Read each question carefully and decide which of the five choices best answers the question. You may use a calculator to answer any of the questions; however, most questions can be answered without a calculator by using reasoning and estimation. You have 90 minutes to complete the 50 questions on this simulated test.

1. Which of the following has a value greater than $\frac{1}{2}$?
   A. $\frac{5}{11}$
   B. 0.098
   C. $\frac{16}{32}$
   D. 0.46
   E. $\frac{15}{25}$

2. Consider the equation $5(x - 4) = x + 4$. To solve the equation for $x$, what would be the most logical first step?
   A. Subtract 4 from each side of the equation.
   B. Multiply both sides of the equation by 5.
   C. Multiply each term in the expression $x - 4$ by 5.
   D. Add 4 to both sides of the equation.
   E. Subtract $5x$ from both sides of the equation.

3. Jana says, “I’m thinking of a number. Four more than twice my number is less than 20. My number is not 4 or less than 4.” Which inequality represents the range that includes Jana’s number?
   A. $n < 20$
   B. $2 < n < 8$
   C. $2 < n < 16$
   D. $4 < n < 8$
   E. $4 < n < 20$

4. The chart below lists the thickness in millimeters of various objects.

<table>
<thead>
<tr>
<th>Object</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>red blood cell</td>
<td>0.0076 mm</td>
</tr>
<tr>
<td>silk fibre</td>
<td>0.015 mm</td>
</tr>
<tr>
<td>sheet of paper</td>
<td>0.09 mm</td>
</tr>
<tr>
<td>pencil lead</td>
<td>0.7 mm</td>
</tr>
<tr>
<td>head of a pin</td>
<td>2.0 mm</td>
</tr>
</tbody>
</table>

About how many times thicker is pencil lead compared to a red blood cell?
   A. 10
   B. 100
   C. 1,000
   D. 10,000
   E. 100,000
5 Which of the following shows the expression \( \left( \frac{x^{-1}}{x^2} \right)^{-3} \) in simplified form using positive exponents?

A \( \frac{1}{x^7} \)
B \( \frac{1}{x^3} \)
C \( x \)
D \( x^6 \)
E \( x^9 \)

6 After she pays her bills each month, Lana has $300 left. Based on the graph below, which is the best estimate of how much she will spend on movies and eating out?

**Discretionary Spending 16- to 22-Year-Olds**

- Shopping for Pleasure 34%
- Hobbies 12%
- Movies 24%
- Eating Out 30%

A $75
B $90
C $160
D $180
E $200

7 Janice is building shelving for her office. Each shelf will be 3 feet 9 inches in length. She can buy boards that are 13\(\frac{1}{2}\) feet long. How many boards does she need to buy to make 30 shelves?

A 9
B 10
C 15
D 26
E 30

8 On the coordinate plane below, which of the following could be the coordinates of point A?

- A (2, –5)
- B (2, 5)
- C (–2, –5)
- D (–5, –2)
- E (–5, 2)
9. A recent poll shows 40 people in favor of water rationing, 18 people against, and 2 people with no opinion. In lowest terms, what fraction of the people polled are against water rationing?
   A. \( \frac{1}{20} \)
   B. \( \frac{1}{9} \)
   C. \( \frac{3}{10} \)
   D. \( \frac{9}{20} \)
   E. \( \frac{2}{3} \)

10. The floor plan for a recreation room in a community center is shown below. All measurements are in feet. All angles are 90°.

What is the perimeter of the recreation room in feet?
   A. 77
   B. 84
   C. 92
   D. 104
   E. 134

11. A baseball team won 40 of its first 60 games. What is the team’s ratio of wins to losses?
   A. 1:2
   B. 1:3
   C. 2:1
   D. 2:3
   E. 3:5
Directions: Questions 12 and 13 are based on the table and graph below.

### Year 1: Sales Data by Quarter

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Sales Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$50,000</td>
</tr>
<tr>
<td>2</td>
<td>$45,000</td>
</tr>
<tr>
<td>3</td>
<td>$45,000</td>
</tr>
<tr>
<td>4</td>
<td>$35,000</td>
</tr>
</tbody>
</table>

### Year 2: Sales Data by Quarter

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Sales Revenue (in thousands of $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>70</td>
</tr>
<tr>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td>4</td>
<td>50</td>
</tr>
</tbody>
</table>

12 In Year 2, sales revenue was how much greater in Quarter 1 than in Quarter 3?

- A $5,000
- B $10,000
- C $15,000
- D $20,000
- E $25,000

13 In which quarter was there no change from Year 1 to the same quarter in Year 2?

- A Quarter 1
- B Quarter 2
- C Quarter 3
- D Quarter 4
- E All quarters showed a change.

14 A dining room table regularly sells for $440. During a weekend sale, the price is reduced to $330. What is the percent decrease in price?

- A 10%
- B 11%
- C 20%
- D 25%
- E 33 1/3%

15 In the figure below, line l is parallel to line m. What is the measure of x?

- A 140°
- B 110°
- C 100°
- D 70°
- E 40°
16 The variables $a$, $b$, $c$, $d$, and $e$ represent points on the number line below. Which expression would have the least value?

![Number line with points labeled a, b, c, d, e]

- **A** $2d$
- **B** $e - a$
- **C** $b + c$
- **D** $ab$
- **E** $-(a + b)$

17 In the drawing below, $\triangle CBA$ is similar to $\triangle CQR$. What is the length of side $BC$?

![Triangle diagram with angles and side lengths labeled]

- **A** 10
- **B** 36
- **C** 64
- **D** 100
- **E** 120

18 A line passes through points $(-1, 4)$ and $(3, 2)$. What is the equation of the line in standard form?

- **A** $x + 8y = 19$
- **B** $x + 2y = 7$
- **C** $2x + y = 2$
- **D** $5x - 3y = 9$
- **E** $2y - x = 7$

19 Scientists measure the length of a wave of light in meters. During an experiment, the wavelengths for several types of light are recorded. The results are shown in the table below.

<table>
<thead>
<tr>
<th>Light</th>
<th>Wavelength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultraviolet light</td>
<td>$9.0 \times 10^{-8}$ m</td>
</tr>
<tr>
<td>Violet light</td>
<td>$4.0 \times 10^{-7}$ m</td>
</tr>
<tr>
<td>Red light</td>
<td>$6.5 \times 10^{-7}$ m</td>
</tr>
<tr>
<td>Infrared light</td>
<td>$1.8 \times 10^{-6}$ m</td>
</tr>
</tbody>
</table>

The wavelength of infrared light is about how many times greater than the wavelength of ultraviolet light?

- **A** 20
- **B** 200
- **C** 2,000
- **D** 20,000
- **E** 200,000
A manager wants to find out how many hours the salespeople spend on the phone during an 8-hour shift. She surveys 16 workers and gathers the information shown on the histogram below.

Based on the data, which is a true statement?

A  Over 50% of the workers spend more than 3 hours on the phone.
B  Every worker spends at least 2 hours on the phone.
C  The median time spent on the phone is 3 hours.
D  More than 25% of the workers spend less than 2 hours on the phone.
E  Most of the workers spend 4 hours on the phone.

Sean is driving from Pittsburgh to St. Louis. He plans to stop in Columbus to pick up supplies.

If he drives at an average rate of 55 miles per hour, about how many hours will he spend driving?

\[ \text{distance} = \text{rate} \times \text{time} \]

A  7
B  8
C  9
D  10
E  11

The triangle and the rectangle shown below have the same area.

If the height \( h \) of the triangle is 6, what is the measure of the base \( b \)?

Area of a rectangle = length \times width
Area of a triangle = \( \frac{1}{2} \times \text{base} \times \text{height} \)

A  3
B  4
C  6
D  12
E  18
23 Which choice shows $\sqrt{72x^3}$ in simplified form?
A $3x^2\sqrt{8x}$
B $6x\sqrt{2x}$
C $8x\sqrt{9x^2}$
D $12x^2\sqrt{6x}$
E $36x\sqrt{2x}$

24 A fitness club has 60 members. Of the total members, $\frac{2}{3}$ are registered for yoga classes. Of those, $\frac{5}{8}$ also use the weight room. Which expression shows how many members use the weight room and also take a yoga class?
A $60 \times \frac{2}{3} \times \frac{5}{8}$
B $(60 \times \frac{2}{3}) + (60 \times \frac{5}{8})$
C $60 \times (\frac{2}{3} + \frac{5}{8})$
D $(60 \div \frac{2}{3}) \times \frac{5}{8}$
E $(60 \div \frac{5}{8}) \times \frac{2}{3}$

25 Ron can earn a bonus if he can average 6 sales per week for 8 weeks. He made 7 sales for each of the first two weeks. The third week, he made only 3 sales. He averaged 5 sales per week for the next 4 weeks. What is the minimum number of sales he needs in the eighth week to earn the bonus?
A 1
B 6
C 7
D 11
E 18

26 What are the possible solutions for the equation: $|\frac{x}{2} + 1| = 7$
A $-16$ and $16$
B $-16$ and $12$
C $-12$ and $12$
D $-12$ and $16$
E 12 only

27 One number ($x$) is 4 less than twice another number ($y$). The difference of the numbers is 8. Which of these systems could be used to solve for the unknown numbers?
A $\begin{cases} 2y - 4 = x \\ x + y = 8 \end{cases}$
B $\begin{cases} x - 4 = 2y \\ x - y = 8 \end{cases}$
C $\begin{cases} 2y = x - 4 \\ y - x = 8 \end{cases}$
D $\begin{cases} 2x - 4 = y \\ xy = 8 \end{cases}$
E $\begin{cases} x = 2y - 4 \\ x - y = 8 \end{cases}$

28 One tube holds 375 milliliters of antibiotic ointment. Which of the following represents the number of tubes that can be filled from 2 liters of the ointment?
A $2 \times 375 \div 1,000$
B $2 \times 375 \div 100$
C $2 \times 100 \times 375$
D $(2 \times 1,000) \div 375$
E $(2 \times 100) \div 375$
Directions: Questions 29 and 30 refer to the following graph, which shows the number of children of each age enrolled in a class at summer camp.

Dino Camp for Young Scientists

<table>
<thead>
<tr>
<th>Age</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
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<td>X</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

29 What age represents the mode of the data?
A 7
B 8
C 8.5
D 9
E 10

30 If there are 25 children in all, what percent are either 10 or 11 years old?
A 5%
B 15%
C 20%
D 35%
E 40%

31 Rectangle $ABCD$ is 6 inches wide and 10 inches long.

Which of the following represents the exact distance from $A$ to $C$, in inches?
A $6\sqrt{10}$
B $3\sqrt{15}$
C $2\sqrt{15}$
D $2\sqrt{30}$
E $2\sqrt{34}$

32 A circle with center $O$ is inscribed in square $ABCD$. If the area of the square is 4 square inches, what is the area of the shaded region of the circle, in square inches?

Area of a square = side$^2$
Area of a circle = $\pi$ (radius)$^2$

A $\frac{\pi}{4}$
B $\frac{\pi}{2}$
C $2\pi$
D $4\pi$
E $\pi^2$
33 Electrical wiring is classified by its diameter, or distance through the center. Five diameters of wire are shown on the chart.

<table>
<thead>
<tr>
<th>Wire</th>
<th>Diameter in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>0.204</td>
</tr>
<tr>
<td>Type 2</td>
<td>0.09076</td>
</tr>
<tr>
<td>Type 3</td>
<td>0.3</td>
</tr>
<tr>
<td>Type 4</td>
<td>0.19</td>
</tr>
<tr>
<td>Type 5</td>
<td>0.072</td>
</tr>
</tbody>
</table>

Which wire has the smallest diameter?

A. Type 1
B. Type 2
C. Type 3
D. Type 4
E. Type 5

34 A sporting goods store is having a sale on golf balls. The sale prices by brand are shown in the table.

<table>
<thead>
<tr>
<th>Brand</th>
<th>Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro Elite</td>
<td>10 for $15.79</td>
</tr>
<tr>
<td>Fly High</td>
<td>1 dozen for $23.76</td>
</tr>
<tr>
<td>Gold Star</td>
<td>$3.89 each</td>
</tr>
<tr>
<td>Pro Tour</td>
<td>15-pack for $30.90</td>
</tr>
<tr>
<td>Nite Flight</td>
<td>3 for $7.50</td>
</tr>
</tbody>
</table>

Which brand is the best buy?

A. Pro Elite
B. Fly High
C. Gold Star
D. Pro Tour
E. Nite Flight

35 A carpenter earned $720 for a certain job. Her apprentice also earned $720, but the apprentice earned $6 less per hour and worked 10 hours more than the carpenter. How much did the carpenter earn per hour?

A. $40
B. $30
C. $24
D. $18
E. $16
36 Which of the following is the graph of a linear function with a positive slope and a negative y-intercept?

A

B

C

D

E

37 Nick is playing a dice game with a friend. If he wins a round, he earns 9 points. If he loses a round, he loses 4 points. After 15 rounds, Nick has 18 points. How many rounds did he lose?

A 2  
B 4  
C 5  
D 7  
E 9

38 A set contains the numbers 4, 8, 8, 10, and 12. Which of the following numbers could be added to the set without changing the median of the set?

A 7  
B 8.5  
C 9  
D 9.5  
E 10

39 Find the sum of $\frac{x-2}{x+4}$ and $\frac{1}{x}$.

A $\frac{x^2-x-4}{x^2+4x}$  
B $\frac{x^2-x-1}{x^2+x}$  
C $\frac{x-4}{4x}$  
D $\frac{x-1}{2x+4}$  
E $\frac{1}{x}$
40. A customer spends exactly $3.21 on stamps. Each stamp is worth either 13 cents or 17 cents. The number of 13-cent stamps is \( \frac{3}{4} \) the number of 17-cent stamps. How many stamps did the customer buy in all?
   A 11  
   B 12  
   C 17  
   D 21  
   E 30

41. A bag contains red, blue, and yellow marbles. There are 20 marbles in all. In an experiment, Lisa draws out 1 marble at random, records the color, and returns the marble to the bag. After 10 trials, she has drawn out 3 blue, 1 red, and 6 yellow.
   Which of the following is the most likely conclusion that can be drawn about the contents of the bag?
   A There are at least 6 yellow marbles in the bag.  
   B There are more yellow marbles than blue or red combined.  
   C There are more yellow marbles than red in the bag.  
   D There are about the same number of blue and yellow marbles.  
   E There are no more than 2 red marbles in the bag.

42. A robotic car traveled at a speed of 12 miles per hour up a hill. It then returned down the hill at 48 miles per hour. The trip took a total of 30 minutes. How many minutes did it take the car to travel up the hill?
   A 6  
   B 7.5  
   C 12  
   D 15  
   E 24

43. Suppose the equation \( y = -\frac{2}{3}x + 2 \) is graphed on a coordinate plane. What are coordinates of the point where the graph intersects the \( x \)-axis?
   A \((-3, 0)\)  
   B \((-2, 0)\)  
   C \((0, 2)\)  
   D \((0, 3)\)  
   E \((3, 0)\)
44 Consider the graph below.

Accuracy of Weather Forecast
March 15 to March 29

Forecasted Temperature (°F)

Actual Temperature (°F)

35 40 45 50 55 60 65 70

Which of the following conclusions can you draw from the data?

A The temperature steadily increased from March 15 to March 29.
B The forecasted temperature was usually greater than the actual temperature.
C During the 2-week period, the actual temperature was usually below 55°.
D The forecast was most accurate on March 29.
E The actual temperature from March 15 to March 29 was higher than in previous years.

45 A rectangular piece of cardboard measures 3 feet by 4 feet. Evan needs to cut smaller rectangles of cardboard, each measuring 6 inches by 8 inches. How many smaller pieces can he cut from the large piece?

A 4
B 12
C 24
D 36
E 48

46 Which correctly factors the following expression?

\[3x^2 + 13x - 30\]

A \((3x + 5)(x - 6)\)
B \((x - 10)(3x + 3)\)
C \((3x - 5)(x + 6)\)
D \((x + 10)(3x - 3)\)
E \((3x + 6)(x - 5)\)

47 The table shows inputs and outputs for a certain function.

<table>
<thead>
<tr>
<th>Input x</th>
<th>-4</th>
<th>2</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output f(x)</td>
<td>20</td>
<td>2</td>
<td>-16</td>
</tr>
</tbody>
</table>

Which of the following is that function?

A \(f(x) = 4x - 6\)
B \(f(x) = -x - 8\)
C \(f(x) = -2x + 2\)
D \(f(x) = -3x + 8\)
E \(f(x) = -5x - 1\)
48 The graph represents the solution set of which of the following inequalities?

\[ -9 \leq n + 4 \leq -4 \]

\[ -2 \geq n - 2 \geq -7 \]

\[ -1 \leq n - 2 \leq 3 \]

\[ -3 \leq n - 5 \leq 0 \]

\[ -1 \geq 3 + n \geq 5 \]

A  \[ -9 \leq n + 4 \leq -4 \]

B  \[ -2 \geq n - 2 \geq -7 \]

C  \[ -1 \leq n - 2 \leq 3 \]

D  \[ -3 \leq n - 5 \leq 0 \]

E  \[ -1 \geq 3 + n \geq 5 \]

50 Consider the graph below.

\[ y \]

\[ x \]

Suppose you draw a new line perpendicular to the line on the graph. What would be the slope of the new line?

A  \[ -\frac{4}{3} \]

B  \[ -\frac{3}{4} \]

C  \[ -\frac{1}{4} \]

D  \[ -3 \]

E  \[ -4 \]

49 The drawing below shows the dimensions of a room.

20 ft

15 ft

9 ft

The owner plans to carpet the shaded part of the room. A square in the center of the room will be tiled. How many square feet will be covered with carpet?

A  81

B  115

C  180

D  219

E  264
1. E $\frac{15}{25}$
2. C Multiply each term in the expression $x - 4$ by 5.
3. D $4 < n < 8$
4. B 100
5. E $x^9$
6. C $160$
7. B 10
8. E $(-5, 2)$
9. C $\frac{3}{10}$
10. D 104
11. C 2:1
12. C $15,000$
13. B Quarter 2
14. D 25%
15. A 140°
16. C $b + c$
17. B 36
18. B $x + 2y = 7$
19. A 20
20. D More than 25% of the workers spend less than 2 hours on the phone.
21. E 11
22. C 6
23. B $6x\sqrt{2x}$
24. A $60 \times \frac{2}{3} \times \frac{5}{9}$
25. D 11
26. B $-16$ and 12
27. E \[
\begin{align*}
x &= 2y - 4 \\
x - y &= 8
\end{align*}
\]
28. D $(2 \times 1,000) \div 375$
29. A 7
30. C 20%
31. E $2\sqrt{34}$
32. B $\frac{n}{2}$
33. E Type 5
34. A Pro Elite
35. C $24$
36. E
37. E $9$
38. A 7
39. A $\frac{x^2 - x - 4}{x^2 + 4x}$
40. D 21
41. C There are more yellow marbles than red in the bag.
42. E 24
43. E $(3, 0)$
44. B The forecasted temperature was usually greater than the actual temperature.
45. D 36
46. C $(3x - 5)(x + 6)$
47. D $f(x) = -3x + 8$
48. B $-2 \geq n - 2 \geq -7$
49. D 219
50. A $-\frac{4}{3}$
### SIMULATED HiSET® TEST

<table>
<thead>
<tr>
<th>HiSET Content Area</th>
<th>Item Number</th>
<th>Corresponding Lessons in Math Sense 2 Series</th>
</tr>
</thead>
</table>
| Numbers and Operations on Numbers  | 1, 4, 9, 11, 14, 19, 21, 24, 33, 34, 39 | Book One: Focus on Operations, Units 1, 2, 3, and 4  
Book Two: Focus on Problem Solving, Unit 1  
Book Three: Focus on Analysis, Unit 2 |
| Measurement and Geometry           | 7, 10, 15, 17, 22, 28, 32, 45, 49     | Book One: Focus on Operations, Unit 5  
Book Two: Focus on Problem Solving, Units 4 and 5  
Book Three: Focus on Analysis, Units 3, 5, and 6 |
| Data Analysis, Probability, and Statistics | 6, 12, 13, 20, 29, 30, 38, 41, 44 | Book Three: Focus on Analysis, Units 1 and 2 |
| Algebraic Concepts                 | 2, 3, 5, 8, 16, 18, 23, 25, 26, 27, 31, 35, 36, 37, 40, 42, 43, 46, 47, 48, 50 | Book Two: Focus on Problem Solving, Units 2, 3, and 5  
Book Three: Focus on Analysis, Units 3, 4, 5, and 6 |