1. The rational numbers are an example of a type of real number. Name the other four types studied in this class.

2. Fill in the blank with a type of number to complete a true statement:
   0 is a real number, but 0 is not ____________________________.

3. Give two exact decimal representations with different digits for the rational number $\frac{2}{5}$.

4. Give the reduced fractional form of the rational number $-1.\overline{5}$.

5. Give a decimal representation of a real number that’s not rational.

Name the main property illustrated in Questions 6 through 10.

6. $10 \cdot 35 = 35 \cdot 10$

7. $-\pi + \pi = 0$

8. $(x + y) + z = z + (x + y)$

9. $2x^2 + x = (2x + 1)x$

10. $m = 1m$

11. Simplify. (a) $-2^4$ (b) $(2a^2)^{-3}$ (c) $9^{1/6} \div 9^{2/3}$

12. Evaluate and simplify with $x = -2$. $x - 1 + 1 \div (x + 1)$

13. On a number line, plot all $x$ such that $2 \leq x < 5$.


15. In interval notation, give the solution set for $|3x - 2| < 7$.

16. Evaluate. (a) $3^0$ (b) $2^0$ (c) $1^0$ (d) $0^0$

17. Simplify. $(1 + \sqrt{5})(1 - \sqrt{5})$

18. Write in simplified exponential form.
   (a) $\sqrt{2}$ (b) $4\sqrt{x^3}$ (c) $x^{3}\sqrt{x^2}$ (d) $\left(\frac{1}{\sqrt{x^2}}\right)^3$
Test 1

19. Give the degree of each polynomial.
   (a) $7x^2 + 3x + 2$   (b) $6x^3 - 4x^5 - 1$   (c) $2x + 1$   (d) $2$   (e) $0$

20. List the coefficients. $7 - 3x^2 - x^5$

21. Factor completely (over the integers).
   (a) $7a^2 + 13ab - 2b^2$
   (b) $8p^3 + 27q^3$
   (c) $m^2(m^2 + 2m + 1) + 3m(m^2 + 2m + 1)$

Do the indicated polynomial operations in Questions 22 through 24. Express your final answers in standard polynomial form.

22. $r - \frac{1}{3}(r + 4)$
23. $(2t - 1)(t + 4)$
24. $(u - 2)^3$

Do the indicated rational operations in Questions 25 through 27. Express your final answers in lowest terms.

25. $\frac{x^2 + v - 12}{v^2 - 7v + 12}$
26. $\frac{1}{w^2 + 4w - 4} - \frac{2}{2w^2 + 4w - 4}$
27. $\frac{1}{h} - \frac{2}{h}$

28. Calculate the discriminant and tell what it says about $3x^2 - 5x + 4$.

29. Find all real solutions. $x(2x - 9) = 0$

30. Find all real solutions. $2y^2 = 3 - 4y$
Selected Answers:
1. natural (counting), whole, integer, irrational; 2. (2 possible answers) a natural (counting) number; an irrational number; 3. 0.4, 0.35; 4. -5/3; 6. commutativity; 7. inverse; 8. commutativity; 9. distributive; 10. identity; 11. (a) -16 (b) 1/(8a^6) (c) 1/3; 12. -4; 14. -5/3, 3; 15. (-5/3, 3); 16. (a) 1 (b) 1 (c) 1 (d) undefined; 17. -4; 18. (a) 2^{1/2} (b) 4x^{3/2} (c) x^{5/3} (d) |x|^{-3/2};

19. (a) 2 (b) 5 (c) 1 (d) 0 (e) undefined; 20. -1, 0, 0, -3, 0, 7; 21. (a) (7a - b)(a + 2b) (b) (2p + 3q)(4p^2 - 6pq + 9q^2) (c) m((m + 1)^2(m + 3); 22. \frac{2}{3}x - \frac{4}{3}; 23. 2t^2 + 7t - 4; 24. u^3 - 6u^2 + 12u - 8; 25. (v + 4)/(v - 4); 26. 1/[(w + 4)(w - 1)(2w - 1)]; 27. -1/[(x + h)]; 28. -23, 3x^2 - 5x + 4 has no real zeros, or is irreducible; or 3x^2 - 5x + 4 = 0 has no real solutions; 29. 0, 9/2; 30. (-4 ± \sqrt{40})/4 or -1 ± 1/2\sqrt{10}.