**Skills Test in Mathematics**

1. Veronica runs for exercise. The following chart shows how far she ran each day last week. How many miles did Veronica need to run on Saturday in order for her average distance for the week to be 4 miles per day?

<table>
<thead>
<tr>
<th>Day of the Week</th>
<th>Number of Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday</td>
<td>3</td>
</tr>
<tr>
<td>Monday</td>
<td>4</td>
</tr>
<tr>
<td>Tuesday</td>
<td>5</td>
</tr>
<tr>
<td>Wednesday</td>
<td>2</td>
</tr>
<tr>
<td>Thursday</td>
<td>5</td>
</tr>
<tr>
<td>Friday</td>
<td>4</td>
</tr>
<tr>
<td>Saturday</td>
<td>?</td>
</tr>
</tbody>
</table>

a. 2
b. 3
c. 4
d. 5
e. 6

2. Which of the following has the greatest value?
   a. $\frac{3}{4}\%$
   b. 4.09%
   c. $\frac{11}{100}$
   d. $\frac{23}{500}$
   e. 0.0408

3. If the following spinner is drawn to scale, what is the probability that the spinner will land on the number 1?

   ![Spinner Diagram]

   a. $\frac{2}{5}$
b. $\frac{2}{3}$
c. $\frac{1}{3}$
d. $\frac{3}{4}$
e. $\frac{3}{5}$

4. The U.S. Bureau of Justice Statistics reported that 7,225,800 people were in prison, on probation, or on parole at the end of 2009. If this number accounted for approximately 3% of the adult U.S. population, what was the U.S. population at the end of 2009?
   a. 216,774
   b. 216,774,000
   c. 2,167,740,000
   d. 240,860,000
   e. 2,408,600,000
5. The following figure is an isosceles right triangle. What is the value of side $h$?

![Isosceles Right Triangle](image)

- a. 5
- b. $5\sqrt{2}$
- c. 10
- d. $\sqrt{10}$
- e. 9

6. Ryan and Kimberly spend a combined total of 12 hours to begin the spring landscaping for a friend. The next week Jaime and Janet spend another 18 hours to finish the landscaping job. If Ryan worked three times as many hours as Kimberly, and Jaime worked five more hours than Ryan worked, how many hours did Janet spend on the landscaping?

- a. 3
- b. 9
- c. 14
- d. 4
- e. 7

7. Paula has four friends over to watch the basketball game. They are all hungry, but no one wants to go get food. Just as they are arguing about who should go pick up food, a commercial comes on for a local pizzeria that delivers. The phone number flashes on the screen briefly and they all try to remember it. By the time Paula grabs a pen and paper, each of them collects a different number. Each of the numbers below is one of the guesses. Which of the numbers is most likely the telephone number of the delivery pizzeria?

- a. 995-9266
- b. 995-936
- c. 995-9268
- d. 995-8266
- e. 996-8638

8. Marvin wrapped a gift that is in a box that is a perfect cube with each side measuring $d$ inches. Maya arrives with a gift that is also in a box that is a perfect cube, but the edge length of each side of her gift is twice as long as Marvin’s gift. How many square inches of wrapping paper, in terms of $d$, will Maya need to wrap her gift?

- a. $6d^2$
- b. $12d^2$
- c. $24d^2$
- d. $2d^2$
- e. $12d^2$

9. Jesse ate $\frac{1}{2}$ of a pizza and left the other half in his dorm room. Dennis came by and ate one-quarter of what was left there. How much of the original pie did Dennis eat?

- a. $\frac{1}{16}$
- b. $\frac{1}{6}$
- c. $\frac{1}{4}$
- d. $\frac{1}{8}$
- e. $\frac{3}{4}$
Use the following table to answer questions 10 and 11.

<table>
<thead>
<tr>
<th>DATE</th>
<th>BALANCE ON 1ST OF MONTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 1, 2008</td>
<td>$3,360</td>
</tr>
<tr>
<td>December 1, 2008</td>
<td>$6,720</td>
</tr>
<tr>
<td>December 1, 2009</td>
<td>$11,760</td>
</tr>
<tr>
<td>May 1, 2010</td>
<td>$13,860</td>
</tr>
<tr>
<td>September 1, 2011</td>
<td>—</td>
</tr>
</tbody>
</table>

10. Frank’s employer deposited a consistent amount of money into his retirement account on the last day of each month. Use the table to figure out how much money his employer put into Frank’s retirement account each month, rounded to the nearest dollar.
   a. $420
   b. $373
   c. $388
   d. $350
   e. $480

11. It is September 7, 2011, and Frank’s wife cannot find his latest bank statement for the 1st of the month. She wants to know how much money is currently in his retirement account. Using the information in the table, calculate what the balance in Frank’s retirement account should be as of September 1, 2011.
   a. $20,160
   b. $19,828
   c. $21,000
   d. $20,201
   e. $20,580

12. Find the value of $w$ in terms of $p$.
   2w = 15k + 4
   3k = 10 - $\frac{1}{2}$q
   q = 12p + 8
   a. 6 - 6p
   b. 3 - 3p
   c. 30 - 30p
   d. 17 - 15p
   e. 37 - 15p

13. A rectangular community garden needs fencing to keep deer from eating the vegetables. If 200 linear feet of fencing is needed to enclose the garden space, which of the following could be the dimensions for the length and width of the garden?
   a. 100 feet long and 100 feet wide
   b. 100 feet long and 20 feet wide
   c. 80 feet long and 20 feet wide
   d. 50 feet long and 40 feet wide
   e. 20 feet long and 10 feet wide

14. The Sunnyside Resort has a pool that is 5 feet deep, 30 feet long, and 20 feet wide. One cubic foot of water is equal to approximately 7.5 gallons. One gallon of water weighs approximately 8.35 pounds. What is the approximate weight, in pounds, of the water held in the pool at the Sunnyside Resort?
   a. 3,000 pounds
   b. 22,500 pounds
   c. 187,875 pounds
   d. 156,563 pounds
   e. 25,050 pounds
Use the following Venn diagram and the information beneath it to answer questions 15 and 16.

Lonely Star Prep School is offering a summer enrichment program that 80 students are enrolled in. One of the electives students can select is science, and if they choose to take a science class they can choose from Biology, Chemistry, or Physics. Students can enroll for 5 classes for the summer and they can choose 0 to 3 science classes. In the Venn diagram above, A represents the students enrolled in Physics, B represents the students enrolled in Biology, and C represents the students enrolled in Chemistry.

15. Circle A contains 18 students who are enrolled in the Physics class, and circle B contains 26 students who are enrolled in Biology. If 34 students are enrolled in just Physics, just Biology, or both Physics and Biology, how many students are enrolled in both Physics and Biology?
   a. 10
   b. 8
   c. 16
   d. 46
   e. 36

16. Which of the following best describes the students in the shaded region of the Venn Diagram?
   a. the students who are most talented in science
   b. the students who are enrolled in Physics and Biology
   c. the students who decided not to take science
   d. the students who like chemistry the best
   e. the students who are enrolled in three science classes this summer

17. Fifty students at Adams College were asked about the sports in which they participate. Each student participates in at least one sport, and some participate in two sports. The results are shown in the following table. What percent of the students participate in two sports?

<table>
<thead>
<tr>
<th>SPORT</th>
<th>STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soccer</td>
<td>13</td>
</tr>
<tr>
<td>Football</td>
<td></td>
</tr>
<tr>
<td>Basketball</td>
<td>12</td>
</tr>
<tr>
<td>Baseball</td>
<td>10</td>
</tr>
<tr>
<td>Hockey</td>
<td>9</td>
</tr>
</tbody>
</table>

   a. 10%
   b. 20%
   c. 50%
   d. 60%
   e. 80%

18. Which of the following triangles could not exist?
   a. an acute equilateral triangle
   b. an obtuse isosceles triangle
   c. a scalene right triangle
   d. an acute isosceles triangle
   e. an obtuse right triangle
19. Which of the following equations was used to construct this input/output table?

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>19</td>
</tr>
</tbody>
</table>

a. $y = 3x + 4$
b. $y = 4x + 3$
c. $y = 8x - 1$
d. $y = 5x - 2$
e. $y = x^2 + 6$

20. A dodecahedron is a 12-sided die that has an equal probability of landing on each side. If Chi Chun rolls a dodecahedron one time, what is the probability that she will roll a prime factor of 12?

a. $\frac{1}{5}$
b. $\frac{1}{2}$
c. $\frac{1}{4}$
d. $\frac{1}{12}$
e. $\frac{1}{6}$

21. The following scatter plot shows the population of a city over the last 50 years.

If the population continues to grow at the same rate, what is the best estimate for the population in 2010?

a. 20,000
b. 22,000
c. 25,000
d. 29,000
e. 30,000

22. Josh buys $5\frac{3}{4}$ yards of upholstery fabric to make seat cushions. If he needs to cover two seats with just that material, how many inches of upholstery fabric does he have to use on each seat?

a. 207 inches
b. 192.24 inches
c. 96.12 inches
d. 103.5 inches
e. 34.5 inches
23. Consider the following three facts:
Fact A: Kris said, "Emily and I both have dogs."
Fact B: Emily said, "I don't have a dog."
Fact C: Kris always tells the truth, but Emily sometimes lies.
If the first three statements are facts, which of the following statements must also be a fact?
I. Emily has a dog.
II. Kris has a dog.
III. Emily is lying.
a. II only
b. I and II only
c. I, II, and III
d. II and III only
e. None of the statements is a known fact.

24. A circular table is going to be covered with tile. If the diameter of the table is 10 feet, approximately how many square feet of tile must be purchased to cover the table?
a. 10 square feet
b. 314 square feet
c. 31 square feet
d. 63 feet
e. 79 feet

25. A factory operates 20 machines that make buttons. Each machine can make between 80 and 100 buttons per minute. Which of the following could be the number of buttons produced per hour if all 20 machines are working at the same time?
a. 1,600
b. 4,800
c. 6,000
d. 88,000
e. 100,000

26. Susie types 12 words per minute, and Doug types 22 words per minute. They are dividing up scenes of an independent film and typing up a 68,000-word manuscript for Buffalo Indi Films. After typing it up, it takes them about 20% additional time to proofread it for errors. Lastly, for every 3 hours they work, Doug and Susie both get a union break of 30 minutes of paid time which can be billed to Buffalo Indi Films. Rounded to the nearest hour, what is the closest approximation to the total amount of hours that Susie and Doug will be able to bill Buffalo Indi Films for at the end of this project?
a. 33 hours
b. 40 hours
c. 48 hours
d. 53 hours
e. 56 hours

27. The graphs of the dotted line \( y = \frac{1}{4}x \) and the solid line \( y = -4x \) form the boundaries of the shaded region. The solution set of which of the following systems of linear inequalities is given by the region with the darkest shading?

```
\begin{align*}
a. y &> \frac{1}{4}x \text{ and } y \leq -4x \\
b. y &< \frac{1}{4}x \text{ and } y \geq -4x \\
c. y &\geq \frac{1}{4}x \text{ and } y < -4x \\
d. y &> \frac{1}{4}x \text{ and } y < -4x \\
e. y &< \frac{1}{4}x \text{ and } y \leq -4x
\end{align*}
```
28. If $\Psi$ is divisible by 3 and 10, then $8\Psi$ must be divisible by all the following EXCEPT
   a. 14.
   b. 15.
   c. 16.
   d. 30.
   e. 32.

The following graph shows the yearly electricity usage for Finnigan Engineering Inc. over the course of three years for three departments. Use it to answer questions 29–31.

29. How much greater was the electricity cost for Sales during the year 1999 than the electricity cost for Customer Service in 2000?
   a. $800
   b. $50
   c. $150
   d. $250
   e. $0

30. Which of the following statements is supported by the data?
   I. The Sales Department showed a steady increase in the dollar amount of electricity used during the four-year period.
   II. The two departments that have the most similar electricity usage over the four-year period are the Customer Service and Sales Departments.
   III. The Engineering Department showed a steady increase in the dollar amount of electricity used from 2000–2002.
   a. I
   b. II
   c. III
   d. II and III
   e. I, II, and III

31. What was the percent decrease in cost of electricity usage from 1999 to 2000 for the Engineering Department?
   a. 25%
   b. 20%
   c. 12.5%
   d. 10%
   e. 0%

32. Look at the following series and determine which two numbers most logically follow next: 28, 25, 5, 21, 18, 5, 14, ...
   a. 11, 5
   b. 10, 7
   c. 11, 8
   d. 5, 10
   e. 10, 5
33. If it takes John \( h \) hours to bike \( k \) kilometers, how far can he bike in \( m \) minutes?
   a. \( \frac{m}{60hk} \)
   b. \( \frac{60h}{mk} \)
   c. \( \frac{mk}{60h} \)
   d. \( \frac{50k}{mh} \)
   e. \( 60mwh \)

34. 1,200 new nursing students were asked to complete a survey in which they were asked which type of nursing they would like to pursue. The data was used to make the following pie chart.

   [Pie chart image]

   If the same color scheme is used, which of the following bar graphs would represent the same data as the pie chart?
   a.
   b.

35. Belicia drives a compact car that gets, on average, 28 miles per gallon of gas. If she must drive 364 miles from Los Angeles to San Francisco, and gas costs on average $4.85 per gallon, approximately how much will she spend on gas?
   a. $63
   b. $75
   c. $73
   d. $136
   e. $65

36. *The Independent* is a British newspaper. It ran a headline in January 2001 that read, “Three-quarters of a million to pay higher rate of tax.” Which number below is equivalent to three-quarters of a million?
   a. 340,000,000
   b. \( \left( \frac{3}{4} \right) \times 1,000,000 \)
   c. 750,000
   d. 750,000,000,000
   e. \( \frac{3}{4} \times 1,000,000,000 \)
37. A cylindrical cooling tank holds 150 liters of chemical solution. How many milliliters of solution does the tank hold?
   a. 7,500
   b. 15,000
   c. 75,000
   d. 150,000
   e. 1,500

38. Shane would like her business to sell an average of $5,000 of jewelry every month; however, her industry is very seasonal, with the end-of-the-year holiday season being the busiest time. In 2010 her sales totaled $35,400 on September 30, 2010. What must her monthly average sales be for October, November, and December if she wants to make her year-end goal of averaging $5,000 a month?
   a. $11,800
   b. $8,200
   c. $5,000
   d. $3,933
   e. Shane will not be able to make her goal in 2010.

39. What inequality is represented by the following graph?

   a. \( x \geq -4 \)
   b. \( x > -4 \)
   c. \( x \leq -4 \)
   d. \( x < -4 \)
   e. \( 10 > x > -4 \)