

Sharyland ISD Study Guide

Advanced Quantitative Reasoning Semester 1



Student Name: _____

Student ID: _____

CBE Review Advanced Quantitative Reasoning (AQR) Semester A**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- 1 A balloon holds 4.2 cubic feet of air. The balloon is blown up larger to hold 5.6 cubic feet of air. What is the percent of change for the volume of air inside the balloon?
- (A) +80%
(B) +33.3%
(C) +75%
(D) +25%
- 2 Angela and Neil are going to the movies. They each bought a medium popcorn, and Neil got a small soft drink. Angela had a \$10 gift certificate to put toward the cost, and Neil paid the rest, which came to \$19.30. A movie ticket costs \$9.00 and a medium popcorn costs \$4.40. How much does a small soft drink cost at the theater?
- (A) \$6.90
(B) \$15.90
(C) \$1.30
(D) \$2.50
- 3 Marcus hikes at a rate of 2 miles per hour. If he hikes for $6\frac{1}{3}$ hours, how many miles will he hike?
- (A) $8\frac{1}{3}$ miles
(B) 14 miles
(C) $12\frac{1}{3}$ miles
(D) $12\frac{2}{3}$ miles
- What is each number written in standard notation?**
- 4 3.6×10^6
- (A) 36,000
(B) 36,000,000
(C) 360,000
(D) 3,600,000
- 5 Angie has \$1,032 in her savings account. If the bank pays 3.5% simple interest on savings, how much does she earn in one year?
- (A) \$36.12
(B) \$361.20
(C) \$294.86
(D) \$46.44
- 6 A flagpole casts a shadow 10 ft long. A girl standing next to the flagpole casts a shadow 2.5 ft long. If the girl is 5 ft tall, how tall is the flagpole?
- (A) 15 ft
(B) 18 ft
(C) 12.5 ft
(D) 20 ft
- 7 Mike was in charge of collecting contributions for the Food Bank. He received contributions of \$80, \$70, \$60, \$40, and \$80.. Find the mean, median, and mode of the contributions.
- (A) mean: \$80
median: \$70
mode: \$66
(B) mean: \$66
median: \$70
mode: \$80
(C) mean: \$70
median: \$66
mode: \$80
(D) mean: \$80
median: \$66
mode: \$70

- 8 Kelly is learning about rational and irrational numbers. What conclusion can she draw about the number $0.01011011101111011111\dots$?
- (A) It is irrational because it repeats.
 - (B) It is irrational because it neither repeats nor terminates.
 - (C) It is rational because it terminates.
 - (D) It is rational because it repeats.

Evaluate the logarithm.

- 10 $\log_5 \frac{1}{625}$
- (A) 4
 - (B) 5
 - (C) -3
 - (D) -4
- 11 Find the value of x that makes the mean the given number.
 $6, 12, 7, 4, 8, 3, x$; mean = 7
- (A) 9
 - (B) 2
 - (C) 4
 - (D) 6

Find the balance in the account.

- 14 \$700 principal earning 2.25%, compounded quarterly, after 6 years
- (A) \$17,178.00
 - (B) \$723.96
 - (C) \$800.87
 - (D) \$799.98
- 15 \$2,100 principal earning 4%, compounded annually, after 4 years
- (A) \$8,736.00
 - (B) \$2,436.00
 - (C) \$537,600.00
 - (D) \$2,456.70

- 9 Is the sequence geometric? If so, identify the common ratio.
 $6, 12, 24, 48, \dots$
- (A) yes; -2
 - (B) yes; 4
 - (C) yes; 2
 - (D) no

- 12 A tractor costs \$12,250 and depreciates in value by 6% per year. How much will the tractor be worth after 6 years?
- (A) \$8,450.90
 - (B) \$12,214.00
 - (C) \$7,943.85
 - (D) \$17,376.86
- 13 Find the mode(s) of the data set shown.
 $2, 6, 8, 3, 4, 6, 2, 6, 8, 5, 6, 2, 7, 8, 4, 3, 2, 7, 3, 4$
- (A) 4
 - (B) 3 and 4
 - (C) 2 and 6
 - (D) 2

16
$$\begin{bmatrix} 0 & -1 & 7 \\ 0 & 0 & 2 \end{bmatrix} + \begin{bmatrix} -2 & 0 & -2 \\ 3 & 5 & -1 \end{bmatrix}$$

(A)
$$\begin{bmatrix} -2 & 1 & 5 \\ 3 & 5 & 1 \end{bmatrix}$$

(B)
$$\begin{bmatrix} -2 & 1 & 5 \\ 3 & 5 & -1 \end{bmatrix}$$

(C)
$$\begin{bmatrix} -2 & -1 & 5 \\ 3 & 5 & 1 \end{bmatrix}$$

(D)
$$\begin{bmatrix} -2 & -1 & 5 \\ -3 & -5 & 1 \end{bmatrix}$$

17 Find $-6A + 4B$.

$$A = \begin{bmatrix} -2 & -8 & 7 \\ -5 & -1 & 7 \end{bmatrix} \quad B = \begin{bmatrix} 8 & -7 & 6 \\ -2 & -6 & 1 \end{bmatrix}$$

(A)
$$\begin{bmatrix} -20 & 10 & -66 \\ 22 & -18 & 22 \end{bmatrix}$$

(B)
$$\begin{bmatrix} 44 & 20 & -18 \\ 22 & -18 & -38 \end{bmatrix}$$

(C)
$$\begin{bmatrix} -20 & 10 & -18 \\ 22 & 32 & 22 \end{bmatrix}$$

(D)
$$\begin{bmatrix} 44 & 20 & -18 \\ -8 & 32 & 22 \end{bmatrix}$$

The rate of change is constant in each table. Find the rate of change. Explain what the rate of change means for the situation.

- 18 The table shows the cost of a ski rental package for a given number of people.

People	Cost (\$)
4	160
5	200
6	240
7	280

- (A) $\frac{1}{40}$ dollars per room; the cost is \$40 for each person.
- (B) $\frac{40}{1}$ dollars per person; the cost is \$40 for each person.
- (C) $\frac{1}{280}$ dollars per person; the cost is \$1 for 280 people.
- (D) $\frac{160}{1}$ dollars per person; the cost is \$160 for each person.

What is each number written in scientific notation?

- 19 36,000,000
- (A) 3.6×10^9
- (B) 36×10^6
- (C) 3.6×10^7
- (D) 3.6×10^8

- 20 Find the mean, median, mode(s), and range of the data.

8.5, 7.9, 8.4, 7.7, 8.5, 7.9, 8.9, 8.2

- Ⓐ mean: 8.25
median: 8.3
modes: 7.9, 8.5
range: 1.2
- Ⓑ mean: 8.25
median: 8.1
modes: 7.9, 8.5
range: 1.3
- Ⓒ mean: 8.25
median: 8.1
mode: 8.5
range: 1.2
- Ⓓ mean: 8.25
median: 8.3
modes: 7.9, 8.5
range: 1.3

- 21 Select the correct description of the sequence:

{3, 6, 9, 12, 15, . . . }

- Ⓐ Arithmetic with $d = 6$
Ⓑ Arithmetic with $d = 3$
Ⓒ Arithmetic with $d = 9$
Ⓓ Not arithmetic

- 22 A shop owner did a survey to determine the ages of shoppers who made purchases in the shop. The results for one afternoon are shown. What was the maximum age?

79, 63, 62, 16, 19, 63, 80, 60, 48, 74, 66, 42, 29, 36, 78

- Ⓐ 16
Ⓑ 54
Ⓒ 80
Ⓓ 62

- 23 Find the mean, median, mode, and range of the data set.

Number of Books Read			
Sylvester	218	Edmund	224
Rashin	217	Treya	217

- Ⓐ The mean is 217.5 books; the median is 219 books; the mode is 217 books; and the range is 7 books.
- Ⓑ The mean is 219 books; the median is 217 books; the mode is 217.5 books; and the range is 7 books.
- Ⓒ The mean is 219 books; the median is 217.5 books; the mode is 217 books; and the range is 7 books.
- Ⓓ The mean is 219 books; the median is 217.5 books; the mode is 7 books; and the range is 217 books.

Find the product or quotient. Write the answer in scientific notation and in standard form. Round to the appropriate number of significant digits.

24 $(-8.35 \times 10^2)(3.14 \times 10^{-4})$

- Ⓐ $-2.62 \times 10^{-1}; -0.262$
 Ⓑ $-8.35 \times 10^{-1}; -0.835$
 Ⓒ $-2.62 \times 10^{-6}; -0.00000262$
 Ⓓ $-5.21 \times 10^{-2}; -0.521$

- 25 The half-life of a certain radioactive material is 32 days. An initial amount of the material has a mass of 361 kg. Write an exponential function that models the decay of this material. Find how much radioactive material remains after 5 days. Round your answer to the nearest thousandth.

- Ⓐ $y = \frac{1}{2} \left(\frac{1}{361} \right)^{\frac{1}{32}x}; 0.199$ kg
 Ⓑ $y = 361 \left(\frac{1}{2} \right)^{32x}; 0$ kg
 Ⓒ $y = 2 \left(\frac{1}{361} \right)^{\frac{1}{32}x}; 0.797$ kg
 Ⓓ $y = 361 \left(\frac{1}{2} \right)^{\frac{1}{32}x}; 323.945$ kg

- 26 The weights of five trout caught in Lake Placid are 3 lb, 1 lb 1 oz, 2 lb 15 oz, 2 lb 9 oz, and 1 lb 1 oz. What is the median weight of the five fish?

- Ⓐ 1 lb 1 oz
 Ⓑ 2 lb 15 oz
 Ⓒ 2 lb 9 oz
 Ⓓ 2 lb 12 oz

- 27 At Aimee’s school her grades is weighted. The tests are worth 80% and her homeworks are worth 20% of her average. Aimee 4 tests and scores are: 100, 85, 70, and 98 and her 5 homework grades are: 100, 100, 95, 92, 88; what would be her final average?

- Ⓐ 88.25
 Ⓑ 95
 Ⓒ 70.6
 Ⓓ 89.6

Describe a pattern in each sequence. What are the next two terms of each sequence?

- 28 2, 4, 8, 16, . . .

- Ⓐ add 2 to the previous term; 14, 12
 Ⓑ multiply the previous term by 2; 32, 64
 Ⓒ multiply the previous term by -2 ; -32 , 64
 Ⓓ subtract 2 from the previous term; 32, 64

Write the equation in logarithmic form.

29 $2^5 = 32$

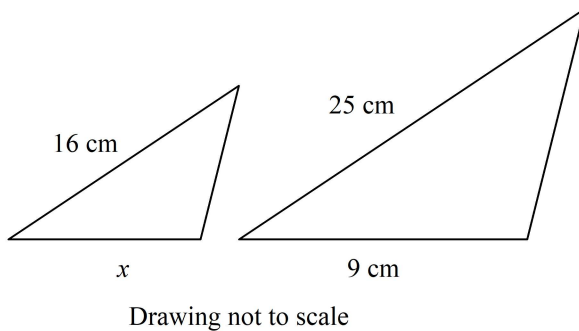
- Ⓐ $\log 32 = 5 \cdot 2$
 Ⓑ $\log_2 32 = 5$
 Ⓒ $\log 32 = 5$
 Ⓓ $\log_5 32 = 2$

- 30 Iris wants to buy two necklaces, one for her sister and one for herself. The necklace for her sister costs \$42.00, and the necklace for herself costs \$28.00. The sales tax on the purchases is 8%. Find the total cost of Iris's purchases, including sales tax. If necessary, round your answer to the nearest cent.
- Ⓐ \$75.60
Ⓑ \$64.40
Ⓒ \$5.60
Ⓓ \$70.00

- 31 Suppose you invest \$1600 at an annual interest rate of 4.6% compounded continuously. How much will you have in the account after 4 years?
- Ⓐ \$1,923.23
Ⓑ \$10,138.07
Ⓒ \$800.26
Ⓓ \$6,701.28

In the diagram, the figures are similar. What is x ?

32



- Ⓐ 5.8 cm Ⓑ 11.9 cm Ⓒ 14.1 cm Ⓓ 18 cm

33 If $A = \begin{bmatrix} -3 & 2 & 0 \\ -5 & 7 & 9 \end{bmatrix}$, $C = \begin{bmatrix} -2 & -1 & -5 \\ -5 & 3 & 2 \end{bmatrix}$, and

$A - B = C$, what is B ?

- (A) $\begin{bmatrix} -2 & 1 & -5 \\ -5 & 3 & 2 \end{bmatrix}$
- (B) $\begin{bmatrix} -2 & -1 & -5 \\ 5 & -3 & 2 \end{bmatrix}$
- (C) $\begin{bmatrix} -1 & 3 & 5 \\ 0 & 4 & 7 \end{bmatrix}$
- (D) $\begin{bmatrix} -1 & 3 & 0 \\ 5 & 4 & 7 \end{bmatrix}$

What is the solution of the proportion?

34 $\frac{w + 14}{4w + 6} = \frac{3}{4}$

- (A) $\frac{15}{28}$
- (B) $\frac{8}{19}$
- (C) $\frac{19}{4}$
- (D) $\frac{2}{7}$

35 Identify the smallest subset of the real numbers that contains the number 2.5.

- (A) irrational numbers
- (B) integers
- (C) whole numbers
- (D) rational numbers

36 A package delivery company has determined that they can meet their schedules if they have 4 drivers for every 30 square miles of area they cover. If they want to offer service to a county of 75 square miles, how many drivers must they have?

- (A) 9 drivers
- (B) 15 drivers
- (C) 10 drivers
- (D) 12 drivers

37 Find 70% of 90.

- (A) 59.4
- (B) 63
- (C) 6300
- (D) 128.57

38 A principal amount p is deposited in an account that earns 4.05% interest compounded annually, for 72 months. What is an equation that represents the total interest earned in this account?

- (A) $I = p(1.0405)^6$
- (B) $I = 0.0405p \times 6$
- (C) $I = 0.0405p \times 72$
- (D) $I = p(1.0405)^{72}$

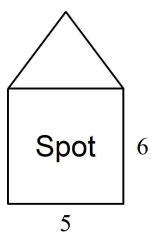
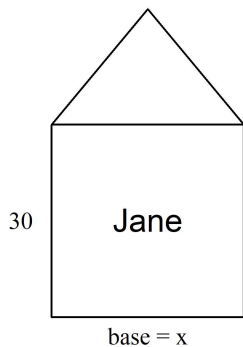
39 A model ocean liner is 12 inches long. If it is built to a scale of 1 in. : 300 ft, how long is the real ocean liner?

- (A) 300 feet
- (B) 3,600 feet
- (C) 2,400 feet
- (D) 400 feet

Name: _____

ID: R

- 40 The front of Jane's house is similar in shape to the front of Spot's doghouse. The base of the doghouse is 5 feet and the height is 6 feet. If the height of Jane's house is 30 feet, what is the length of its base? If necessary, round your answer to the nearest tenth.



- Ⓐ 30 ft
- Ⓑ 25 ft
- Ⓒ 36 ft
- Ⓓ 29 ft

**CBE Review Advanced Quantitative Reasoning (AQR) Semester A
Answer Section**

MULTIPLE CHOICE

- 1 B
- 2 D
- 3 D
- 4 D
- 5 A
- 6 D
- 7 B
- 8 B
- 9 C
- 10 D
- 11 A
- 12 A
- 13 C
- 14 C
- 15 D
- 16 C
- 17 B
- 18 B
- 19 C
- 20 A
- 21 B
- 22 C
- 23 C
- 24 A
- 25 D
- 26 C
- 27 D
- 28 B
- 29 B
- 30 A
- 31 A
- 32 A
- 33 C
- 34 C
- 35 D
- 36 C
- 37 B
- 38 A
- 39 B

40 B