

Directions: For this section, solve each problem and decide which is the best of the choices given. Fill in the corresponding circle on the answer sheet. You may use any available space for scratchwork.

The use of a calculator is permitted.

All numbers are real numbers unless otherwise specified.

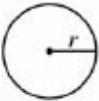
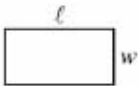
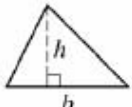


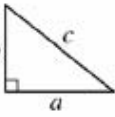
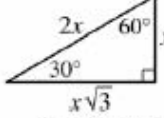
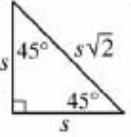
Figures that accompany problems in this test are intended to provide information useful in solving the problems.

They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is not drawn to scale.

All figures lie in a plane unless otherwise indicated.

Unless otherwise specified, the domain of any function is assumed to be the set of all real numbers x for which $f(x)$ is a real number.

$f(x)$

Reference Information								
	$A = \pi r^2$ $C = 2\pi r$	$A = \ell w$	$A = \frac{1}{2}bh$	$V = \ell wh$	$V = \pi r^2 h$	$c^2 = a^2 + b^2$	Special Right Triangles	
	The number of degrees of arc in a circle is 360. The sum of the measures in degrees of the angles of a triangle is 180.							

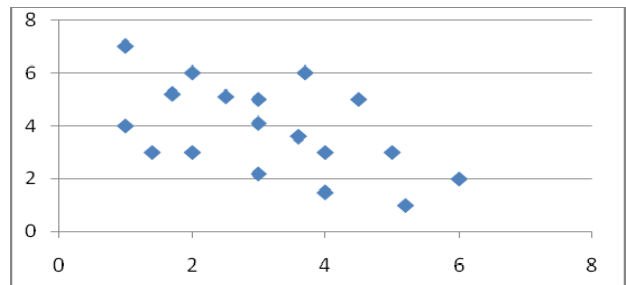
2.1.a Students understand the relationship between precision and accuracy.

- Sara uses a laser sighting device to measure the distance across a lake. The device is accurate to ± 5 meters. If the device gives a reading of 531 meters, which measure lies outside of the range of expected actual values?
 - 525 meters
 - 527 meters
 - 529 meters
 - 530 meters
 - 535 meters
- Diana's yard is listed as being 120 feet by 80 feet. Her real estate agent tells her that the measures are rounded to the nearest foot. What is the difference between the minimum and maximum possible areas of her yard (rounded to the nearest square foot)?
 - 50 square feet
 - 100 square feet
 - 150 square feet
 - 200 square feet
 - 400 square feet
- Of the following, which is most likely to be the width of a city park?
 - 75 centimeters

- B. 75 meters
 - C. 75 square meters
 - D. 75 cubic centimeters
 - E. 75 kilometers
4. Of the following, which is the best unit to use when measuring the growth of a plant every other day during a 2-week period?
- A. Centimeter
 - B. Meter
 - C. Kilometer
 - D. Foot
 - E. Yard

2.2.a Students understand correlation and cause and effect.

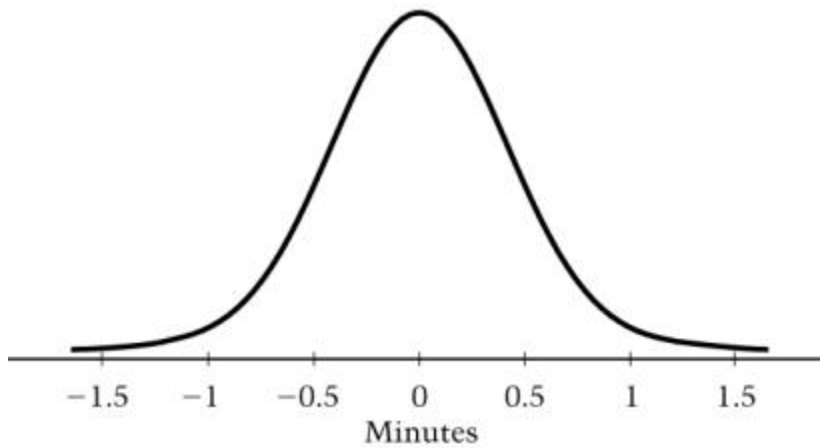
1. Factors A and B are strongly positively correlated. What is the most likely slope of the line of best fit for a scatter plot showing the relationship between A and B?
- A. 1.5
 - B. 1.0
 - C. 0.8
 - D. 0.2
 - E. It cannot be determined which is the most likely slope.
2. Factors A and B are strongly negatively correlated. This could be the result of
- I. a decrease in A causing a decrease in B
 - II. an increase in B causing a decrease in A
 - III. an outside factor C causing a decrease in A when C causes an increase in B
- A. I only
 - B. II only
 - C. I or II
 - D. II or III
 - E. I, II, or III
3. What correlation best reflects the scatter plot to the right?
- A. Weak negative correlation
 - B. Weak positive correlation
 - C. Strong negative correlation



- D. Strong positive correlation
- E. No Correlation

2.2.c Students understand that the purpose of random sampling is to reduce bias when creating a representative sample for a set of data.

1. A member of the city council wants to find out the public opinion in her city about a proposed new sports arena. Which sampling method is random?
 - A. giving the survey to every 25th person listed on the city census
 - B. giving the survey to 20 people suggested by each city council member
 - C. giving the survey to every fifth person who buys tickets at the old sports arena
 - D. giving the survey to every 10th person who comes into town hall
 - E. none of the methods is random
2. A clock manufacturer has found that the amount of time their clocks gain or lose per week is normally distributed with a mean of 0 minutes and a standard deviation of 0.5 minute, as shown below.



In a random sample of 1,500 of their clocks, which of the following is closest to the expected number of clocks that would gain or lose more than 1 minute per week?

- A. 15
 - B. 30
 - C. 50
 - D. 70
 - E. 90
3. Which of the following statements are true?
 - I. Random sampling is a good way to reduce response bias.

- II. To guard against bias from under-coverage, use a convenience sample.
- III. Increasing the sample size tends to reduce survey bias.
- IV. To guard against non-response bias, use a mail-in survey.

- A. I only
- B. II only
- C. III only
- D. IV only
- E. None of the above

2.3.a Students understand the relationship of probability to relative frequency and know how to find the probability of compound events.

1. You have an equally likely chance of choosing any number 1 through 30. What is the probability of selecting a factor of 90?

A. $\frac{2}{15}$

B. $\frac{4}{15}$

C. $\frac{1}{3}$

D. $\frac{6}{15}$

E. $\frac{11}{30}$

2. Two six-sided dice are rolled. Find the probability that the sum of the numbers facing up is greater than 8.

A. $\frac{2}{9}$

B. $\frac{1}{4}$

C. $\frac{5}{18}$

D. $\frac{1}{3}$

E. $\frac{7}{18}$

3. If you toss 1 coin three times, what is the probability you will get exactly 2 heads?

A. $\frac{7}{8}$

B. $\frac{1}{2}$

C. $\frac{3}{8}$

D. $\frac{1}{8}$

E. $\frac{5}{8}$

4. Given a deck of 52 cards with 4 suits and 13 cards in each suit. Each suit has cards ace, 2 thru 10, jack, queen and a king. Determine the probability of getting 2 pairs if you are dealt 5 cards.

A. 1.3%

B. 2.4%

C. 4.8%

D. 6.1%

E. 42.3%

5. John has 3 pairs of blue socks and 2 pairs of brown socks. The socks are just out of the dryer (not paired together). If he pulls two socks out without looking, what is the probability that they are both blue?

A. $\frac{1}{6}$

B. $\frac{1}{5}$

C. $\frac{1}{4}$

D. $\frac{1}{3}$

E. $\frac{9}{25}$

3.1.c Students understand and use basic ideas of trigonometry.

1. Let θ be an angle in standard position and $(3, y)$ a point in the fourth quadrant on the terminal side. The distance from the origin to the point is 5. Find $\cot \theta$.

- A. $\frac{3}{4}$
B. $-\frac{4}{3}$
C. $\frac{4}{3}$
D. $-\frac{4}{5}$
E. $-\frac{3}{4}$

2. Given a 30-60° right triangle with $m \angle A = 60^\circ$ and $m \angle B = 30^\circ$

determine the length of \overline{BC} if the length of the hypotenuse is 6.

- A. 3
B. $3\sqrt{3}$
C. $\frac{3\sqrt{3}}{2}$
D. $3\sqrt{2}$
E. 9
3. Find the value of the secant of an angle in standard position if $(4, 3)$ lies on its terminal side.

- A. $\frac{4}{5}$
B. $\frac{4}{3}$
C. $\frac{5}{3}$
D. $\frac{5}{2}$
E. $\frac{5}{4}$

4. Find the angle of inclination of the line $5x + 2y = 6$. Round to the nearest degree.

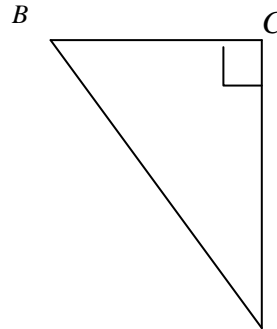
- A. 68°
- B. 112°
- C. 158°
- D. 202°
- E. 292°

5. The length of the hypotenuse in a $30^\circ - 60^\circ - 90^\circ$ triangle is 14. What are the lengths of the other two sides?

- A. $\{7\sqrt{3}, 7\}$
- B. $\{7\sqrt{2}, 7\}$
- C. $\{7\sqrt{3}, 14\}$
- D. $\{7\sqrt{2}, 7\sqrt{2}\}$
- E. $\{14\sqrt{3}, 14\}$

6. Given the measure of angle A is 30° and $AC = \sqrt{15}$ the length of the hypotenuse is

- A. $\frac{2\sqrt{5}}{5}$
- B. $\frac{2\sqrt{3}}{3}$
- C. $\frac{\sqrt{15}}{2}$
- D. $2\sqrt{5}$
- E. $2\sqrt{15}$



A

7. A student determines the angle of elevation to the top of a California redwood tree to be 60° . If the student is standing 120 ft. from the base of the tree, then the height of the tree in feet is closest to

- A. 120.0
- B. 69.30
- C. 240.0
- D. 138.6
- E. 207.8

3.2.a Students find the surface area and volume of three-dimensional objects.

1. Find the volume of a cone with a radius of 4 and a height of 9.

- A. $\frac{16}{3}\pi$
B. 16π
C. 32π
D. 48π
E. 144π

2. Calculate the volume of the pyramid which has height 9 and a triangular base with sides 7 and 8 at right angles to each other.

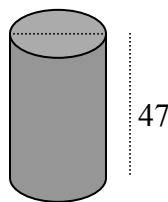
- A. 66
B. 68
C. 75
D. 84
E. 168

3. If you were to put a spherical scoop of ice cream with diameter x on a cone with diameter 5 and height equal to 9, determine what the maximum value is for x , rounded to the nearest integer, such that if all of the ice cream were to melt that it would not overflow out of the cone (assuming melted ice cream has the same volume as solid ice cream).

- A. 3
B. 4
C. 5
D. 6
E. 7

4. Find the total surface area of the cylinder shown below given that its diameter is 22 ft. and its height is 47.

- A. 5687π
B. 1276π
C. 1155π
D. 1034π
E. 1895π



5. The total surface area of a square prism with a height of 24 and a base area of 16 is

- A. 800
- B. 768
- C. 384
- D. 400
- E. 416



4.2.b Students understand and apply ideas of logarithms.

1. Solve $\log_3(5x + 6) = 2$ for x .

- A. $-\frac{4}{5}$
- B. 0
- C. $\frac{1}{5}$
- D. $\frac{2}{5}$
- E. $\frac{3}{5}$

2. If $f(x) = \log_2 x$, then $f^{-1}(x) =$

- A. x^2
- B. 2^x
- C. $x + 2$
- D. $e^x - 2$
- E. $2x$

3. If $\log_{16} x^3 = 3/2$, solve for x .

- A. $x = -4.4$
- B. $x = 4$
- C. $x = 8$
- D. $x = -8.8$
- E. $x = -2.2$

4. The number of bacteria present in a laboratory sample after t days can be represented by $500(2^t)$. What is the initial number of bacteria present in this sample?
- A. 250
 - B. 500
 - C. 750
 - D. 1,000
 - E. 2,000
5. If $\log_2(2x+1) - \log_2(x-3) = 2 \log_2 3$, solve for x .
- A. 4
 - B. 5
 - C. 6
 - D. 7
 - E. 8

ANSWERS

2.1.a

1. A
2. D
3. B
4. A

2.2.a

1. E
2. D
3. A

2.2.c

1. E
2. D
3. E

2.3.a

1. C
2. C
3. C
4. C
5. D

3.1.c

1. E
2. B
3. E
4. B
5. A
6. D
7. E

3.2.a

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

4.2.b

1. E
2. B
3. B
4. B
5. A