9. a. $\frac{5}{14} < \frac{5}{8}$

b. $\frac{12}{12} < \frac{11}{12}$

c. $\frac{15}{19} > \frac{15}{23}$

d. $\frac{33}{96} > \frac{27}{100}$

e. $\frac{45}{70} > \frac{45}{55}$

f. $\frac{37}{80} > \frac{33}{90}$

g. $\frac{64}{279} < \frac{72}{79}$

h. $\frac{32}{39} > \frac{27}{39}$

10. $\frac{3}{14} < \frac{6}{7}$

(b) 2. $\frac{8}{9} > \frac{5}{6}$

(c) $\frac{9}{10} < \frac{5}{8}$

d) $\frac{11}{12} > \frac{8}{9}$

(e) $6\frac{6}{7} \quad \frac{49}{8}$

(f) $\frac{48}{7} > \frac{49}{8}$

$= 6\frac{6}{7} > \frac{49}{8}$

(8) $5\frac{2}{7}$ $\frac{41}{8}$

$= \frac{37}{7} > \frac{41}{8}$

$= 5\frac{2}{7} > \frac{41}{8}$

(9) $1\frac{11}{12}$ $1\frac{12}{15}$

$= \frac{23}{12} > \frac{27}{15}$

$= 1\frac{11}{12} > 1\frac{12}{15}$

(10) $16\frac{3}{5}$ $16\frac{4}{7}$

$= \frac{83}{5} > \frac{116}{7}$

$= 16\frac{3}{5} > 16\frac{4}{7}$

11. a, $\frac{11}{13}$ $\frac{11}{17}$ $\frac{11}{15}$

A → $\frac{11}{17} < \frac{11}{15} < \frac{11}{13}$

B. $\frac{8}{15} < \frac{8}{17} < \frac{8}{9}$

C. $\frac{8}{17}$ $\frac{16}{17}$ $\frac{15}{17}$

$\frac{8}{17} < \frac{15}{17} < \frac{16}{17}$

4. $\frac{2}{4}$ $\frac{5}{6}$ $\frac{7}{18}$

$\frac{9 \times 9}{4 \times 9} = \frac{27}{36}$

$\frac{5 \times 6}{6 \times 6} = \frac{30}{36}$

$\frac{7 \times 2}{18 \times 2} = \frac{14}{36}$

$\frac{14}{36}, \frac{27}{36}, \frac{30}{36}$

$\frac{7}{18} < \frac{3}{4} < \frac{5}{6}$

5. (c) $\frac{8}{9}, \frac{7}{9}, \frac{2}{3}$

$\frac{8 \times 1}{9 \times 1} = \frac{8}{9}$

$\frac{7 \times 1}{9 \times 1} = \frac{7}{9}$

$\frac{2 \times 3}{3 \times 3} = \frac{6}{9}$

$\frac{6}{9} < \frac{7}{9} < \frac{8}{9}$

2	4, 6, 18
3	2, 3, 9
	2, 1, 3

LCM = 2 × 3 × 2 × 3 = 36

3	3 9
	1, 3

(f) $\frac{7}{12}, \frac{5}{6}, \frac{2}{3}$

$= \frac{7 \times 1}{12 \times 1} = \frac{7}{12}$

$5 \times 2 = 10$
$6 \times 2 = 12$

$2 \times 4 = 8$
$3 \times 4 = 12$

$= \frac{7}{12} < \frac{8}{12} < \frac{10}{12}$

$= \frac{7}{12} < \frac{8}{3} < \frac{5}{6}$

(g) $\frac{7}{10}, \frac{2}{3}, \frac{11}{24}$

$7 \times 12 = 84$
$10 \times 12 = 120$

$2 \times 40 = 80$
$3 \times 40 = 120$

$11 \times 5 = 55$
$24 \times 5 = 120$

$\frac{55}{120} < \frac{80}{120} < \frac{84}{120}$

$\frac{11}{24} < \frac{2}{3} < \frac{7}{10}$

(h) $\frac{11}{21}, \frac{5}{7}, \frac{1}{2}$

$\Rightarrow \frac{11 \times 2}{21 \times 2} = \frac{22}{42}$

$5 \times 6 = 30$
$7 \times 6 = 42$

$1 \times 21 = 21$
$2 \times 21 = 42$

2	8, 12, 6, 3
2	4, 6, 3
3	2, 3, 3
	2, 1, 1

$12 = 2 \times 2 \times 3$
$6 = 2 \times 3$
$3 = 3 \times 1$

$LCM = 2 \times 2 \times 3 \times 1 = 12$

3	10, 3, 24
2	10, 1, 8
2	5, 1, 4
	5, 1, 2

$LCM = 3 \times 2 \times 2 \times 5 \times 2 = 120$

7	21, 7, 2
	3, 1, 2

$LCM = 7 \times 3 \times 2 = 42$

$\frac{21}{42} < \frac{22}{42} < \frac{30}{42}$

$\frac{1}{2} < \frac{11}{21} < \frac{5}{7}$

12 (a) $\frac{1}{4}, \frac{7}{8}, \frac{5}{12}$

$1 \times 6 = 6$
$4 \times 6 = 24$

$7 \times 3 = 21$
$8 \times 3 = 24$

$5 \times 2 = 10$
$12 \times 2 = 24$

$\frac{21}{24} > \frac{10}{24} > \frac{6}{24}$

$\frac{7}{8} > \frac{5}{12} > \frac{1}{4}$

(b) $\frac{5}{8}, \frac{3}{16}, \frac{3}{4}$

$5 \times 2 = 10$
$8 \times 2 = 16$

$3 \times 1 = 3$
$16 \times 1 = 16$

$3 \times 4 = 12$
$4 \times 4 = 16$

$\frac{12}{16} > \frac{10}{16} > \frac{3}{16}$

(c) $\frac{5}{8}, \frac{3}{4}, \frac{5}{14}$

$5 \times 7 = 35$
$8 \times 7 = 56$

$3 \times 14 = 42$
$4 \times 14 = 56$

2	4, 8, 12
2	2, 4, 6
	1, 2, 3

LCM = $2 \times 2 \times 2 \times 3 = 24$

2	8, 16, 4
2	4, 8, 2
2	2, 4, 1
	1, 2, 1

LCM = $2 \times 2 \times 2 \times 2 = 16$

2	4, 8, 14
2	2, 4, 7
	1, 2, 7

LCM = $2 \times 2 \times 2 \times 7 = 56$

$\frac{5 \times 4 = 20}{14 \times 4 = 56}$

$\frac{42}{56} < \frac{35}{56} < \frac{20}{56}$

(d) $\frac{5}{14}, \frac{7}{9}, \frac{2}{3}$

$\frac{5 \times 9 = 45}{14 \times 9 = 126}$

$\frac{7 \times 14 = 98}{9 \times 14 = 126}$

$\frac{2 \times 42 = 84}{9 \times 42 = 126}$

$\frac{98}{126} > \frac{84}{126} > \frac{45}{126}$

$= \frac{7}{9} > \frac{2}{3} > \frac{5}{14}$

(e) $\frac{7}{16}, \frac{3}{8}, \frac{5}{12}$

$\frac{7 \times 3 = 21}{16 \times 3 = 48}$

$\frac{3 \times 6 = 18}{8 \times 6 = 48}$

$\frac{5 \times 4 = 20}{12 \times 4 = 48}$

$\frac{21}{48} > \frac{20}{48} > \frac{18}{48}$

$= \frac{7}{16} > \frac{5}{12} > \frac{3}{8}$

(f) $\frac{25}{27}, \frac{8}{9}, \frac{5}{18}$

$= \frac{25 \times 2 = 50}{27 \times 2 = 54}$

3	14, 9, 3
3	14, 3, 1
3	7, 3, 1
	7, 1, 1

LCM = 3 × 2 × 3 × 7 = 126

2	16, 8, 12
2	8, 4, 6
2	4, 2, 3
	2, 1, 3

LCM = 2 × 2 × 2 × 2 × 3 = 48

3	27, 9, 18
3	9, 3, 6
	3, 1, 2

LCM = 3 × 3 × 3 × 2 = 54

$\frac{8 \times 6 = 48}{9 \times 6 = 54}$

$\frac{5 \times 3 = 15}{18 \times 3 = 54}$

$\frac{50}{54} > \frac{48}{54} > \frac{15}{54}$

$= \frac{35}{27} > \frac{8}{9} > \frac{5}{18}$

(a) $\frac{11}{20}, \frac{4}{5}, \frac{17}{40}$

$\frac{11 \times 2 = 22}{20 \times 2 = 40}$

$\frac{4 \times 8 = 32}{5 \times 8 = 40}$

$\frac{17 \times 1 = 17}{40 \times 1 = 40}$

$\frac{32}{40} > \frac{22}{40} > \frac{17}{40}$

$= \frac{4}{5} > \frac{4}{20} > \frac{17}{40}$

(b) $\frac{11}{17}, \frac{1}{4}, \frac{1}{2}$

$\frac{11 \times 4 = 44}{17 \times 4 = 68}$

$\frac{1 \times 17 = 17}{4 \times 17 = 68}$

$\frac{1 \times 34 = 34}{2 \times 34 = 68}$

$\frac{44}{68} > \frac{34}{68} > \frac{17}{68}$

$= \frac{11}{17} > \frac{1}{2} > \frac{1}{4}$

5	20, 5, 40
2	4, 1, 8
2	2, 1, 4
	1, 1, 2

LCM = $5 \times 2 \times 2 \times 2 = 40$

2	17, 4, 2
17	17, 2, 1
	1, 2, 1

LCM = $2 \times 17 \times 2 = 68$