

Number System and Equations Review

Student

1. Which equation has an infinite number of solutions?

- A. $12 = 3y$
- B. $8q + 5 = 21$
- C. $2x + 7 - 2x = 7$
- D. $4p - 4 = 4p + 4$

2. Four students each wrote an equation.

Student Equations

| Student | Equation |
|---------|-------------------|
| Beto | $3m = 3m + 5$ |
| Lila | $9r + 4 = 4 + 9r$ |
| Mark | $6 - n = -n + 2$ |
| Wanda | $8u - 2 = 2u + 8$ |

Which two students wrote equations that have no solution?

- A. Beto and Wanda
- B. Beto and Mark
- C. Lila and Wanda
- D. Lila and Mark

3. Part A How many solutions does the equation $3x + 6 = 9(x + 4)$ have? What are the solutions? Show or explain your work.

Part B In the equation $3x + c = 3x + d$ what must be true for c and d so that the equation has an infinite number of solutions? Explain your answer.

4. Which equation is equivalent to $4x + 2(3x - 2) = 10$?

- A. $6x = 10$
- B. $8x = 20$
- C. $10x - 4 = 10$
- D. $10x - 2 = 10$

5. Which equation is equivalent to $-6(y - 3) = 2(3x + 7)$?

- A. $-6y - 3 = 6x + 7$
- B. $-6y + 3 = 6x + 7$
- C. $-6y - 18 = 6x + 14$
- D. $-6y + 18 = 6x + 14$

6. The average high temperature in Valerie's city during the month of December is 50°F . Using the formula

$$F = \frac{9}{5}C + 32,$$

what is C , the average high temperature in degrees Celsius?

- A. 10°C
- B. 32.4°C
- C. 45.5°C
- D. 122°C

7. Which set of numbers only contains rational numbers?

- A. $\left\{\frac{1}{2}, \frac{2}{3}, \sqrt{3}\right\}$
- B. $\{0, 4, \sqrt{9}\}$
- C. $\{5, \sqrt{6}, 7\}$

8. Which list shows the fractions shown below, in order from least to greatest?

$$\frac{21}{495}, \frac{220}{4909}, \frac{19}{441}$$

- A. $\frac{19}{441}, \frac{21}{495}, \frac{220}{4909}$
 B. $\frac{21}{495}, \frac{19}{441}, \frac{220}{4909}$
 C. $\frac{21}{495}, \frac{220}{4909}, \frac{19}{441}$
 D. $\frac{220}{4909}, \frac{21}{495}, \frac{19}{441}$

9. Which choice is an example of an irrational number?

- A. $\frac{16}{7}$
 B. $2.\bar{5}$
 C. $\sqrt[3]{24}$
 D. $\sqrt{49}$

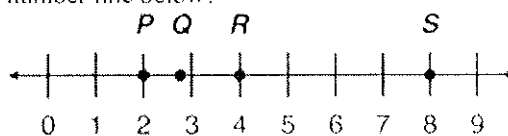
10. The value of $\sqrt{63}$ is between what two numbers?

- A. 62 and 64
 B. 31 and 32
 C. 7 and 8
 D. 3 and 4

11. Which shows the numbers in order from least to greatest?

- A. $\frac{22}{7}, 200\%, \frac{5}{3}, \sqrt{2}$
 B. $\frac{5}{3}, 200\%, \frac{22}{7}, \sqrt{2}$
 C. $\sqrt{2}, \frac{5}{3}, \frac{22}{7}, 200\%$
 D. $\sqrt{2}, \frac{5}{3}, 200\%, \frac{22}{7}$

12. Which point most closely corresponds to $\sqrt{8}$ on the number line below?



- A. P
 B. Q
 C. R
 D. S

Number System and Equations Review Answers

① A) $12 = 3y$
 $\frac{12}{3} = \frac{3y}{3}$
 $4 = y$ One Solution

B) $8q + 5 = 21$
 $8q + 5 - 5 = 21 - 5$
 $8q = 16$
 $\frac{8q}{8} = \frac{16}{8}$
 $q = 2$ One solution

③ C) $2x + 7 - 2x = 7$
 $2x + 7 - 2x = 7$
 $7 = 7$ ✓ Infinitely many

A) $4p - 4 = 4p + 4$
 $4p - 4 - 4p = 4p + 4 - 4p$
 $-4 \neq 4$ No solution

② Beto $3m = 3m + 5$
 Lila $9r + 4 = 4 + 9r$
 Mark $6 - n = -n + 2$
 Wanda $8u - 2 = 2u + 8$

Beto $3m = 3m + 5$
 $3m - 3m = 3m + 5 - 3m$
 $0 \neq 5$ No Solution

Lila $9r + 4 = 4 + 9r$
 $9r + 4 = 9r + 4$ ← Same equation
 Infinitely many Solutions

B. Beto and Mark have no solution

Mark $6 - n = -n + 2$
 $6 - n + n = -n + 2 + n$
 $6 \neq 2$ No solution

Wanda $8u - 2 = 2u + 8$
 $8u - 2 - 2u = 2u + 8 - 2u$
 $6u - 2 = 8$
 $6u - 2 + 2 = 8 + 2$
 $6u = 10$
 $\frac{6u}{6} = \frac{10}{6}$ $u = \frac{5}{3}$ One solution

$$\begin{aligned}
 \textcircled{3} \quad a) \quad & 3x+6 = 9(x+4) \\
 & 3x+6 = 9(x)+9(4) \\
 & 3x+6 = 9x+36 \\
 & 3x+6 - 9x = 9x+36 - 9x \\
 & -6x+6 = 36 \\
 & -6x+6 - 6 = 36 - 6 \\
 & -6x = 30 \\
 & -6x = 30 \\
 & \frac{-6}{-6} = \frac{30}{-6} \\
 & \boxed{x = -5}
 \end{aligned}$$

$$b) \quad 3x+c = 3x+d$$

c must be equal to d, so that both of the equations would be the same. If there is the same equations on both sides, then the equation has infinitely many solutions.

$$\begin{aligned}
 \textcircled{4} \quad & 4x+2(3x-2) = 10 \\
 & 4x+2(3x)+2(-2) = 10 \\
 & 4x+6x-4 = 10 \\
 & 10x-4 = 10 \leftarrow \textcircled{C}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{5} \quad & -6(y-3) = 2(3x+7) \\
 & -6(y)-6(-3) = 2(3x)+2(7) \\
 & -6y+18 = 6x+14 \leftarrow \textcircled{D}
 \end{aligned}$$

$$\textcircled{6} \quad F = \frac{9}{5}C + 32$$

$$50^\circ\text{F} = F$$

$$\frac{5}{9} \cdot 18 = \frac{9}{5}C \cdot \frac{5}{9}$$

* multiply by reciprocal

$$50 = \frac{9}{5}C + 32$$

$$\frac{90}{9} = C$$

$$50 - 32 = \frac{9}{5}C + 32 - 32$$

$$18 = \frac{9}{5}C$$

$$A. \sqrt{10} = C$$

- ⑦ Rational Numbers - any number that can be turned into a fraction.
- whole, integers, decimals that repeat or terminate

- A) $\sqrt{3}$ - irrational, because it is not a perfect square
 B) $0,4, \sqrt{9}$ - all rational, because $\sqrt{9}=3$
 C) $\sqrt{6}$ - irrational, because it is not a perfect square

⑧

| | | |
|--------------------------|----------------------------|---------------------------|
| $00.042\dots$ | $000.044\dots$ | $00.043\dots$ |
| $495 \overline{) 21000}$ | $4909 \overline{) 220000}$ | $441 \overline{) 190000}$ |
| $\underline{-1980}$ | $\underline{-19636}$ | $\underline{-1764}$ |
| 1200 | 23640 | 1360 |
| $\underline{-990}$ | $\underline{-19636}$ | $\underline{-1323}$ |
| 210 | 4004 | -37 |

$\frac{21}{495} = 0.042\dots$

$\frac{220}{4909} = 0.044\dots$

$\frac{19}{441} = 0.043\dots$

Least to Greatest

$\frac{21}{495}, \frac{19}{441}, \frac{220}{4909}$ (B)

- ⑨ A) $\frac{16}{7}$ = fraction, so rational

B) $2.\overline{5}$ = repeating \rightarrow rational

C) $\sqrt[3]{24}$ = irrational, because $3 \cdot 3 \cdot 3 = 27$, which is close... but not exact.

D) $\sqrt{49} = 7 \rightarrow$ rational (integer/whole/natural)

⑩

$\sqrt[=7]{49} < \sqrt{63} < \sqrt[=8]{64}$

(C) 7 and 8

11) *Turn all into decimals and compare

$$\frac{22}{7} = 7 \overline{) 22.00} \approx 3.14...$$

$$\begin{array}{r} 3.14 \\ 7 \overline{) 22.00} \\ \underline{-21} \\ 10 \\ \underline{-7} \\ 30 \\ \underline{-28} \\ 2 \end{array}$$

$$200\% = \frac{200}{100} = 2$$

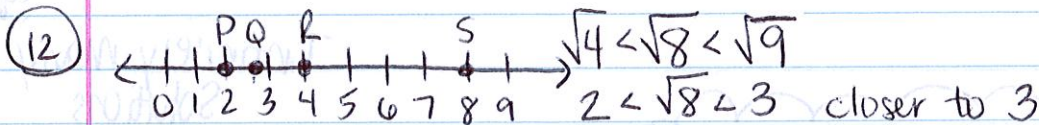
*Move decimal to the left 2 places (divide by 100)

$$\frac{5}{3} = 3 \overline{) 5.00} = 1.6 \leftarrow \text{closer to 2}$$

$$\begin{array}{r} 1.6 \\ 3 \overline{) 5.00} \\ \underline{-3} \\ 20 \\ \underline{-18} \\ 20 \end{array}$$

$\sqrt{2}$ is $\sqrt{1} < \sqrt{2} < \sqrt{4} = 2$ between 1 and 2, but closer to 1.
least to Greatest

D. $\sqrt{2}, \frac{5}{3}, 200\%, \frac{22}{7}$



B