

Math 110 Review

1. Simplify each expression; your answers should have no negative exponents.

(a) $-\frac{1}{9}$

(b) $\frac{1}{9}$

(c) $\frac{2^8}{r^8t^3}$

(d) $-x^2y^5$

(e) $15a^2b$

(f) $\frac{2^3b^6}{3^3a^9}$

(g) 5^{8-7y}

(h) $\frac{y^2}{3^3x^{10}}$

(i) 2^6

2. Perform the indicated operations.

(a) $x^2 - \frac{4}{3}x - \frac{5}{6}$

(b) $a^4 + a^3 - 2a^2 + 2a^2b - 5ab - 3b^2$

(c) $x^{6r} + y^3$

(d) $6t^4 + t^2 - 12$

(e) $2x^2 + 13x + 15$

(f) $xy - xw + 7y - 7w$

(g) $16w^6 - 9y^4$

(h) $9h^2 + 6h(k-1) + (k-1)^2 = 9h^2 + 6hk - 6h + k^2 - 2k + 1$

(i) $x^4 + 4x^3 + 6x^2 + 4x + 1$

(j) $100y^3 - 20y^2 + y$

(k) $x^{2w} - 2x^{w+t} + x^{2t}$

3. Factor each polynomial completely.

(a) $x(x^2 + 4)$

(b) $(9 - y)(9 + y)$

(c) $(ax - b)(ax + b)$

(d) $(2x + 5y)^2$

(e) $(3x - 1)(9x^2 + 6x + 1)$

(f) $5a^2m(a - 3)(a + 3)$

(g) $(t - a)(2w - 1)$

(h) $(x + 3)(a - 2)(a + 2)$

(i) $x^2y(3 - 4y)(16y^2 + 24y + 9)$

(j) $-2n(m + 2)^2$

(k) $(5y + 1)(y - 3)$

(l) $(2w + 1)(w - 11)$

(m) $(u^{3n} - 2)^2$

(n) $-2(z + 4)^2$

(o) $x^m(x^m + 3)(x^m - 2)$

(p) $(x - 1)(x + 1)(x^2 + 1)$

4. Solve by factoring. State the solution set.

(a) $\{\frac{1}{3}, -\frac{1}{2}\}$

(b) $\{-\frac{2}{3}, -3\}$

(c) $\{\frac{3}{2}\}$

(d) $\{1\}$

(e) $\{4, -4, -2\}$

(f) $\{0, \frac{1}{6}, -2\}$

5. State the domain of each rational expression, using both set notation and interval notation.

- (a) $\{y \mid y \neq 2, y \neq -2\}; (-\infty, -2) \cup (-2, 2) \cup (2, \infty)$ \cup (c) $\mathbb{R}; (-\infty, \infty)$
 (b) $\{x \mid x \neq 1\}; (-\infty, 1) \cup (1, \infty)$ (d) $\{x \mid x \neq 0\}; (-\infty, 0) \cup (0, \infty)$

6. Perform the indicated operations. Cancel common factors before multiplying; simplify before adding.

- (a) 2 (f) $\frac{4a^2 + 8a - 2}{a^3 - a}$
 (b) $w + 1$
 (c) $(x + 3)^2$ (g) $\frac{a - 3}{(a + 1)^2}$
 (d) $\frac{3x}{x - 2}$
 (e) $\frac{4x + 9}{x^2 - 9}$ (h) $\frac{x^3 - 4x - 6}{(x - 1)(x + 1)(x^2 + x + 1)}$

7. Simplify each complex fraction.

- (a) $\frac{21}{10(x - 6)}$
 (b) $\frac{5x + 14}{4(x - 1)}$
 (c) $\frac{a^5 - b^3}{a^7b + ab^2}$
 (d) $\frac{b^3 - a^2}{ab + a^3b^2}$

8. Solve each equation.

- (a) \emptyset
 (b) $\{-\frac{5}{2}\}$
 (c) $\{-5, 3\}$
 (d) $\{-2, 3\}$

9. Answers to the word problems:

111. 10 hours
 112. 7 mph
 113. 400 hours
 114. 12 minutes