24}{x} = \frac{80}{100} \quad \text{\$30.00}$$

- 7 Leyla's class used 10 cans of paint to paint 4 identical classrooms. Which proportion can be used to find  $c$ , the number of cans of paint needed to paint 7 more identical classrooms?

- Ⓐ  $\frac{c}{10} = \frac{4}{7}$                       Ⓒ  $\frac{4}{c} = \frac{7}{10}$   
Ⓑ  $\frac{c}{4} = \frac{10}{7}$                       Ⓓ  $\frac{10}{4} = \frac{c}{7}$

$$\frac{\text{cans } 10}{\text{classes } 4} = \frac{c}{7}$$

GO ON

Mastery Test

8 Erin bought a lamp for \$25.49. The next week, the lamp went on sale for \$19.89. What is the percentage decrease in the price of the lamp? Round to the nearest whole percent.

- (A) 6%
- (B) 22%**
- (C) 28%
- (D) 56%

$$\frac{5.60}{25.49} = \frac{x}{100}$$

$\approx 22\%$

9 Florencio invested \$8,200 for 3 years. He received a 3% simple interest rate. How much interest did he earn?

- (A) \$728
- (B) \$738**
- (C) \$2,460
- (D) \$7,380

$$I = 8200 \cdot 0.03 \cdot 3 = \$738.00$$

10  $-5 - (-17) = -5 + 17 = 12$

- (A) -12
- (B) 12**
- (C) -22
- (D) 22

11  $2 \times (-1 + 4) = 2 \cdot 3 = 6$

- (A) 6**
- (B) -6
- (C) -2
- (D) 2

12  $-42 \div (-6) = 7$

- (A) 7**
- (B) -48
- (C)  $\frac{1}{7}$
- (D) -7

13 Which fraction equals a repeating decimal?

- (A)  $\frac{4}{5} = 0.8$
- (B)  $\frac{3}{7}$**
- (C)  $\frac{2}{5} = 0.4$
- (D)  $\frac{6}{5} = 1\frac{1}{5} = 1.2$

$$\begin{array}{r} 0.428571 \\ 7 \overline{) 3.000000} \\ \underline{-28} \phantom{000} \\ 20 \phantom{00} \\ \underline{14} \phantom{00} \\ 60 \phantom{0} \\ \underline{56} \phantom{0} \\ 40 \phantom{0} \\ \underline{35} \phantom{0} \\ 50 \phantom{0} \\ \underline{49} \phantom{0} \\ 10 \phantom{0} \end{array}$$

14 Simplify.

$$-5\frac{5}{8} - 6\frac{2}{9}$$

- (A)  $11\frac{61}{72}$
- (B)  $\frac{43}{72}$
- (C)  $-\frac{43}{72}$
- (D)  $-11\frac{61}{72}$**

15 The temperature in Juneau is  $-8^\circ\text{F}$ . If the temperature drops 7 degrees, what will the new temperature be?

- (A)  $1^\circ\text{F}$
- (B)  $-1^\circ\text{F}$
- (C)  $15^\circ\text{F}$
- (D)  $-15^\circ\text{F}$**

$$-8 - 7 = -15$$

16  $-2\frac{1}{2} \times (-\frac{1}{6}) = -\frac{5}{2} \cdot -\frac{1}{6} = \frac{5}{12}$

- (A)  $\frac{5}{12}$**
- (B)  $-\frac{5}{12}$
- (C)  $2\frac{2}{3}$
- (D)  $-2\frac{2}{3}$

17 To make a smoothie, Carrie uses  $1\frac{3}{4}$  cups of yogurt. She bought a container of yogurt that holds 4 cups. How much yogurt will she have left after she makes her smoothie?

$$4 - 1\frac{3}{4} = 2\frac{1}{4} \text{ or } 2.25$$

Answer: 2.25 or  $\frac{9}{4}$

18 Name the property demonstrated by the equation below.

$$5(20 + 9) = (5 \times 20) + (5 \times 9)$$

- (A) Commutative Property
- (B) Identity Property of Multiplication
- (C) Associative Property
- (D) Distributive Property**

- 19 What is the product of the following expression?

$$\frac{5}{7} \times 6 \times 1\frac{2}{5} \times 10$$

Answer:

$$\frac{15}{7} \cdot \frac{6}{1} \cdot \frac{7}{5} \cdot \frac{10}{1} = 60$$

- 20 Harry is lifting weights. The weight of one set of hand weights is  $10\frac{3}{4}$  pounds. The weight of the other set is  $15\frac{1}{16}$  pounds. Estimate the sum of the weights of the two sets of hand weights.

Answer:  $11 + 15 = 26$  pounds

- 21 Judy bought 39 bags of mulch that each weighed 19.75 pounds. Estimate the total weight of all the bags Judy bought.

- Ⓐ 800 lb                      Ⓒ 900 lb  
Ⓑ 8,000 lb                    Ⓓ 400 lb

$$40 \cdot 20 = 800 \text{ lb}$$

- 22 Estimate the percentage that describes 148 out of 301.

Answer: \_\_\_\_\_

- 23 Evaluate this expression for  $f = 7$  and  $g = 4$ .

$$\frac{(4f - g)}{f + f(g - 6) - f^2}$$

- Ⓐ  $-\frac{3}{7}$   
Ⓑ  $-\frac{4}{7}$   
Ⓒ  $-1\frac{1}{8}$   
Ⓓ  $-1\frac{5}{7}$

$$\frac{(4(7) - 4)}{7 + 7(4 - 6) - 7^2} =$$

$$\frac{24}{7 + 28 - 42 - 49} =$$

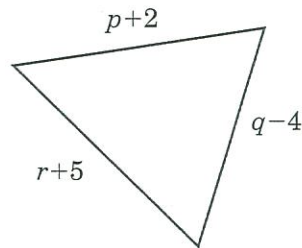
$$\frac{24}{-56} = -\frac{3}{7}$$

- 24 Simplify.

$$7(-a - 3) + 5a + 6$$

- Ⓐ  $-2a - 15$                        $-7a - 21 + 5a + 6$   
Ⓑ  $4a + 10$                          $-2a - 21 + 6$   
Ⓒ  $28a + 21$   
Ⓓ  $-2a + 3$                           $-2a - 15$

- 25 The perimeter of a triangle equals the sum of the lengths of its sides. Which expression equals the perimeter of this triangle?



- Ⓐ  $pqr + 3$                          $p + 2 + r + 5 + q - 4$   
Ⓑ  $pqr + 11$   
Ⓒ  $p + q + r + 3$                        $p + r + q + 3$   
Ⓓ  $p + q + r + 11$

- 26 Which expression represents 32 less than the quotient of a number and 14?

- Ⓐ  $32 - \frac{n}{14}$                         Ⓒ  $\frac{n}{14} - 32$   
Ⓑ  $32 - \frac{14}{n}$                         Ⓓ  $\frac{14}{n} + 32$

- 27 Simplify.

$$\frac{n}{14} - 32$$

$$(2x - x^2 - 3) + (4x^2 - 3x - 2)$$

- Ⓐ  $3x^2 - x - 5$                        $3x^2 - x - 5$   
Ⓑ  $6x^2 - 4x - 5$   
Ⓒ  $3x^2 + 5x - 1$   
Ⓓ  $5x^2 + 5x + 5$

Mastery Test

28 Jason shopped for new school clothes. He purchased a pair of pants for \$24.75 and a shirt for \$15.00. There is a 5% sales tax on all clothing. What is a reasonable estimate of what Jason's purchases will cost him?

- (A) \$35.00 (B) \$40.00 (C) \$42.00 (D) \$45.00

$$\frac{x}{39.75} = \frac{105}{100} \quad x = \$41.74$$

29 Olivia joined a gym. The table shows her cost,  $C$ , for the first four months,  $m$ . Identify the expression that can be used to find the cost for any number of months.

$m$	$C$
1	\$60
2	\$100
3	\$140
4	\$180

- (A)  $m + 40$  (B)  $m \times 60$  (C)  $40m + 20$  (D)  $60m + 40$
- $40(1) + 20 = 60$   
 $40(2) + 20 = 100$   
 $40(3) + 20 = 140$   
 $40(4) + 20 = 180$

30 Solve for  $b$ .

$$2b + 9 = 35$$

- (A)  $b = 13$  (B)  $b = 22$  (C)  $b = -13$  (D)  $b = -22$
- $2b = 26$   $b = 13$

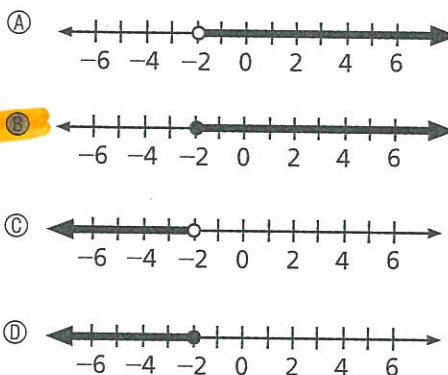
31 Jessica is 56 inches tall. She is 2 inches more than  $\frac{2}{3}$  of her sister's height. Which equation can be used to find her sister's height,  $s$ ?

- (A)  $56 = (\frac{2}{3})s + 2$  (B)  $56 + 2 = (\frac{2}{3})s$  (C)  $\frac{2}{3} + 2s = 56$  (D)  $56s - 2 = \frac{2}{3}$
- $\frac{2}{3}$  of her sisters height  
 $\rightarrow$  2 more than

32 Reed and Catherine are friends. Catherine is one year older than Reed. The sum of their ages is 29. Which equation represents this situation if  $r$  represents Reed's age?

- (A)  $r + (r + 1) = 29$  (B)  $r + (1 - r) = 29$  (C)  $r + (r - 1) = 29$  (D)  $r - (r + 1) = 29$
- $r + (r + 1) = 29$   
 $\downarrow$  reed's age       $\downarrow$  Catherine's age

33 Which number line shows the graph of the inequality  $x \geq -2$ ?



34 What is the solution set for this inequality?

$$5h > 9h + 12$$

$-4h > 12$   
 $h < -3$

- (A)  $h < -3$  (B)  $h > -3$  (C)  $h < 3$  (D)  $h > 3$

35 Jennifer is solving the equation below.

$$9 + \frac{x}{3} = -10$$

She multiplies both sides by 3. What should she do next?

- (A) Add 10 to both sides. (B) Add 30 to both sides. (C) Subtract 9 from both sides. (D) Subtract 27 from both sides.

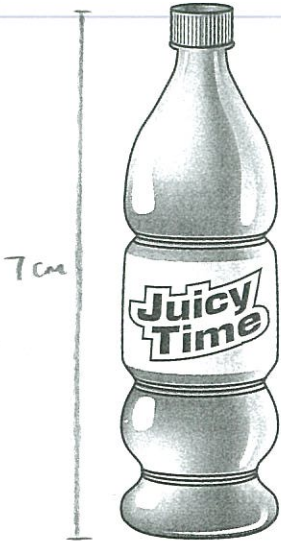
she should subtract 9 first

$$3(9 + \frac{x}{3} = -10)$$

$$27 + x = -30$$

$$\underline{-27} \quad \underline{-27}$$

- 36 The scale drawing shows a new juice drink bottle. Measure and find the actual height of the bottle.



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

$$x = 21 \text{ cm}$$

Key: 1 cm = 3 cm

- (A) 7 cm  
 (B) 10 cm  
 (C) 15 cm  
 (D) 21 cm

- 37 Which shape **cannot** be the cross section of a square pyramid?

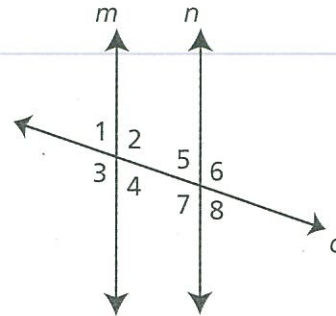
(A) → cut off a corner from the bottom

(B) → parallel to the base

(C) → diagonal cut

(D)

- 38 In the figure below,  $m$  and  $n$  are parallel lines.

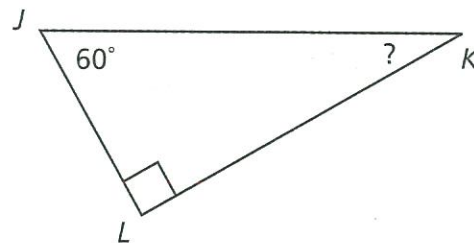


What is the relationship between angle 4 and angle 5?

- (A) alternate interior angles  
 (B) alternate exterior angles  
 (C) complementary angles  
 (D) corresponding angles

→ inside the parallel lines and opposite sides of the transversal

- 39 What is the measure of  $\angle K$ ?



Answer:  $90 + 60 + x = 180$   
 $150 + x = 180$   
 $x = 30^\circ$

- 40 Jorge is reading a map with a scale of 1 inch = 25 miles. Two cities are  $5\frac{3}{4}$  inches apart on the map. Estimate the actual distance between the two cities.

- (A) 5 miles  
 (B) 6 miles  
 (C) 125 miles  
 (D) 144 miles

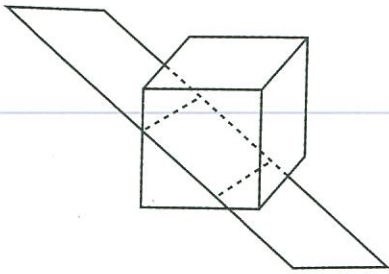
$$\frac{1}{25} = \frac{5.75}{x}$$

$$x = 143.75 \text{ mi}$$



# Mastery Test

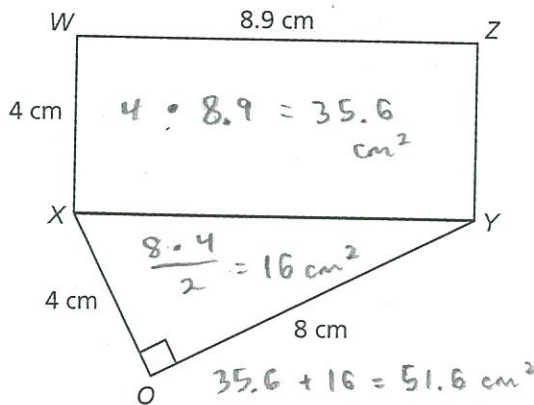
41 A plane intersects a cube as shown below.



Which shape BEST describes the cross section?

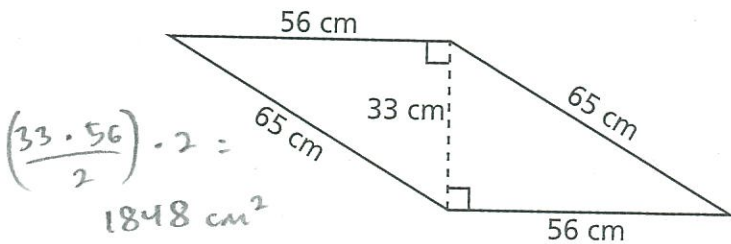
- (A) square
- (B) triangle
- (C) kite
- (D) rectangle

42 Choose the best estimate for the area of this pentagon.



- (A) 19 cm<sup>2</sup>
- (B) 25 cm<sup>2</sup>
- (C) 29 cm<sup>2</sup>
- (D) 52 cm<sup>2</sup>

43 Sam is building a table. The figure shows the dimensions of the top of the table. What is the area of the tabletop?



- (A) 924 cm<sup>2</sup>
- (B) 1,848 cm<sup>2</sup>
- (C) 2,145 cm<sup>2</sup>
- (D) 3,640 cm<sup>2</sup>

44 Lucinda is trimming the edge of a circular tablecloth. The tablecloth has a diameter of 7 feet. How much trim does Lucinda need? (Use  $\frac{22}{7}$  for  $\pi$ .)

- (A) 44 ft
- (B) 22 ft
- (C) 11 ft
- (D) 5.5 ft

$$\pi(7) = 21.98 \text{ ft}$$

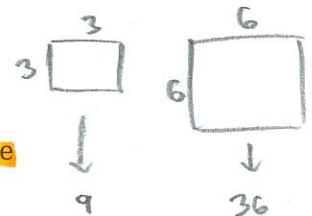
45 The new city park will have a large center area paved with brick. This area will be a circle with a diameter of 100 feet. Find the area of this circle. (Use 3.14 for  $\pi$ .)

- (A) 628 ft<sup>2</sup>
- (B) 3,140 ft<sup>2</sup>
- (C) 7,850 ft<sup>2</sup>
- (D) 31,400 ft<sup>2</sup>

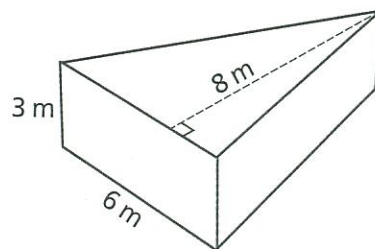
$$\pi(50)^2 = 7850 \text{ ft}^2$$

46 Christine drew a 3-inch square and colored it blue. Then she drew a 6-inch square and colored it red. How much greater is the area of the red square than the blue square?

- (A) the same size
- (B) twice as large
- (C) four times as large
- (D) six times as large



47 The foundation for a new sculpture is a hole shaped like this triangular prism.



Find the number of cubic meters of dirt that will be removed from the hole.

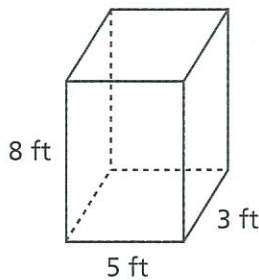
- (A) 18 m<sup>3</sup>
- (B) 48 m<sup>3</sup>
- (C) 72 m<sup>3</sup>
- (D) 144 m<sup>3</sup>

$$\left(\frac{6 \cdot 8}{2}\right) \cdot 3 = 72 \text{ m}^3$$

48 The density of sugar cane is 400.5 kilograms per cubic meter. Victor is transporting bundles of sugar cane in his truck. The bundles take up a space that measures 2 meters by 2 meters by 1 meter. Find the mass of the bundles of sugar cane.

- (A) 801 kg  
 (B) 1,602 kg  
 (C) 3,204 kg  
 (D) 6,408 kg
- $2 \cdot 2 \cdot 1 = 4 \text{ m}^3$   
 $400.5 \cdot 4 = 1602 \text{ kg}$

49 Justin is making this crate out of plywood. How much plywood does he need?

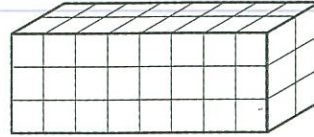


- (A) 79 ft<sup>2</sup>  
 (B) 120 ft<sup>2</sup>  
 (C) 143 ft<sup>2</sup>  
 (D) 158 ft<sup>2</sup>
- $5 \cdot 3 \cdot 2 = 30$   
 $5 \cdot 8 \cdot 2 = 80$   
 $3 \cdot 8 \cdot 2 = 48$   
 $\underline{\hspace{1cm}}$   
 $158 \text{ ft}^2$

50 A square rug is made from 324 squares that have sides measuring 1 foot. What is the length of one side of the rug?

- (A) 3.24 ft  
 (B) 16.2 ft  
 (C) 18 ft  
 (D) 32.4 ft
- $\sqrt{324} = 18$   
 $18 \cdot 18 = 324$

51 For this prism, the areas of the front, top, and right sides are 24, 16, and 6 square units.



Choose the expression that equals the surface area of the prism.

- (A)  $(6 + 16 + 24)$   
 (B)  $2 \times (6 + 16 + 24)$   
 (C)  $2 \times (6 \times 16 \times 24)$   
 (D)  $2 + (6 + 16 + 24)$

Claire recorded the height in inches of the corn plants in her garden. Her results are shown below. Use the data to answer questions 52 and 53.

~~62, 65, 64, 60, 65, 60, 64, 63, 64, 61,~~  
~~61, 64, 62, 64, 63, 63, 60, 62, 65, 64,~~  
~~63, 64, 61, 65, 62, 65, 65, 62, 64, 60~~

52 Which data item has the least frequency?

- (A) 60 - 4  
 (B) 61 - 3  
 (C) 63 - 4  
 (D) 64 - 8

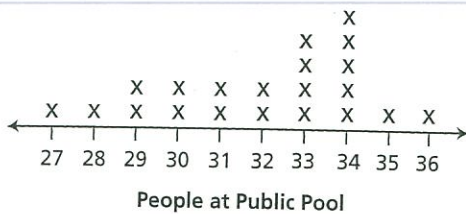
53 Which conclusion could you accurately draw from Claire's data?

- (A) Half of the plants are less than 63 inches tall.  
 (B) About half of the plants are 64 inches tall.  
 (C) The same number of plants are 60 inches tall as are 63 inches tall.  
 (D) The most number of plants are 63 inches tall.

(look at # 52)



This line plot shows the number of people who use a neighborhood pool. Use the plot to answer questions 54 and 55.



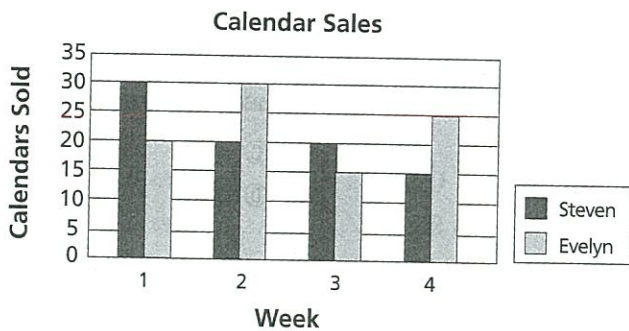
54 What is the mode?

- (A) 9
- (B) 32
- (C) 33
- (D) 34 *5 times*

55 What is the median? *→ the 11th value*

- (A) 30
- (B) 32
- (C) 33
- (D) 34

56 This graph shows the number of calendars sold for a fundraiser by two students.



Which quantity **cannot** be found on the graph?

- (A) total number of calendars sold by each student
- (B) which student sold the most calendars each week
- (C) total money raised by each student
- (D) the week with the greatest total number of calendars sold by the two students

Larry recorded the number of students he saw each day wearing purple. His data is shown below. Use the data to answer questions 57 and 58.

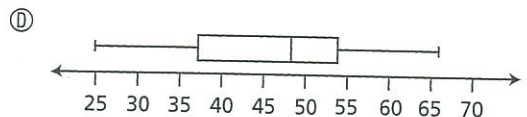
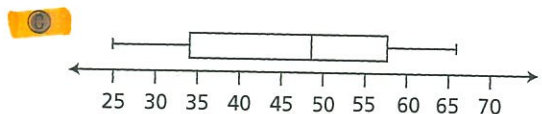
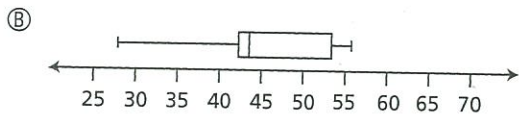
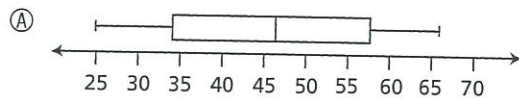
56, 37, 25, 62, 38, 34, 29,

65, 66, 34, 54, 58, 50, 48

57 What is the lower quartile of the data?

- (A) 34
- (B) 35.5
- (C) 37
- (D) 38

58 Which box-and-whisker plot shows the data?



*min = 25*

*Q<sub>1</sub> = 34*

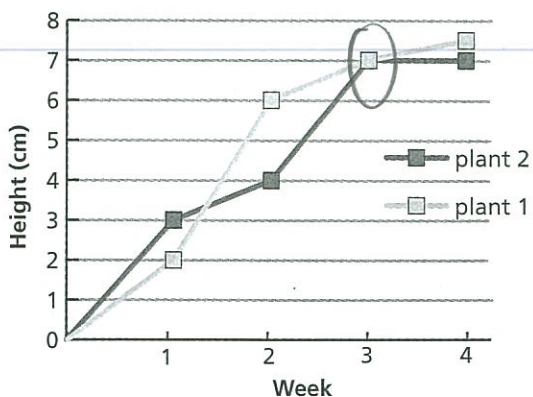
*med = 49*

*Q<sub>3</sub> = 58*

*max = 66*



- 59 This line graph shows the height of two plants that Sam grew for four weeks.



During which week were the plants the same height?

- (A) week 1  
 (B) week 2  
 (C) week 3  
 (D) week 4
- 60 Jabar recorded the number of points the school basketball team scored each game this season on a stem-and-leaf plot. Looking at the shape of the data in the stem-and-leaf plot, which statement are you certain is true?

Stem	Leaf
2	3 6 8 9 9
3	1 4 4 4 5 6 9
4	4 6 6 6 8
5	2 6

- (A) Most of the time, the basketball team scored fewer than 30 points.  
 (B) The basketball team scored about 40 points in each game.  
 (C) Almost always, the basketball team scored between 20 and 50 points.  
 (D) The average number of points the team scored per game is 30.

- 61 Diane's teacher puts 9 red, 15 black, and 6 yellow chips in a bag. What are Diane's chances of getting a yellow chip on the first draw?

- (A)  $\frac{1}{4}$   
 (B)  $\frac{1}{5}$   
 (C) 2%  
 (D) 25%
- $\frac{6}{30} = \frac{1}{5}$

- 62 Six cards are put into a hat. The cards have these symbols.

1 2 3 A B C

A card is drawn, replaced, and a second card is drawn. What are the chances of getting a 1 and then a B?

- (A)  $\frac{1}{36}$   
 (B)  $\frac{1}{6}$   
 (C)  $\frac{11}{30}$   
 (D)  $\frac{1}{3}$
- $\frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$

- 63 Audrey used this spinner 20 times. She spun 2 exactly twice.

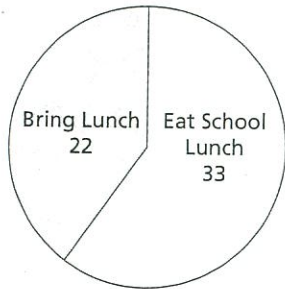


If Audrey were to use the spinner 100 times, which is the most likely outcome of her experiment?

- (A) She would spin 2 about 10 times.  
 (B) She would spin 2 about 25 times.  
 (C) She would spin 2 more often than she would spin 4.  
 (D) She would spin 2 more often than she would spin either 1 or 4.

Mastery Test

The circle graph shows the number of seventh-grade students at Henderson Middle School who eat a school lunch and the number of students who bring their lunch. Use the graph to answer questions 64 and 65.



64 What is the probability that a student chosen at random from the seventh grade will eat a school lunch?

- (A)  $\frac{1}{3}$
- (B)  $\frac{2}{5}$

(C)  $\frac{33}{55} = \frac{3}{5}$   
 (D)  $\frac{22}{55}$

65 Which is the best prediction of how many of the 300 students at Henderson Middle School bring their lunch?

- (A) 200
- (B) 180
- (C) 150
- (D) 120

$$\frac{22}{55} = \frac{x}{300}$$

$$55x = 6600$$

$$x = 120$$

66 The chess club has 8-seventh graders and 10-eighth graders. Two members will be chosen at random to compete in a state match. How many different 2-person teams are possible?

- (A) 18
- (B) 36
- (C) 153
- (D) 324

67 George took a survey to find out the number of siblings (brothers and sisters) his classmates have. Here are his results.

Number of Siblings	Number of Students
0	36
1	74
2	46
3	23
more than 3	21

Based on this data, what is the probability that a student chosen at random from this group will have no brothers or sisters?

- (A)  $\frac{1}{365}$
- (B)  $\frac{9}{10}$
- (C)  $\frac{9}{2}$
- (D)  $\frac{9}{50}$

$$36 + 74 + 46 + 23 + 21 = 200$$

$$\frac{36}{200} = \frac{18}{100} = \frac{9}{50}$$



Number Correct/Total = \_\_\_\_/67