

Discrete Mathematics

Exercises

Week 1

1. Reduce as much as possible

(a) $\frac{3}{4} + \frac{5}{4}$

(b) $\frac{3}{2} + \frac{5}{3} + \frac{2}{6}$

(c) $\frac{3}{4} - \frac{5}{4}$

(d) $\frac{7}{3} - \frac{3}{7}$

(e) $\frac{3}{4} \cdot \frac{5}{4}$

(f) $\frac{7}{3} \cdot \frac{3}{7}$

(g) $\frac{\left(\frac{3}{4}\right)}{\left(\frac{5}{4}\right)}$

(h) $\frac{\left(\frac{7}{3}\right)}{\left(\frac{3}{7}\right)}$

2. Express each of the following in the form $2^m 3^n a^r b^s$, where m, n, r , and s are positive integers

(a) $8a^2b^3(27a^4)(2^5ab)$

(b) $3^2(2ab)^3(16a^2b^5)(24b^2a)$

(c) $(3^2ab)^2(18a^3b)(16ab^3)$

3. Put the following fractions in lowest form

(a) $\frac{10}{25}$

(b) $\frac{3}{9}$

(c) $\frac{30}{25}$

(d) $\frac{50}{15}$

(e) $\frac{45}{9}$

(f) $\frac{33}{25}$

(g) $\frac{16}{40}$

(h) $\frac{23}{46}$

4. State if the following is true or false

(a) $\frac{16}{20} = \frac{8}{10}$

(b) $\frac{33}{110} = \frac{3}{10}$

(c) $\frac{36}{16} = \frac{34}{14}$

(d) $\frac{15}{16} \leq \frac{3}{4}$

(e) $\frac{8}{14} \leq \frac{7}{9}$

5. Solve for x in the following equations:

(a) $\frac{3}{5}x = \frac{23}{7}$

(e) $\frac{4(1-3x)}{7} = \frac{2}{3}x - 1$

(b) $\frac{3}{5}x + \frac{8}{9} = \frac{7}{11}$

(f) $\frac{2-x}{3} = \frac{7}{8}x$

(c) $2x - \frac{3}{7} = \frac{x}{5} + 1$

(g) $x^2 + 4x - 5 = 0$

(d) $\frac{-2}{13}x = 3x - 1$

(h) $x^2 = x + 6$

6. Solve for x and y in the following equations:

(a) $y = 2x$

(c) $2y + 4 = 2x$

$x + 2 = 3$

$2x + 2y = 4$

(b) $\frac{4x + 3y}{2} = 5$

(d) $\frac{2y}{x} - \frac{1}{3} = -1$

$4x - 2 = y$

$2y + 4 = x - 1$

7. Show that $\frac{1}{x-y} + \frac{1}{x+y} = \frac{2x}{x^2-y^2}$

8. Find all possible numbers x such that

(a) $|x - 1| = 2$

(d) $|3x + 1| = 2$

(b) $|x| = 5$

(c) $|x - 3| = 4$

(e) $|4x - 5| = 6$

9. Which of the following numbers is rational

(a) π

(b) $\frac{\sqrt{9}}{2}$

(c) $\frac{\sqrt{4}}{\sqrt{2}}$