

Name: _____

Course and Year: _____

Part 1. Insert \in or \notin in the blank to make the statement correct.

1. $15 \text{ } ______ N$ 2. $1.4142 \text{ } ______ H$ 3. $0 \text{ } ______ Q$ 4. $2007 \text{ } ______ J$ 5. $-5 \text{ } ______ H$

Part 2. Use the symbol \subseteq to give a correct statement involving the two sets.

1. N and Q 2. R and Q 3. J and N 4. H and R 5. 0 and J

Part 3. Determine which of the sets N , J , Q , H , R , and \emptyset is equal to the given set.

1. $Q \cap R$ 2. $H \cap R$ 3. $Q \cup R$ 4. $H \cap Q$ 5. $J \cap N$

Part 4. Use set builder notation and one or more of the symbols $<$, $>$, \leq , and \geq to denote the set.

- The set of all y between -12 and -3 .
- The set of all y such that y is greater than or equal to -26 and less than -16 .
- The set of all x such that $2x + 4$ is nonnegative.
- The set of all a such that $a - 2$ is greater than -5 and less than or equal to 7 .
- The set of all z such that $2z + 5$ is between and including -1 and 15 .

Part 5. Show the set on the number line and represent the set by interval notation.

- $\{x | -4 < x \leq 4\}$
- $\{x | x > 2 \text{ and } x < 12\}$
- $\{x | x < 3 \text{ or } x > 6\}$
- $\{x | x \geq -5\} \cap \{x | x \leq 5\}$
- $\{x | x > 2\} \cup \{x | x > 10\}$

Part 6. Write the number without absolute value bars.

1. $|3 - \sqrt{3}|$ 2. $\left| -\frac{3}{4} \right|$ 3. $\left| \frac{1}{3} \right|$ 4. $|-8|$ 5. $|3 - \pi|$

Part 7. Use laws of exponents to write the expression so that each variable occurs only once and all the exponents are positive. None of the denominators is zero.

- | | |
|-------------------------|---------------------------------------------|
| 1. $a^{-3} \cdot a^6$ | 4. $\left(\frac{x^{-1}}{y^3} \right)^{-4}$ |
| 2. $\frac{y^5}{y^{-7}}$ | 5. $-7(-x^6y)(-x^6y^5)$ |
| 3. $(s^5t^{-1})^{-2}$ | 6. $(2x^2)^3(3y^3)^2$ |
| | 7. $(4s^4)^4(2t^3)^3$ |

$$8. \frac{(20r^2s^3t^4)(2r^2s^2t)}{(-4rst)(3rs^4t^2)}$$

$$9. \frac{3^{-2}x^{-4}y^0}{(3x^2y^3)^{-4}}$$

$$10. \left(\frac{3x^{-1}y^2z^3}{2x^{-3}y^{-2}z^{-1}} \right)^{-1}$$

Part 8. Simplify the algebraic expression. For items 8, 12, and 23, n is a positive integer. For items 21-25, none of the divisor is zero.

$$1. 4x^2 - 5x + 6x^2 - 2x$$

$$2. 2(3u - 4v) - (5u - 3v)$$

$$3. 3(-t^2 + 3st - 2s^2) - 2(7t^2 - st - s^2)$$

$$4. 3(2w - 3z) - [w - z - (w + z)]$$

$$5. (4x^3 - 7x^2 + 2x - 4) + (3x^3 + 8x^2 + 3x - 7)$$

$$6. -(4z^5 - 6z^3 + z - 8) - (2z^5 + 7z^4 - z^2 + 4z + 1)$$

$$7. 2xyz^2(3xz - 6yz - xy - 1)$$

$$8. 3x^{2n}(x^{n+1} - 4x^n + 5)$$

$$9. (y + 8)(4y - 3)$$

$$10. (2x^2 - 5y^2)(-3x^2 + y^2)$$

$$11. (b - 3b^2 + 7)(5b^2 + 2 - 3b)$$

$$12. (3x^{2n} + y^n)(4x^{2n} - 5y^n)$$

$$13. (y - 2)(y + 7)$$

$$14. (5t + 4)^2$$

$$15. (w + 6)(w - 6)$$

$$16. (6x - y)(3x + 2y)$$

$$17. (t^2 - 5)(t^2 + 9)$$

$$18. (4x^2 - 3y^2)^2$$

$$19. (3r - 10s)(3r + 10s)$$

$$20. (7a^2 - 2b^2)(5a^2 + 3b^2)$$

$$21. \frac{-48y^3 + 30y^2 - 18y}{6y}$$

$$22. \frac{-24a^3b^3c^4 + 32a^2b^4c^2 - 16a^5b^3c^3}{8a^2b^2c^2}$$

$$23. \frac{16t^{4n} - 64t^{6n}}{2t^{2n}}$$

$$24. \frac{a^3 - 3a^2 - a + 3}{a - 2}$$

$$25. \frac{t^3 - 7t - 6}{t + 2}$$