Directions: Answer the following question(s).

1 How could you convert $0.12\overline{3}$ into a fraction?

A. Subtract the equation $x = 0.12\overline{3}$ from the equation $100x = 12.\overline{3}$ and solve for x.

B. Subtract the equation $x = 0.12\overline{3}$ from the equation $1000x = 123.\overline{3}$ and solve for x.

C. Subtract the equation $10x = 1.2\overline{3}$ from the equation $100x = 12.\overline{3}$ and solve for x.

D. Subtract the equation $100x = 12.\overline{3}$ from the equation $1000x = 123.\overline{3}$ and solve for x.

2 After simplifying, which of the following procedures will correctly convert $0.\overline{68}$ into a fraction? Select three that apply.

A. subtracting the equation $x = 0.\overline{68}$ from the equation $10x = 6.\overline{86}$

B. subtracting the equation $x = 0.\overline{68}$ from the equation $100x = 68.\overline{68}$

C. subtracting the equation $10x = 6.\overline{86}$ from the equation $100x = 68.\overline{68}$

D. subtracting the equation $10x = 6.\overline{86}$ from the equation $1000x = 686.\overline{86}$

E. subtracting the equation $100x = 68.\overline{68}$ from the equation $1000x = 686.\overline{86}$

F. subtracting the equation $100x = 68.\overline{68}$ from the equation $10{,}000x = 6868.\overline{68}$

3 .3596 is considered a rational number. What makes this number rational? Explain your reasoning.

4 Which of the following are equivalent to $(2^{-4} \cdot 2^3)^3$? Select *all* that apply.

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

B. 8

C. $2^{-12} \cdot 2^9$

D. $2^{-1} \cdot 2^6$

5 Enter the value of n for the equation $(3^n \cdot 3^2)^4 = 3^{28}$.

***n* =** ______

6 The radius of the Sun is about 700,000,000 meters, the radius of the planet Venus is about 6,000,000 meters, and the radius of the supergiant star Betelgeuse is about 500,000,000,000 meters. Which of these statements is correct? Select three that apply.

A. The radius of the Sun is about 7×10^7 meters, and the radius of Venus is about 6×10^6 meters.

B. The radius of the Sun is about 7×10^8 meters, and the radius of Betelgeuse is about 5×10^{11} meters.

C. The radius of Venus is about 6×10^6 meters, and the radius of the Sun is about 7×10^8 meters.

D. The radius of Venus is about 6×10^7 meters, and the radius of Betelgeuse is about 5×10^{11} meters.

E. The radius of Betelgeuse is about 5×10^{10} meters, and the radius of the Sun is about 7×10^8 meters.

F. The radius of Betelgeuse is about 5×10^{11} meters, and the radius of Venus is about 6×10^6 meters.

Directions: Answer the following question(s).

7 **A computer magazine is analyzing three microprocessors. Microprocessor A executes one cycle in 0.00000000003 seconds, microprocessor B executes one cycle in 0.0000002 seconds, and microprocessor C executes one cycle in 0.000000008 seconds. Which of these statements is correct? Select *three* that apply.**

A. Microprocessor A executes one cycle in 3×10^{-11} seconds, and microprocessor B executes one cycle in 2×10^{-7} seconds.

B. Microprocessor A executes one cycle in 3×10^{-11} seconds, and microprocessor C executes one cycle in 8×10^{-8} seconds.

C. Microprocessor B executes one cycle in 2×10^{-7} seconds, and microprocessor A executes one cycle in 3×10^{-12} seconds.

D. Microprocessor B executes one cycle in 2×10^{-7} seconds, and microprocessor C executes one cycle in 8×10^{-9} seconds.

E. Microprocessor C executes one cycle in 8×10^{-9} seconds, and microprocessor A executes one cycle in 3×10^{-11} seconds.

F. Microprocessor C executes one cycle in 8×10^{-9} seconds, and microprocessor B executes one cycle in 2×10^{-6} seconds.

8 **Which of these equations are correct? Select *three* that apply.**

A. $(4.6 \times 10^5) - (2.1 \times 10^4) = 250{,}000$

B. $(8.8 \times 10^8) - (6.2 \times 10^7) = 818{,}000{,}000$

C. $(9.9 \times 10^7) - (5.8 \times 10^6) = 9{,}320{,}000$

D. $(7.3 \times 10^6) - (4.2 \times 10^5) = 6{,}880{,}000$

E. $(2.9 \times 10^8) - (1.3 \times 10^7) = 16{,}000{,}000$

F. $(3.6 \times 10^5) - (1.1 \times 10^4) = 349{,}000$

9 **Scientists are analyzing three earthquakes that occurred during January, April, and September of a particular year. The January earthquake released 2×10^{14} Joules of energy, the April earthquake released 8×10^{10} Joules, and the September earthquake released 4×10^{16} Joules. Which of these statements is correct? Select three that apply.**

A. The January earthquake released 2500 times as much energy as the April earthquake.

B. The January earthquake released 0.05 times as much energy as the September earthquake.

C. The April earthquake released 0.00004 times as much energy as the January earthquake.

D. The April earthquake released 0.000002 times as much energy as the September earthquake.

E. The September earthquake released 200 times as much energy as the January earthquake.

F. The September earthquake released 50,000 times as much energy as the April earthquake.

10 **Which of these statements is correct? Select *two* that apply.**

A. A solution to the equation $x^2 = 7$ is $x = \sqrt{49}$.

B. A solution to the equation $x^2 = 15$ is $x = \sqrt{15}$.

C. A solution to the equation $x^2 = 38$ is $x = \sqrt[3]{38}$.

D. A solution to the equation $x^3 = 3$ is $x = \sqrt[3]{27}$.

E. A solution to the equation $x^3 = 10$ is $x = \sqrt{10}$.

F. A solution to the equation $x^3 = 44$ is $x = \sqrt[3]{44}$.

11 **An equation is shown below with a missing value. Enter the missing value into the box in the equation.**

8 = $\sqrt[3]{\boxed{}}$

Continue: Turn to the next page.

Directions: Answer the following question(s).

12 **Toni has a plastic container in the shape of a cube. The container holds 8 cubic inches of water.**

Part A:
Write an equation to determine the side length *s* of the container.

Part B:
Solve the equation in part A.

13 **It is important for engineers designing buildings to understand the relationship between the height and volume of the building. A taller building if not built correctly is more likely to collapse, because a small increase in height leads to a large increase in volume.**

An engineer builds two building models of different sizes in the shape of square blocks. The smaller building has a height of 1 *m*, and a volume of 1 m^3. The volume of the larger building is 125 m^3.

The height of the building, represented by *x*, is equal to the cube root of the building's volume. The equation below can be used to find *x*, in meters.

x^3 = volume

Determine how much taller, in meters, the height of the larger building is than the smaller building.

14 **Amy made the conjecture below.**

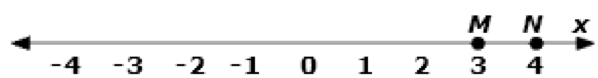
"If a rational number is an integer over 100, then the square root of the rational number is rational. For example, $\sqrt{225}$ is rational and $\sqrt{121}$ is rational."

Provide two examples of integer numbers over 100 that show that Amy's conjecture is *false*.

15 **Select *all* the numbers below that are irrational.**

A. 5462.263
B. $\sqrt{19}$
C. $\frac{13}{24}$
D. $\sqrt{61}$
E. $3.3333\overline{3}$
F. $\sqrt{25}$

16 **Is $\sqrt{15}$ located between points *M* and *N* on the number line below?**



A. No, because it is not greater than 3 and less than 4.
B. No, because it is not greater than 9 and less than 16.
C. Yes, because it is greater than 3 and less than 4.
D. Yes, because it is greater than 9 and less than 16.

Stop: You have finished the assessment.