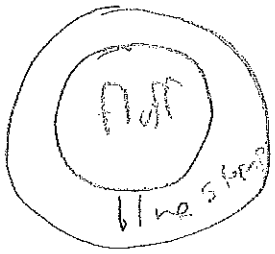
Section III: Quantitative Reasoning

81. All flufferpot plants have blue stems, but not all blue-stemmed plants are flufferpots. Which of the following must be true?

(A) At least two types of plants that have blue stems.
B) All flufferpots have blue leaves.
C) A plant with a blue stem is not a flufferpot.
D) If a plant develops blue stems and roots, it becomes a flufferpot.



82. A triangle has two interior angles that measure 45°. What is the measure of the triangle's remaining angle?

A) 45°
B) 60°
C) 75°
(D) 90°

$2 \cdot 45 + a = 180$

$a = 180 - 90$

$a = 90$

83. What is the slope of the line below?

$$y = -5x + 8$$

A) -8
(B) -5
C) 5
D) 8

84. Which of the following could be the missing term in the sequence below?

3, 6, 12, ?, 48, 96 . . .

A) 18
B) 21
(C) 24
D) 26

$X_t = 2 \cdot X_{t-1}$

CLT homework -

Section III: Quantitative Reasoning

85. The Changs have three family pets. Two of the pets are the same species, and all of the pets are female. If one of their pets is a female cat, which of the following could be the remaining two pets in their family?

A) A female cat and a male cat
B) A female cat and a female dog
C) A female dog and a female bird
D) A female dog and a male dog

86. If x is an even integer, which of the following must also be an even integer?

A) $x+1$
B) $x-3$
C) $2x$
D) $4x-1$

2x is divisible by 2

87. If a triangle has an area of 18 square inches and a height of 12 inches, what is the length of that triangle's base?

A) 1.5 inches
B) 3 inches
C) 6 inches
D) 9 inches

Correct

$18 = \frac{1}{2}12b$

$\frac{2}{1}\cdot\frac{18}{12} = b$

$2 \cdot 1.5 = b, \quad b = 3$

88. Triangle JKL is an equilateral triangle. Which of the following could be one of the measures of the interior angles of triangle JKL?

A) 45°
B) 60°
C) 75°
D) 90°

$3a = 180$

$a = \frac{180}{3} = 60$

89. Which of the following is similar to a rectangle with a length of 10 units and a width of 2 units?

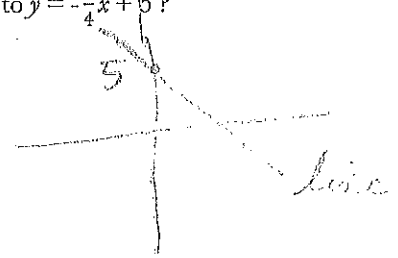
A) A square with a side length of 6 units
B) A rectangle with a length of 20 units and a width of 1 unit
C) A rectangle with a length of 8 units and a width of 4 units
D) A rectangle with a length of 5 units and a width of 1 unit

$\frac{L}{W} = \frac{10}{2} = 5$

hard

90. Which of the following lines is perpendicular to $y = -\frac{1}{4}x + 5$?

A) $y = -\frac{1}{4}x - 5$
B) $y = \frac{1}{4}x + 5$
C) $y = 4x + 5$
D) $y = -4x + 5$



91. A biologist calculates that there are 21 deer per 2 square miles in a forest park. Based on this calculation, how many deer are in 6 square miles of the park?

A) 7 deer
B) 42 deer
C) 63 deer
D) 126 deer

$\frac{21}{2} = \frac{d}{6}$

$21 \cdot \frac{6}{2} = d$

$21 \cdot 3 = d$

$63 = d$

92. If a is a prime number, which of the following must also be prime?

A) $2a$
B) a^2
C) a^3
D) None of the above

Try $a = 2$

hard

93. A chemist finds that the atmosphere of Planet A has more oxygen than the atmosphere of Planet B by 24 percentage points. He also discovers that the atmosphere of Planet C is 60% oxygen. If the atmosphere of Planet C has twice as much oxygen as that of Planet B, what percentage of Planet A's atmosphere is composed of oxygen?

A) 6%
B) 54%
C) 72%
D) 96%

$A = B + 24$

$C = 60$

$C = 2B$

$60 = 2B$

$B = 30$

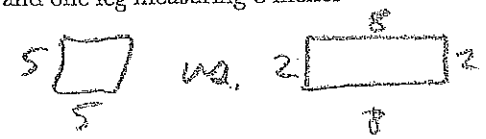
$A = 30 + 24 = 54$

CLT Test - Answers (2018)

Section III: Quantitative Reasoning

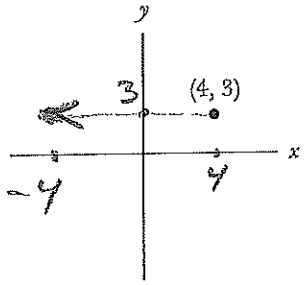
94. A student analyzes a number of figures and concludes that squares and rectangles are always similar. Which of the following is a counterexample that disproves this claim?

A) A square with an area of 25 square inches and a rectangle with a width of 5 inches and a height of 5 inches
B) A square with an area of 25 square inches and a rectangle with an area of 25 square inches and one leg measuring 5 inches
C) A square with an area of 25 square inches and a rectangle with a perimeter of 20 inches and an area of 25 square inches
(D) A square with an area of 25 square inches and a rectangle with a perimeter of 20 inches and one leg measuring 8 inches



If one leg is 8, two are 16 and that leaves 4 - 2·2 for the other 2.

95. The point below on the (x, y) coordinate plane is reflected across the y-axis. What is the resulting point?



A) (4, -3)
(B) (-4, 3)
C) (-4, -3)
D) (3, 4)

96. How many numbers between 1 and 21 (inclusive) meet both conditions below?

Condition 1: The number is a multiple of 3.
Condition 2: The number is even.

1, 3, (6), 9, (12), 15, (18), 21

(A) 3
B) 4
C) 6
D) 7

97. A roll of quarters can fit forty quarters. If Santiago asks a bank for $50 in rolled quarters, how many rolls will he receive?

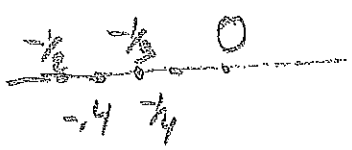
A) 1.25
B) 4
C) 5
D) 12.5

40 · $\frac{1}{4}$ = 10

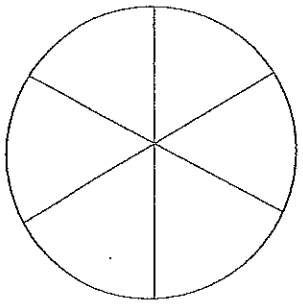
$50 = 5 · $10

98. If $x = -\frac{1}{4}$, which of the following must be true?

A) $x < -.4$
B) $x < -\frac{1}{3}$
C) $x > -.04$
D) $x > -\frac{1}{2}$



99. A chemist is studying a population of bacteria in a petri dish, and wants to divide the dish into six equal segments using three glass dividers, as shown below. If the circumference of the dish measures 4π inches, what would be the length of each glass divider? The figure is not drawn to scale.



A) 2 inches
B) 4 inches
C) 8 inches
D) 16 inches

Divider = 2 · radius

Circ = $2\pi r$

$4\pi = 2\pi r$

$2 = r$

so Divider = 4

100. If the interior angles of a polygon add up to 540°, which of the following must be true?

I. The shape has five sides. - guess
II. The shape's side lengths are equal. - no reason for that
III. The shape has at least one angle measuring 108°. - no reason for that

A) I only
B) II only
C) I and III only
D) I, II, and III

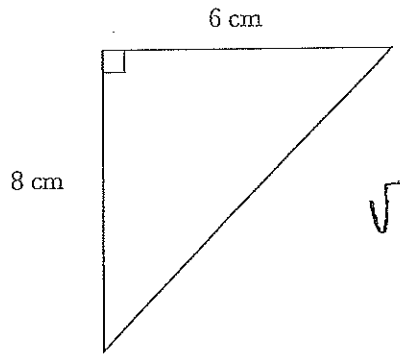
101. Which of the following is equivalent to $2x^2(5 - x)$?

$= 10x^2 - 2x^3$

A) $10x$
B) $10x^2 - x$
C) $10x^2 - 2x^3$
D) $50 - 2x^2$

102. What is the length of the hypotenuse of the triangle below?

(Hint: The Pythagorean theorem states that, for a right triangle, if a, b, and c are the side lengths of the triangle, and c is the hypotenuse, then $a^2 + b^2 = c^2$.)



$\sqrt{36+64} = \sqrt{100} = 10$

A) 8 cm
B) 10 cm
C) 12 cm
D) 100 cm

103. Which of the following is a solution to $3x^2 - 7x = 20$?

A) $x = -\frac{5}{3}$
B) $x = 0$
C) $x = \frac{3}{7}$
D) $x = 5$

104. Nora has a handful of coins in her pocket that add up to thirty-four cents. If she has an equal number of pennies and nickels, then how many dimes and quarters does Nora have in her pocket?

A) 0 quarters and 1 dime
B) 0 quarters and 2 dimes
C) 1 quarter and 0 dimes
D) 1 quarter and 1 dime

105. A scientist goes to a lake to study water strider bugs of the family *Gerridae*, which can move across the surface of bodies of water. The scientist determines the lake is perfectly circular, and that the circumference of the lake measures 2π kilometers. If there are approximately 1,000 water strider bugs per square kilometer on this particular lake's surface, which of the following gives the closest approximation of how many water strider bugs are on the lakes surface, in total?

A) $1{,}000\pi$ water strider bugs
B) $2{,}000\pi$ water strider bugs
C) $4{,}000\pi$ water strider bugs
D) $10{,}000\pi$ water strider bugs

106. If x is an integer less than 0, which of the following could be a value of $|x^3 - 1|$?

A) -9
B) -2
C) 0
D) 28

107. Circle A has a circumference that measures twice the circumference of Circle B. What is the relationship between the radii of Circle A and Circle B?

A) Circle A's radius is twice the length of Circle B's radius.
B) Circle A's radius is four times the length of Circle B's radius.
C) Circle A's radius is Circle B's radius divided by 2π.
D) Circle A's radius is Circle B's radius divided by π.

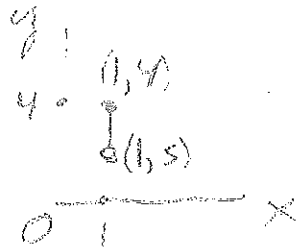
108. A triangle has two angles that measure 10° and 75°. Which of the following must be true about the triangle?

$10 + 75 + a = 180$

$\rightarrow a = 100$

(A) None of the triangle's legs are equal in length.
B) The triangle is an isosceles right triangle.
C) The triangle's longest leg is opposite the 75° angle.
D) None of the above can be true.

109. A square in the (x, y) coordinate plane has one leg that extends from $(1, 4)$ to $(1, s)$. What is the slope of the legs of the square that are perpendicular to this leg?



A) The slope of the perpendicular legs is undefined.
(B) The slope of the perpendicular legs is 0.
C) The slope of the perpendicular legs is 1.
D) The slope of the perpendicular legs cannot be determined.

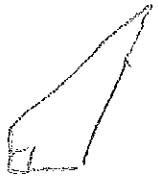
110. A sphere has a diameter of 4 inches (in). What is the volume of the sphere?

$4 = d = 2r \rightarrow r = 2$

$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi 2^3 = \frac{4}{3} \cdot 8 \cdot \pi = \frac{32\pi}{3}$

(A) $\frac{32\pi}{3}$ in^3
B) 16π in^3
C) 64π in^3
D) $\frac{256\pi}{3}$ in^3

111. If a shape has four sides and one interior angle that measures 90°, which of the following must be true for that shape?



A) The shape is a rectangle.
B) The shape has at least two sides that are equal in length.
C) The shape does not have any acute interior angles.
(D) None of the above must be true.

112. Which of the following is a point at which the two equations below intersect?

$y = -3x + 7$

$\frac{1}{2}y = 2x + 7$

$y = 4x + 14$

$-3x + 7 = 4x + 14$

$-7x = 7$

$x = 1$

A) (7, -14)
B) (1, 4)
C) (1, 5)
D) None of the above

113. A cylinder has a surface area of 150π in^2 and a height of 10 in. Which of the following is false?

$A = \pi r^2 = \pi 5.5 = 25\pi$

$SA = 2\pi r \cdot h + 2r^2\pi$

$150\pi = 2\pi r \cdot 10 + 2r^2\pi$

$150 = 20r + 2r^2$

$75 = 10r + r^2$

$V = h \cdot \pi r^2$
$= 10 \cdot \pi \cdot 5^2$
$= 250\pi$

$D = 2r = 10 \Rightarrow r = 5$

A) The radius of the cylinder is 5 in.
B) The diameter of the cylinder is 10 in.
C) The area of the base of the cylinder is 15 in^2.
D) The volume of the cylinder is 250π in^3.

114. How many numbers between 20 and 100 (inclusive) meet both conditions below?

1: The square root of the number is an integer.
2: The number shares at least one prime factor with 15.

25, 36, 49, 64, 81, 100

3, 5

A) 3
B) 4
C) 5
D) 6

115. If $b \blacksquare n = \sqrt{b^2+n^2}$, which of the following is equivalent to $a^2 \blacksquare 4$?

$\sqrt{(a^2)^2 + 4^2}$

A) $2a$
B) $4a^2$
C) a^2+4
D) $\sqrt{a^4+16}$

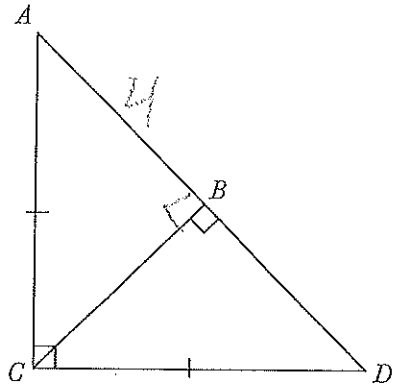
116. If s is the real square root of the integer v, and v^2 is odd, then which of the following must be true about $2s^2$?

$2s^2$ is even because $2x$ is even for any x.

$2s^2$ is positive because 2 and s^2 are positive for any s.

A) It is odd and positive.
B) It is odd and negative.
C) It is even and positive.
D) It is even and negative.

117. Line $\overline{AB}$ measures 4 cm. What is the area of Triangle BCD?



A) 4 cm^2
B) 8 cm^2
C) 16 cm^2
D) 32 cm^2

$A = \frac{1}{2} b \cdot h = \frac{1}{2} 4 \cdot 4$

118. For every \$500 earned by a new company, \$15 is donated to charity. If the company earned \$10,000 in May and \$12,000 in June, how much MORE money did it donate in June than in May?

A) \$60
B) \$133
C) \$200
D) \$400

$\frac{15}{500} \cdot e_J = d_J$ $\quad e_m = 10000$

$\frac{15}{500} \cdot e_m = d_m$ $\quad e_j = 12000$

$d_j - d_m \Rightarrow \frac{3}{100} \cdot 12000 - \frac{3}{100} \cdot 10,000$

$= \frac{3}{100}(2000) = 3 \frac{2000}{100} = 60$

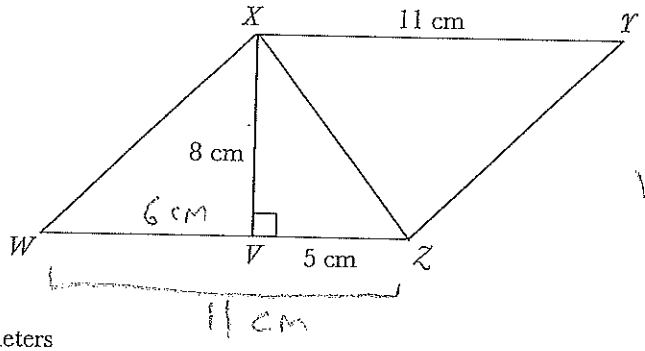
119. Which of the following is equivalent to $\left(\frac{x^4y^2}{xy}\right)^3$?

A) x^3y
B) x^6y^4
C) x^9y^3
D) $x^{12}y^6$

$= \frac{x^{12}y^6}{x^3y^3} = x^9y^3$

120. If $XY = 11$ cm, $XV = 8$ cm, and $VZ = 5$ cm, what is the perimeter of the parallelogram $WXYZ$ below?

(Hint: The Pythagorean theorem states that, for a right triangle, if a, b, and c are the side lengths of the triangle, and c is the hypotenuse, then $a^2 + b^2 = c^2$.)



A) 38 centimeters
B) 42 centimeters
C) $22 + 8\sqrt{2}$ centimeters
D) $22 + 4\sqrt{10}$ centimeters

$WX = \sqrt{6^2 + 8^2}$
$= \sqrt{36+64} = 10$

$P = 2 \cdot 11 + 2 \cdot 10$
$= 22 + 20 = 42$

STOP

Do not go on to the next section until instructed to do so by the proctor.

You may use any remaining time to check your work on this section (Section III) only.