(All fractional answers must be in lowest terms.)

1. $\frac{2}{169} + \frac{33}{104} =$

2. $\frac{1}{9^3} + \frac{23}{18^2} =$

3. $\frac{9}{(0.8)^2} - \frac{1}{9} =$

4. $\frac{10}{2+(2/3)} + \frac{1}{2/9} =$

5. $\frac{13 \cdot 9}{(0.9)^2} - \frac{13^2}{10} =$

6. $\frac{21^{-30}}{3^{-25}} \cdot \frac{7^{31}}{12^2} =$

7. $\frac{3^{-6}}{2^{-1}} \div \frac{2/3-1/4}{6^4} =$

8. $\frac{11}{7} \cdot \square - \frac{15}{2} = \frac{1}{4}$

$\square =$

9. $\frac{11}{7}(\square - \frac{15}{2}) = \frac{1}{4}$

$\square =$

10. $21{,}000{,}100\ ^1/_5$
$\underline{-\ 999{,}109\ ^4/_7}$

41

Name _____ Date _____

Fractions

(Answer ID # 0826543)

Fill in the missing number.

1. $\frac{3}{6} = \frac{\square}{2}$	2. $\frac{1}{3} = \frac{\square}{54}$	3. $\frac{\square}{36} = \frac{4}{6}$
4. $\frac{2}{\square} = \frac{34}{85}$	5. $\frac{24}{\square} = \frac{3}{4}$	6. $\frac{196}{140} = \frac{14}{\square}$
7. $\frac{14}{49} = \frac{2}{\square}$	8. $\frac{\square}{14} = \frac{50}{140}$	9. $\frac{9}{\square} = \frac{1}{9}$
10. $\frac{10}{13} = \frac{\square}{156}$	11. $\frac{220}{80} = \frac{22}{\square}$	12. $\frac{96}{120} = \frac{\square}{15}$
13. $\frac{\square}{12} = \frac{63}{84}$	14. $\frac{\square}{11} = \frac{64}{88}$	15. $\frac{49}{\square} = \frac{7}{14}$
16. $\frac{11}{33} = \frac{1}{\square}$	17. $\frac{17}{5} = \frac{\square}{50}$	18. $\frac{5}{\square} = \frac{50}{80}$
19. $\frac{3}{2} = \frac{54}{\square}$	20. $\frac{21}{\square} = \frac{7}{9}$	21. $\frac{\square}{143} = \frac{4}{13}$
22. $\frac{\square}{11} = \frac{162}{198}$	23. $\frac{92}{24} = \frac{46}{\square}$	24. $\frac{14}{15} = \frac{\square}{195}$

41

42

Name _____ Date _____

Fractions

(Answer ID # 0818731)

Write each fraction in simplest form.

1. $\frac{15}{35}$	2. $\frac{4}{8}$	3. $\frac{3}{18}$	4. $\frac{12}{18}$
5. $\frac{14}{21}$	6. $\frac{54}{72}$	7. $\frac{24}{30}$	8. $\frac{120}{132}$
9. $\frac{14}{42}$	10. $\frac{40}{80}$	11. $\frac{8}{16}$	12. $\frac{7}{39}$
13. $\frac{27}{54}$	14. $\frac{11}{88}$	15. $\frac{4}{22}$	16. $\frac{132}{144}$
17. $\frac{6}{9}$	18. $\frac{9}{37}$	19. $\frac{21}{28}$	20. $\frac{30}{54}$
21. $\frac{4}{20}$	22. $\frac{20}{50}$	23. $\frac{8}{23}$	24. $\frac{25}{30}$
25. $\frac{8}{56}$	26. $\frac{21}{27}$	27. $\frac{14}{45}$	28. $\frac{6}{18}$
29. $\frac{77}{110}$	30. $\frac{100}{110}$	31. $\frac{6}{48}$	32. $\frac{10}{12}$

42

43

Name _____ edHelper.com Date _____

Fractions

(Answer ID # 1045059)

Order the fractions from least to greatest.

1. $\frac{1}{2}, \frac{1}{5}, \frac{5}{9}$	2. $\frac{3}{10}, \frac{2}{3}, \frac{6}{8}$	3. $\frac{3}{4}, \frac{10}{11}, \frac{4}{6}$
4. $\frac{6}{7}, \frac{5}{12}, \frac{9}{10}$	5. $\frac{2}{3}, \frac{1}{4}, \frac{1}{12}$	6. $\frac{1}{2}, \frac{6}{7}, \frac{4}{9}$
7. $\frac{7}{8}, \frac{2}{6}, \frac{10}{11}$	8. $\frac{1}{13}, \frac{11}{16}, \frac{14}{18}$	9. $\frac{5}{14}, \frac{12}{17}, \frac{9}{15}$
10. $\frac{12}{14}, \frac{4}{19}, \frac{1}{5}$	11. $\frac{13}{15}, \frac{3}{5}, \frac{1}{2}$	12. $\frac{6}{8}, \frac{4}{9}, \frac{2}{19}$
13. $\frac{10}{17}, \frac{5}{10}, \frac{7}{13}$	14. $\frac{8}{11}, \frac{2}{6}, \frac{10}{16}$	15. $\frac{4}{18}, \frac{2}{4}, \frac{1}{7}$
16. $\frac{1}{3}, \frac{11}{12}, \frac{5}{10}$	17. $\frac{2}{16}, \frac{7}{8}, \frac{11}{19}$	18. $\frac{12}{17}, \frac{2}{6}, \frac{3}{9}$
19. $\frac{3}{18}, \frac{10}{15}, \frac{1}{2}$	20. $\frac{2}{4}, \frac{1}{3}, \frac{5}{12}$	21. $\frac{7}{14}, \frac{3}{5}, \frac{6}{7}$
22. $\frac{8}{11}, \frac{5}{13}, \frac{4}{13}$	23. $\frac{3}{4}, \frac{1}{2}, \frac{2}{16}$	24. $\frac{1}{8}, \frac{4}{5}, \frac{9}{12}$

43

44

Name _____ Date _____

Fractions

(Answer ID # 0509040)

Compare. Write <, >, or =.

1. $\frac{4}{11} \square \frac{6}{9}$	2. $\frac{2}{7} \square \frac{4}{14}$	3. $\frac{2}{8} \square \frac{4}{5}$
4. $\frac{20}{24} \square \frac{25}{30}$	5. $\frac{5}{13} \square \frac{8}{10}$	6. $\frac{5}{14} \square \frac{7}{12}$
7. $\frac{9}{20} \square \frac{4}{21}$	8. $\frac{16}{29} \square \frac{2}{35}$	9. $\frac{1}{26} \square \frac{14}{22}$
10. $\frac{25}{28} \square \frac{3}{24}$	11. $\frac{4}{5} \square \frac{3}{8}$	12. $\frac{1}{23} \square \frac{13}{28}$
13. $\frac{12}{21} \square \frac{4}{7}$	14. $\frac{8}{11} \square \frac{7}{14}$	15. $\frac{1}{10} \square \frac{5}{14}$
16. $\frac{7}{9} \square \frac{6}{11}$	17. $\frac{2}{12} \square \frac{16}{18}$	18. $\frac{2}{14} \square \frac{5}{12}$
19. $\frac{6}{13} \square \frac{2}{9}$	20. $\frac{4}{24} \square \frac{3}{18}$	21. $\frac{1}{30} \square \frac{16}{27}$
22. $\frac{5}{24} \square \frac{2}{29}$	23. $\frac{1}{20} \square \frac{9}{15}$	24. $\frac{12}{14} \square \frac{6}{7}$

44

45

Name _____ Date _____

Fractions

(Answer ID # 0817735)

Write each improper fraction as a mixed number in simplest form.

1. $\frac{14}{5}$	2. $\frac{3}{2}$	3. $\frac{27}{4}$	4. $\frac{29}{6}$
5. $\frac{45}{12}$	6. $\frac{36}{7}$	7. $\frac{26}{8}$	8. $\frac{16}{3}$
9. $\frac{48}{18}$	10. $\frac{95}{15}$	11. $\frac{46}{10}$	12. $\frac{21}{13}$
13. $\frac{19}{3}$	14. $\frac{23}{5}$	15. $\frac{22}{4}$	16. $\frac{18}{12}$
17. $\frac{33}{14}$	18. $\frac{20}{6}$	19. $\frac{7}{2}$	20. $\frac{22}{15}$
21. $\frac{33}{8}$	22. $\frac{18}{7}$	23. $\frac{63}{11}$	24. $\frac{88}{13}$
25. $\frac{83}{18}$	26. $\frac{29}{12}$	27. $\frac{37}{7}$	28. $\frac{5}{4}$
29. $\frac{54}{8}$	30. $\frac{23}{6}$	31. $\frac{111}{19}$	32. $\frac{18}{10}$

45

46

Name _____ Date _____

Fractions

(Answer ID # 0941262)

Add or subtract. Write the answer in simplest form.

1. $3\frac{40}{68} - 2\frac{59}{68}$	2. $9\frac{9}{14} + 15\frac{6}{14}$	3. $16 - 4\frac{1}{18}$
4. $\frac{9}{23} - \frac{8}{23}$	5. $\frac{5}{17} + \frac{7}{17}$	6. $\frac{9}{12} - \frac{2}{12}$
7. $7\frac{3}{6} + 12$	8. $\frac{21}{22} + \frac{21}{22} + \frac{14}{22}$	9. $5\frac{3}{8} + 1\frac{4}{8}$
10. $19\frac{1}{9} - 13\frac{3}{9}$	11. $\frac{33}{96} + \frac{57}{96}$	12. $\frac{14}{19} + \frac{14}{19}$
13. $\frac{5}{11} - \frac{4}{11}$	14. $\frac{9}{53} - \frac{2}{53}$	15. $\frac{11}{24} + \frac{8}{24}$
16. $6\frac{3}{10} + 11\frac{8}{10}$	17. $10 - 8\frac{1}{5}$	18. $17\frac{5}{7} + 14\frac{6}{7}$
19. $20\frac{13}{21} - 18\frac{17}{21}$	20. $15 + 3\frac{3}{4}$	21. $\frac{10}{15} + \frac{10}{15} + \frac{2}{15}$
22. $17\frac{47}{50} - 10\frac{10}{50}$	23. $12\frac{2}{3} - 2\frac{2}{3}$	24. $13\frac{1}{2} - 5\frac{1}{2}$

46

47

Name _____ Date _____

Fractions

(Answer ID # 0375513)

Add or subtract. Write the answer in simplest form.

1. $16 - \frac{13}{18}$	2. $19 + \frac{3}{9}$	3. $3 - \frac{2}{3}$
4. $5 + \frac{12}{17}$	5. $9 - \frac{9}{16}$	6. $17 + \frac{16}{19}$
7. $13 + \frac{3}{6}$	8. $8 - \frac{7}{12}$	9. $12 - \frac{1}{11}$
10. $\frac{4}{7} + 7$	11. $11 - \frac{8}{13}$	12. $\frac{3}{15} + 10$
13. $18 + \frac{1}{2}$	14. $6 - \frac{13}{14}$	15. $4 - \frac{2}{4}$
16. $15 - \frac{9}{10}$	17. $\frac{1}{5} + 14$	18. $\frac{6}{8} + 20$
19. $2 - \frac{3}{14}$	20. $2 + \frac{4}{13}$	21. $5 - \frac{1}{4}$
22. $8 + \frac{5}{10}$	23. $11 - \frac{14}{19}$	24. $10 + \frac{6}{7}$

47

48

Name _____ Date _____

Fractions

(Answer ID # 0570567)

Multiply. Write the answer in simplest form.

1. $\frac{4}{5} \cdot \frac{1}{2}$	2. $\frac{1}{6} \cdot \frac{6}{8}$	3. $\frac{3}{7} \cdot \frac{1}{4}$
4. $\frac{2}{3} \cdot \frac{6}{9}$	5. $\frac{4}{5} \cdot \frac{3}{9}$	6. $\frac{1}{2} \cdot \frac{5}{7}$
7. $\frac{2}{4} \cdot \frac{1}{3}$	8. $\frac{4}{18} \cdot \frac{11}{12}$	9. $\frac{3}{8} \cdot \frac{1}{4}$
10. $\frac{7}{13} \cdot \frac{3}{11}$	11. $\frac{11}{12} \cdot \frac{4}{5}$	12. $\frac{1}{10} \cdot \frac{1}{3}$
13. $\frac{15}{19} \cdot \frac{4}{7}$	14. $\frac{1}{2} \cdot \frac{8}{9}$	15. $\frac{9}{14} \cdot \frac{12}{16}$
16. $\frac{4}{7} \cdot \frac{1}{4}$	17. $\frac{6}{9} \cdot \frac{1}{2}$	18. $\frac{2}{3} \cdot \frac{7}{12}$
19. $\frac{3}{8} \cdot \frac{1}{6}$	20. $\frac{5}{10} \cdot \frac{2}{5}$	21. $\frac{1}{7} \cdot \frac{3}{4}$
22. $\frac{8}{16} \cdot \frac{11}{18}$	23. $\frac{3}{6} \cdot \frac{1}{11}$	24. $\frac{5}{10} \cdot \frac{15}{17}$

48

49

Name _____ Date _____

Fractions

(Answer ID # 0105411)

Multiply. Write the answer in simplest form.

1. $6\frac{3}{6} \cdot \frac{1}{3}$	2. $11\frac{2}{7} \cdot 4\frac{7}{9}$	3. $2\frac{2}{5} \cdot 1\frac{3}{4}$
4. $\frac{1}{2} \cdot 5\frac{7}{8}$	5. $7\frac{1}{7} \cdot \frac{4}{8}$	6. $\frac{1}{2} \cdot 3\frac{1}{5}$
7. $9\frac{2}{3} \cdot \frac{8}{13}$	8. $10\frac{4}{6} \cdot \frac{5}{10}$	9. $\frac{7}{12} \cdot 8\frac{11}{17}$
10. $12\frac{17}{18} \cdot 5\frac{10}{15}$	11. $2\frac{4}{5} \cdot 11\frac{5}{6}$	12. $\frac{2}{4} \cdot 10\frac{13}{17}$
13. $12\frac{1}{8} \cdot 7\frac{7}{16}$	14. $\frac{6}{7} \cdot 6\frac{1}{9}$	15. $\frac{10}{13} \cdot 4\frac{3}{19}$
16. $9\frac{8}{11} \cdot \frac{7}{14}$	17. $8\frac{5}{8} \cdot 3\frac{2}{9}$	18. $1\frac{1}{2} \cdot \frac{9}{17}$
19. $\frac{4}{11} \cdot 8\frac{2}{3}$	20. $6\frac{4}{13} \cdot \frac{12}{14}$	21. $7\frac{5}{7} \cdot \frac{2}{3}$
22. $2\frac{11}{12} \cdot 10\frac{13}{18}$	23. $\frac{1}{2} \cdot 1\frac{1}{10}$	24. $5\frac{7}{19} \cdot 11\frac{1}{4}$

49

50

Name _____  Date _____

Fractions

(Answer ID # 1007864)

Divide. Write the answer in simplest form.

1. $\frac{2}{4} \div \frac{7}{9}$	2. $\frac{1}{3} \div \frac{3}{8}$	3. $\frac{2}{5} \div \frac{1}{2}$
4. $\frac{6}{7} \div \frac{5}{6}$	5. $\frac{4}{7} \div \frac{3}{5}$	6. $\frac{2}{8} \div \frac{1}{3}$
7. $\frac{3}{18} \div \frac{7}{16}$	8. $\frac{1}{2} \div \frac{2}{4}$	9. $\frac{5}{11} \div \frac{6}{12}$
10. $\frac{8}{15} \div \frac{1}{9}$	11. $\frac{2}{4} \div \frac{4}{7}$	12. $\frac{11}{15} \div \frac{6}{18}$
13. $\frac{1}{2} \div \frac{13}{14}$	14. $\frac{1}{5} \div \frac{3}{6}$	15. $\frac{1}{2} \div \frac{2}{7}$
16. $\frac{1}{3} \div \frac{7}{15}$	17. $\frac{6}{8} \div \frac{3}{5}$	18. $\frac{9}{18} \div \frac{2}{14}$
19. $\frac{8}{10} \div \frac{4}{13}$	20. $\frac{2}{9} \div \frac{4}{12}$	21. $\frac{1}{16} \div \frac{5}{6}$
22. $\frac{3}{8} \div \frac{1}{3}$	23. $\frac{7}{15} \div \frac{8}{9}$	24. $\frac{9}{19} \div \frac{10}{18}$

50

51

Name _____ Date _____

Fractions

(Answer ID # 0791877)

Divide. Write the answer in simplest form.

1. $4 \div \frac{3}{7}$	2. $\frac{7}{8} \div 9$	3. $10\frac{2}{3} \div 5\frac{3}{5}$
4. $1\frac{1}{4} \div 11\frac{1}{2}$	5. $7\frac{4}{7} \div \frac{5}{6}$	6. $3\frac{2}{5} \div 6$
7. $12\frac{1}{2} \div \frac{3}{4}$	8. $8\frac{13}{16} \div 6$	9. $\frac{4}{18} \div 2\frac{9}{12}$
10. $\frac{14}{15} \div 1\frac{8}{10}$	11. $3 \div \frac{1}{4}$	12. $11 \div 9\frac{2}{3}$
13. $7\frac{1}{15} \div \frac{5}{6}$	14. $\frac{6}{8} \div 5$	15. $8\frac{1}{5} \div \frac{2}{3}$
16. $\frac{3}{16} \div 2$	17. $1 \div \frac{8}{10}$	18. $\frac{7}{8} \div 8$
19. $3 \div \frac{5}{16}$	20. $7\frac{1}{2} \div 5\frac{6}{10}$	21. $11\frac{10}{11} \div \frac{2}{7}$
22. $10\frac{3}{9} \div 4\frac{1}{3}$	23. $\frac{3}{4} \div 1\frac{11}{13}$	24. $11\frac{1}{2} \div \frac{4}{5}$

51

Math 4010
(Key to Extra Fraction Problems)

ID # 0826543

1. 1
2. 18
3. 24
4. 5
5. 32
6. 10
7. 7
8. 5
9. 81
10. 120
11. 8
12. 12
13. 9
14. 8
15. 98
16. 3
17. 170
18. 8
19. 36
20. 27
21. 44
22. 9
23. 12
24. 182

ID # 0818731

1. $3/7$
2. $1/2$
3. $1/6$
4. $2/3$
5. $2/3$
6. $3/4$
7. $4/5$
8. $10/11$
9. $1/3$
10. $1/2$
11. $1/2$
12. $7/39$
13. $1/2$
14. $1/8$
15. $2/11$
16. $11/12$
17. $2/3$
18. $9/37$
19. $3/4$
20. $5/9$
21. $1/5$
22. $2/5$
23. $8/23$
24. $5/6$
25. $1/7$
26. $7/9$
27. $14/45$
28. $1/3$
29. $7/10$
30. $10/11$
31. $1/8$
32. $5/6$

(2)

ID# 1045059

1. 1/5, 1/2, 5/9
2. 3/10, 2/3, 6/8
3. 4/6, 3/4, 10/11
4. 5/12, 6/7, 9/10
5. 1/12, 1/4, 2/3
6. 4/9, 1/2, 6/7
7. 2/6, 7/8, 10/11
8. 1/13, 11/16, 14/18
9. 5/14, 9/15, 12/17
10. 1/5, 4/19, 12/14
11. 1/2, 3/5, 13/15
12. 2/19, 4/9, 6/8
13. 5/10, 7/13, 10/17
14. 2/6, 10/16, 8/11
15. 1/7, 4/18, 2/4
16. 1/3, 5/10, 11/12
17. 2/16, 11/19, 7/8
18. 2/6, 3/9, 12/17
19. 3/18, 1/2, 10/15
20. 1/3, 5/12, 2/4
21. 7/14, 3/5, 6/7
22. 4/13, 5/13, 8/11
23. 2/16, 1/2, 3/4
24. 1/8, 9/12, 4/5

ID# 0509040

1. <
2. =
3. <
4. =
5. <
6. <
7. >
8. >
9. <
10. >
11. >
12. <
13. =
14. >
15. <
16. >
17. <
18. <
19. >
20. =
21. <
22. >
23. <
24. =

(3)

ID # 0817735

1. $2\frac{4}{5}$
2. $1\frac{1}{2}$
3. $6\frac{3}{4}$
4. $4\frac{5}{6}$
5. $3\frac{3}{4}$
6. $5\frac{1}{7}$
7. $3\frac{1}{4}$
8. $5\frac{1}{3}$
9. $2\frac{2}{3}$
10. $6\frac{1}{3}$
11. $4\frac{3}{5}$
12. $1\frac{8}{13}$
13. $6\frac{1}{3}$
14. $4\frac{3}{5}$
15. $5\frac{1}{2}$
16. $1\frac{1}{2}$
17. $2\frac{5}{14}$
18. $3\frac{1}{3}$
19. $3\frac{1}{2}$
20. $1\frac{7}{15}$
21. $4\frac{1}{8}$
22. $2\frac{4}{7}$
23. $5\frac{8}{11}$
24. $6\frac{10}{13}$
25. $4\frac{11}{18}$
26. $2\frac{5}{12}$
27. $5\frac{2}{7}$
28. $1\frac{1}{4}$
29. $6\frac{3}{4}$
30. $3\frac{5}{6}$
31. $5\frac{14}{19}$
32. $1\frac{4}{5}$

ID # 0941262

1. $\frac{49}{68}$
2. $25\frac{1}{14}$ or $\frac{351}{14}$
3. $11\frac{17}{18}$ or $\frac{215}{18}$
4. $\frac{1}{23}$
5. $\frac{12}{17}$
6. $\frac{7}{12}$
7. $19\frac{1}{2}$ or $\frac{39}{2}$
8. $2\frac{6}{11}$ or $\frac{28}{11}$
9. $6\frac{7}{8}$ or $\frac{55}{8}$
10. $5\frac{7}{9}$ or $\frac{52}{9}$
11. $\frac{15}{16}$
12. $1\frac{9}{19}$ or $\frac{28}{19}$
13. $\frac{1}{11}$
14. $\frac{7}{53}$
15. $\frac{19}{24}$
16. $18\frac{1}{10}$ or $\frac{181}{10}$
17. $1\frac{4}{5}$ or $\frac{9}{5}$
18. $32\frac{4}{7}$ or $\frac{228}{7}$
19. $1\frac{17}{21}$ or $\frac{38}{21}$
20. $18\frac{3}{4}$ or $\frac{75}{4}$
21. $1\frac{7}{15}$ or $\frac{22}{15}$
22. $7\frac{37}{50}$ or $\frac{387}{50}$
23. 10
24. 8

ID # 0375513

1. $15\frac{5}{18}$ or $\frac{275}{18}$
2. $19\frac{1}{3}$ or $\frac{58}{3}$
3. $2\frac{1}{3}$ or $\frac{7}{3}$
4. $5\frac{12}{17}$ or $\frac{97}{17}$
5. $8\frac{7}{16}$ or $\frac{135}{16}$
6. $17\frac{14}{19}$ or $\frac{339}{19}$
7. $13\frac{1}{2}$ or $\frac{27}{2}$
8. $7\frac{5}{12}$ or $\frac{89}{12}$
9. $11\frac{10}{11}$ or $\frac{131}{11}$
10. $7\frac{4}{7}$ or $\frac{53}{7}$
11. $10\frac{5}{13}$ or $\frac{135}{13}$
12. $10\frac{1}{5}$ or $\frac{51}{5}$
13. $18\frac{1}{2}$ or $\frac{37}{2}$
14. $5\frac{1}{14}$ or $\frac{71}{14}$
15. $3\frac{1}{2}$ or $\frac{7}{2}$
16. $14\frac{1}{10}$ or $\frac{141}{10}$
17. $14\frac{1}{5}$ or $\frac{71}{5}$
18. $20\frac{3}{4}$ or $\frac{83}{4}$
19. $1\frac{11}{14}$ or $\frac{25}{14}$
20. $2\frac{4}{13}$ or $\frac{30}{13}$
21. $4\frac{3}{4}$ or $\frac{19}{4}$
22. $8\frac{1}{2}$ or $\frac{17}{2}$
23. $10\frac{5}{19}$ or $\frac{195}{19}$
24. $10\frac{6}{7}$ or $\frac{76}{7}$

ID # 0570567

1. $\frac{2}{5}$
2. $\frac{1}{8}$
3. $\frac{3}{28}$
4. $\frac{4}{9}$
5. $\frac{4}{15}$
6. $\frac{5}{14}$
7. $\frac{1}{6}$
8. $\frac{11}{54}$
9. $\frac{3}{32}$
10. $\frac{21}{143}$
11. $\frac{11}{15}$
12. $\frac{1}{30}$
13. $\frac{60}{133}$
14. $\frac{4}{9}$
15. $\frac{27}{56}$
16. $\frac{1}{7}$
17. $\frac{1}{3}$
18. $\frac{7}{18}$
19. $\frac{1}{16}$
20. $\frac{1}{5}$
21. $\frac{3}{28}$
22. $\frac{11}{36}$
23. $\frac{1}{22}$
24. $\frac{15}{34}$

ID # 0105411

1. $2\frac{1}{6}$ or $\frac{13}{6}$
2. $53\frac{58}{63}$ or $\frac{3397}{63}$
3. $4\frac{1}{5}$ or $\frac{21}{5}$
4. $2\frac{15}{16}$ or $\frac{47}{16}$
5. $3\frac{4}{7}$ or $\frac{25}{7}$
6. $1\frac{3}{5}$ or $\frac{8}{5}$
7. $5\frac{37}{39}$ or $\frac{232}{39}$
8. $5\frac{1}{3}$ or $\frac{16}{3}$
9. $5\frac{3}{68}$ or $\frac{343}{68}$
10. $73\frac{19}{54}$ or $\frac{3961}{54}$
11. $33\frac{2}{15}$ or $\frac{497}{15}$
12. $5\frac{13}{34}$ or $\frac{183}{34}$
13. $90\frac{23}{128}$ or $\frac{11543}{128}$
14. $55\frac{1}{21}$ or $\frac{110}{21}$
15. $3\frac{49}{247}$ or $\frac{740}{247}$
16. $4\frac{19}{22}$ or $\frac{107}{22}$
17. $27\frac{19}{24}$ or $\frac{667}{24}$
18. $\frac{27}{34}$
19. $3\frac{5}{33}$ or $\frac{104}{33}$
20. $5\frac{37}{91}$ or $\frac{492}{91}$
21. $5\frac{1}{7}$ or $\frac{36}{7}$
22. $31\frac{59}{216}$ or $\frac{6755}{216}$
23. $\frac{11}{20}$
24. $60\frac{15}{38}$ or $\frac{2295}{38}$

ID #1007864

1. $\frac{9}{14}$
2. $\frac{8}{9}$
3. $\frac{4}{5}$
4. $1\frac{1}{35}$ or $\frac{36}{35}$
5. $\frac{20}{21}$
6. $\frac{3}{4}$
7. $\frac{8}{21}$
8. 1
9. $\frac{10}{11}$
10. $4\frac{4}{5}$ or $\frac{24}{5}$
11. $\frac{7}{8}$
12. $2\frac{1}{5}$ or $\frac{11}{5}$
13. $\frac{7}{13}$
14. $\frac{2}{5}$
15. $1\frac{3}{4}$ or $\frac{7}{4}$
16. $\frac{5}{7}$
17. $1\frac{1}{4}$ or $\frac{5}{4}$
18. $3\frac{1}{2}$ or $\frac{7}{2}$
19. $2\frac{3}{5}$ or $\frac{13}{5}$
20. $\frac{2}{3}$
21. $\frac{3}{40}$
22. $1\frac{1}{8}$ or $\frac{9}{8}$
23. $\frac{21}{40}$
24. $\frac{81}{95}$

ID # 0791877

1. $9\frac{1}{3}$ or $\frac{28}{3}$
2. $\frac{7}{72}$
3. $1\frac{19}{21}$ or $\frac{40}{21}$
4. $\frac{5}{46}$
5. $9\frac{3}{35}$ or $\frac{318}{35}$
6. $\frac{17}{30}$
7. $16\frac{2}{3}$ or $\frac{50}{3}$
8. $1\frac{15}{32}$ or $\frac{47}{32}$
9. $\frac{8}{99}$
10. $\frac{14}{27}$
11. 12
12. $1\frac{4}{29}$ or $\frac{33}{29}$
13. $8\frac{12}{25}$ or $\frac{212}{25}$
14. $\frac{3}{20}$
15. $12\frac{3}{10}$ or $\frac{123}{10}$
16. $\frac{3}{32}$
17. $1\frac{1}{4}$ or $\frac{5}{4}$
18. $\frac{7}{64}$
19. $9\frac{3}{5}$ or $\frac{48}{5}$
20. $1\frac{19}{56}$ or $\frac{75}{56}$
21. $41\frac{15}{22}$ or $\frac{917}{22}$
22. $2\frac{5}{13}$ or $\frac{31}{13}$
23. $\frac{13}{32}$
24. $14\frac{3}{8}$ or $\frac{115}{8}$

57

Name _____ Date _____

Fractions

(Answer ID # 0698150)

Complete.

1. "Ned No-Idea" was what everyone called him. His real name was Ned Franklin, but everywhere he went he was called "Ned No-Idea." Every time someone asked him a question, he said, "I have no idea!" He didn't even try to think; he just said, "I have no idea." One day Ned's mother had in idea. She called all Ned's relatives and asked each one to send Ned eleven ideas about how to have an idea. The twelve relatives each sent eleven ideas. One-fifth of the ideas were about school, a third of the ideas were about listening, and the rest of ideas were about thinking. How many ideas were about thinking?

2. Catharina's father harvests one hundred eight ears of maize every hour. How many ears does he harvest in two-fifths of an hour?

Complete.

3. Professor Crump maintains his theory is correct. He states "the concentration of krill is reduced by 1/7 every time a pod of baleen whales passes by." Consider an area of the ocean where the krill concentration is $35/m^3$. If Professor Crump's theory were correct, what would we expect the krill concentration to be after a pod of whales comes through and feeds? Round your answer to the nearest whole number.

4. In an introductory biology lab, students are asked to determine the average length of the red earthworm. Working in teams, they reported the data in Table 1. At the end of the experiment, the teams combined their data to find the overall average. What was the overall average? Round your answer to the nearest tenth.

Table 1

Team #	Average length (cm)	# of worms measured
1	5 1/3	3
2	5 1/4	5
3	6 3/8	4

57

58

Complete.

5. A new island has formed off the coast of Bay City, which is not unexpected since it is near a subduction zone. The island is currently about 1 km^2. How many years would it take for the island to increase its area by one-half through volcanic activity if it expands at a rate of three-eighths of a square kilometer each year?

6. In examining a series of sediment layers in a canyon near the new BigTown geodesic dome, Dylan has been studying many layers of shale. He recently mapped all 18 of them. If one-sixth of the layers are more than 300 million years old, how many layers are younger than 300 million years?

Complete.

7. Nicholas is hiking in the national park. He is on a 6 1/2-mile hike and he makes four evenly spaced rest stops along the way. At what mile of the hike does he make his last stop?

8. A bus is making a trip from Bigtown to Megacity. The average round trip speed is always 55 MPH on this journey. The round trip distance is 126 miles. At Megacity the bus waits exactly 16 minutes and then returns to Bigtown. If the bus has completed 2/3 of this entire journey, how long has it been since it left Bigtown on the way to Megacity? Round your answer to the nearest minute.

Complete.

9. In a chromatography column (basically a long thin tube) there is carbon dioxide flowing at a rate of 20 ml/min. If the maximum flow rate for the column is 122 ml/min, at what fraction of the maximum is the column currently operating? Express your answer as a fraction.

10. A mixture of organic compounds is distilling. As the boiling point of each compound in the mixture is reached, the liquid boils at that temperature until the entire compound is gone and then the temperature rises to the boiling point of the next higher boiling compound. Compound–A boiled at 69° C and now the temperature has risen to 85°C and stabilized. The Boiling point of compound–B is 0° C. From this we can conclude that the boiling point of compound–A is _____ of the boiling point of compound–B. (Note: Fill in the blank above with a fraction that makes the statement true)

58

Complete.

11. David scored about 1/8 of his team's goals during the hockey tournament that just ended. If the team scored 20 goals, how many did David score?

12. Analysis by the marketing department of the local minor league baseball team showed that for every fan who bought a hotdog at the ball park, about half that many people bought a bag of popcorn. So far this year, 28,400 people have been to the ballpark, and 1/4 of them bought hotdogs. Based on this information, about how many fans bought popcorn?

59

60

Answer Key 0698150

1 62 ideas
2 43 maize
3 30 /m^3
4 5.6 cm
5 1 1/3 years
6 15 layers
7 5 1/5 miles
8 1 hour and 47 minutes
9 10/61
10 $\frac{69}{85}$
11 3 goals
12 3550 people

60

61

Name _____ Date _____

Fractions

(Answer ID # 0467944)

Complete.

1. Anna is making white oatmeal cookies with raisins and pecans for her club. The recipe makes fourteen of the big, chewy kind of oatmeal cookies with lots of raisins and nuts. It takes four-fifths of a cup of nuts and a third of a cup of raisins just for the fourteen cookies! There are fifty-one members in Anna's club. If she makes exactly fifty-one cookies, how many cups of nuts will she need?

2. Hannah's recipe for apple fritters makes twenty fritters and uses half of a cup of milk. Hannah wants to make five fritters. How much milk will she need?

Complete.

3. If 92 out of 100 grasshoppers are immune to a pesticide after five years of use, how many would be expected to be immune in a population of 2.2 million after five years of use?

4. Ranger Roger has counted about 35% of the scrum trees in Vista Park today. He has this chore of counting the 1,200 scrum trees three times a year. If this is his second count this year, what fraction of the total number of scrum trees has he counted so far?

61

62

Complete.

5. At the geologists convention 1/3 of the people are students, 1/4 are professors and 1/12 are industry representatives. The rest are employees of the convention center. If there are 360 people at the convention, how many are employees of the center?

6. Deep in the earth's mantle near the core, the temperature is around 5000° C. If the temperature on the surface near your house is 22°C today, the surface temperature is what fraction of the deep mantle's temperature?

Complete.

7. Alexandra estimates that one-fifth of a certain type of stone has a mass greater than one-eighth of a gram. If she has 600 of these stones, about how many stones have a mass less than or equal to one-eighth of a gram?

8. Justin is hiking in the national park. He is on a 7 1/4-mile hike and he makes four evenly spaced rest stops along the way. At what mile of the hike does he make his last stop?

Complete.

9. A good tasting coating needs to be put on Micromed's new fever tablet. Each tablet without the coating has a mass of 250 mg. Experiments have shown that the coating cannot make up more than 1/73 of the mass of each tablet (otherwise some of the tablet processing machinery doesn't work right). So what is the maximum mass of the coating allowed on a 250-mg tablet? Round your answer to the nearest hundredth.

10. If a solution of MgCl is 5/8 M, what will its concentration be if it is diluted by 16%? Express your answer as a fraction.

62

Complete.

11. David scored about 3/8 of his team's goals during the hockey tournament that just ended. If the team scored 14 goals, how many did David score?

12. Alexandra ran the 100 meters in 15.76 seconds. Her archrival Natalie ran it in 2/5 of a second less. What was Natalie's time?

64

Answer Key 0467944

1 2 32/35 cups
2 1/8 of a cup
3 2024000 grasshoppers
4 7/20
5 120 employees
6 11/2500
7 480 stones
8 5 4/5 miles
9 3.47 mg (difficult question, check answer by calculating the percentage after you add it as well!)
10 21/40
11 5 goals
12 15.36 seconds

64

65

Name _____ Date _____

Fractions

(Answer ID # 0621748)

Complete.

1. "Yuck!" Luis said. "This is disgusting." He was looking for something to eat and had found some that looked like green and blue jelly with fuzzy hair in the back of the refrigerator. "I guess it's time to clean out the refrigerator. I think I'll do it and surprise Mom when she gets home," he thought. He started working on it right after his favorite TV show was over at 2:30 p.m. It was a bigger job than he thought but he finished up just as his mother drove into the garage one and a third hours later. What time did he finish cleaning the refrigerator?

2. It seemed like the graduation speech would last forever. Connor leaned over to his father and asked in a discreet whisper, ''what time is it now?'' His father told him it was one-sixth of an hour after the last time he asked. If it was 2:49 p.m. the last time he asked, what time is it now?

Complete.

3. One-third of the class grew peas, one-third grew carrots, and one-third grew beans. The class consisted of 63 students of which five-sevenths were girls. The teacher chose the three groups to be as equal in their boy-girl composition as possible. How many boys and girls were assigned to each team?

4. In a herd of 981 zebras, about a third of one percent of all animals are injured crossing a stream. How many are injured?

65

66

Complete.

5. Mr. Bloop is giving a demonstration using a water trough. This is a device used to observe (among other things) the action of water on sediments. He began with a flow rate of one and a third gallons per minute (gpm) and every thirty seconds he halved the rate. Throughout the demonstration the students watched small marked stones move down the trough. What was the flow rate (in gpm) after he halved the rate six times? Express your answer as a fraction.

6. A new island has formed off the coast of Bay City, which is not unexpected since it is near a subduction zone. The island is currently about 2 km^2. How many years would it take for the island to increase its area by one-half through volcanic activity if it expands at a rate of one-fourth of a square kilometer each year?

Complete.

7. The acceleration of gravity on planet X is seven-eighths of that of earth's moon and the gravity on the moon is one-sixth that of earth. If a block of wood weighs 30 pounds on earth, what will it weigh on planet X?

8. The potential energy (J) [= Mass(kg) x Distance(m) x Acceleration of Gravity(m/s^2)] of an object on earth depends on its distance from the ground. If you hold a hammer (mass = 1 1/4 kg) 101 cm from the ground, what is its potential energy? The acceleration of gravity is 9.8 m/s^2. Hint: The unit for distance must be in meters when calculating potential energy.

Complete.

9. If a solution of MgCl is 5/8 M, what will its concentration be if it is diluted by 27%? Express your answer as a fraction.

10. Eight moles of silver nitrate followed by two moles of silver chloride are added to a vat containing 90 L of water. Of the silver that was added, what fraction came from the silver nitrate?

66

67

Complete.

11. The Floop family went to a hockey game last weekend. They spent $19 on food, $35 on souvenirs, and $12 on drinks. What fraction of their expenditures was spent on drinks?

12. Austin scored about 1/8 of his team's goals during the hockey tournament that just ended. If the team scored 19 goals, how many did Austin score?

67

68

Answer Key 0621748

1 3:50 p.m.
2 2:59 p.m.
3 a) 15 girls
b) 6 boys
4 4 zebras
5 1/48 gpm
6 4 years
7 4 3/8 pounds
8 12 149/400 J
9 73/160
10 4/5
11 2/11
12 2 goals

68

69

Name _____ Date _____

Fractions

(Answer ID # 1072993)

Complete.

1. One-fifth of the students in James' class in Perth are immigrants. If there are forty people in the class, how many students are not immigrants?	2. The clasp on Alexis' purse was broken. She decided to go downtown to have it repaired. She told her mother that she would be back in three and one-fifth hours. As she began her descent of the stairs she looked at her watch. It was 11:46 a.m. What time should she be back at home?
3. Sydney is doing research on lemurs. On Monday, she spent four and a half hours on the Internet looking for materials. On Tuesday, she browsed encyclopedias online for one and a half hours. On Wednesday, she made note cards and read a book about lemurs. She worked on the report for three and one-fourth hours. Thursday she didn't feel well, but she still looked through some online journals for 32 minutes. Friday she didn't work at all. How many minutes of time did she spend on the Internet during the week?	4. Samantha went to New York City last summer. While they were there they took a 15-minute ride on a ferry to Liberty Island and toured the Statue of Liberty. They climbed the 162 stairs to the top and looked at the beautiful view of New York Harbor. They spent two and a third hours on Liberty Island. If they left Manhattan Island at 11:44 a.m., what time did they get back?
5. "Ned No-Idea" was what everyone called him. His real name was Ned Franklin, but everywhere he went he was called "Ned No-Idea." Every time someone asked him a question, he said, "I have no idea!" He didn't even try to think; he just said, "I have no idea." One day Ned's mother had in idea. She called all Ned's relatives and asked each one to send Ned twelve ideas about how to have an idea. The twelve relatives each sent twelve ideas. One-fourth of the ideas were about school, a third of the ideas were about listening, and the rest of ideas were about thinking. How many ideas were about thinking?	6. Jordan wanted to make bread pudding with lemon sauce for dessert for her family. However, she couldn't find a recipe that would make four servings. She decided to use a recipe for eight servings and use only half as much of each ingredient. The recipe for eight called for two and a half cups of raisins. How many cups of raisins will she need for four people?

69

70

Answer Key 1072993

1 32
2 2:58 p.m.
3 9 hours and 47 minutes
4 2:34 p.m.
5 60 ideas
6 1 1/4 cups

70

Math4010
Fraction Exercises

Draw a picture, write an arithmetic problem and then perform the calculation to get the answer.

1. Gianni has $\frac{2}{3}$ of a pizza. Angie has $\frac{3}{4}$ of a pizza (the same size) and Renzo has $\frac{1}{6}$. How many pizzas (and/or portions of pizza) do they have all together?

2. Each lap of the running track is $\frac{3}{4}$ of a mile. Beth runs around 5 and a half times. How far does she run?

3. You have three and a half feet of ribbon. You are making bookmarks, each of which requires $\frac{5}{8}$ of a foot of ribbon. How many bookmarks can you make and how much is left over?

4. A necklace was broken in an amorous struggle. One third of the pearls fell to the ground, $\frac{1}{5}$ of them stayed on the couch, $\frac{1}{6}$ of the pearls were found by the woman and the man recovered $\frac{1}{10}$ of them. If six pearls remained on the string, of how many pearls was the necklace composed?

5. Patrick walks by the cookie jar and takes half of the cookies. Then, Debbie walks by and takes $\frac{2}{5}$ of what's left. Amy takes $\frac{2}{3}$ of what is left after Debbie has been there. If there are now 4 cookies left in the jar, how many were in there to begin with?

6. If you have 3 dozen bagels and 5 people to share them, how many dozen (or how much of a dozen) bagels does each person get?

Math4010
Number System Properties

	Closed under				Contains		Contains		Has
	Addition	Subtraction	Multiplication	Division	Multiplicative Identity	Additive Identity	Multiplicative Inverses*	Additive Inverses	Density
N = Natural Numbers {1, 2, 3, ...}	x		x		x				
W = Whole Numbers {0, 1, 2, 3, ...}	x		x		x	x			
F = Fractions {a/b | a & b in W, b is not zero}	x		x	a*	x	x	x		x
I = Integers {..., -3, -2, -1, 0, 1, 2, 3, ...}	x	x	x		x	x		x	
Q = Rational Numbers {a/b | a & b in I, b is not zero}	x	x	x	a*	x	x	x	x	x
Z = Irrational Numbers {numbers whose decimal representation is nonterminating and non-repeating}								x	x
R = Real Numbers Q U Z	x	x	x	a*	x	x	x	x	x

*For every number that has a multiplicative inverse (I.e. for every nonzero number in the set).
a* = "almost"--the only problem is that dividing by zero is undefined (this is as close as it gets for division).

27

Math4010
Number System Questions

(1) Are these positive, negative, or you can't tell? (P = positive #, N = negative #)

(a) P + N

(b) P – N

(c) N^2

(d) N(P)(N)

(2) Are these even, odd or you can't tell? (O = odd #, E = even #)

(a) O^2

(b) E + O

(c) EE – OO

(d) 27(E)

(e) O^{10}

(3) Are these rational, irrational or you can't tell? (I = an irrational #, R = a rational #)

(a) I^2

(b) R + I

(c) I + I

(d) I^0

(e) $I \cdot I^{-1}$

(f) R(I)

(4) Are these closer to 0, 1, or 2?

(a) $\left(\frac{2}{3}\right)^3$

(b) $\left(\frac{9}{4}\right)^{1/2}$

(c) 0^0

(d) $\left(\frac{1}{2}\right)^{10}$

(5) Simplify these, if possible. If not possible, then state that.

(a) $\frac{6}{0}$

(b) $\frac{0}{5}$

(c) $\frac{0}{0}$

(d) 6^0

(e) 0^6

(f) 0^0

(6) Draw a Venn diagram to represent the relationship between the following sets.
N = natural numbers
W = whole numbers
F = fractions
I = integers
Q = rational numbers
Z = irrational numbers
R = real numbers

(a) Q and R

(b) I and R

(c) I and F

(d) R and F

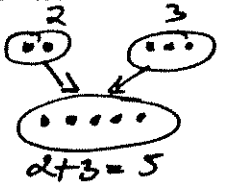
Development of the 4 Arithmetics Operations, +, −, ×, ÷.

Addition

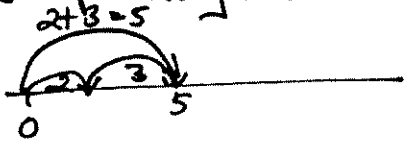
$2+3=?$

Whole No.s

union of disjoint sets



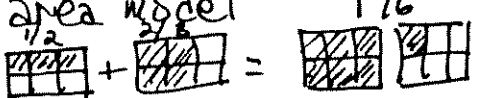
jumps along the no. line



Fractions

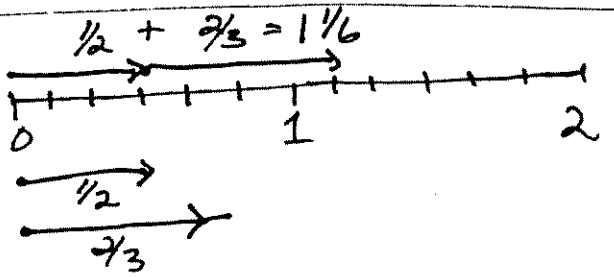
$\frac{1}{2}+\frac{2}{3}=?$

area model



$\frac{3}{6}+\frac{4}{6}=\frac{7}{6}=1\frac{1}{6}$

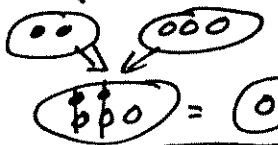
"Combine shaded regions and measure how much relative to the unit of ⊞."



Integers

$2+(-3)=?$

union of disjoint sets using two-colored chips with ●○ = 0.



no. line with negative jumps

Rationals combination of concepts from Fractions and Integers

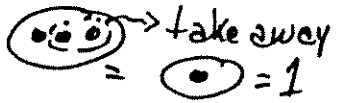
Subtraction

Whole No.s

$3-2=?$

take away

sets:



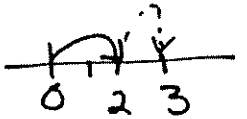
no. line: take away 2 jumps

missing addend (comparison)

$2+?=3$

Sets: 

no. line:



Fractions

$\frac{2}{3}-\frac{1}{2}=?$

area model or no. line model using take away or missing addend

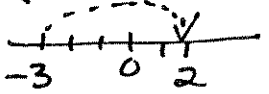
Integers

$2-(-3)=?$

take away: sets - 

no. line - similar where taking away changes neg. jump to pos. jump

Missing addend (comparison): sets → 

no. line 

Rationals

$a-b = a+(\text{add inv. of } b) = a+(-b)$.

"to subtract b, add the add inv. of b"

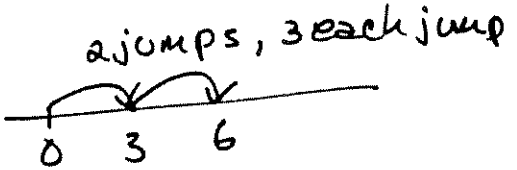
Multiplication

Whole Nos

$2 \times 3 = ?$

repeated addition : $2 \times 3 = 3 + 3 = 6$

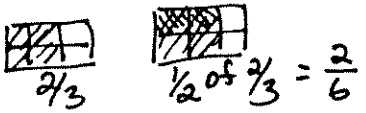
area model : $2 \times 3 \rightarrow$  $= 6$; no. line →



Fractions

$\frac{1}{2} \times \frac{2}{3} = ?$

$\frac{1}{2} \times \frac{2}{3} = \frac{1}{2}$ of $\frac{2}{3}$

area model: 

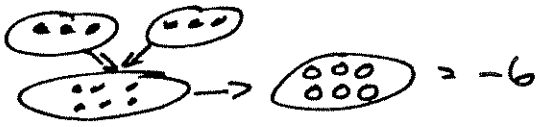
Integers

$(-2) \times 3 = ?$

repeated subtraction : $(-2) \times 3 = (-3) + (-3) = -6$

patterns :

$2 \times 3 = 6$
$1 \times 3 = 3$
$0 \times 3 = 0$
$-1 \times 3 = -3$
$-2 \times 3 = -6$

sets: 

Sign Rules

Rational No.s Combination of concepts from Fractions and Integers

Division

Whole No.s

$15 \div 3 = ?$

- repeated subtraction $\begin{array}{r} 15 \\ -3 \\ \hline 12 \\ -3 \\ \hline 9 \end{array}$ etcetera ; repeated addition $3+3+\ldots = 15$

both ask: How many gps, with 3 in a gp, are there in 15?

- missing factor / equivalent mult. question: $3 \times ? = 15$

asks: If we have 3 gps, how many will each gp have if the total is 15?

Fractions

$\frac{2}{3} \div \frac{1}{2} = ?$

equivalent mult question, $\frac{1}{2} \times \boxed{?} = \frac{2}{3}$, leads to the rule "invert the divisor and multiply by the dividend, $\frac{2}{1} \times \frac{2}{3} =$

$\frac{2}{3} \times \frac{2}{1} = \frac{2}{3} \times$ (the mult. inv. of the divisor)

Integers

$(-12) \div 4 = ?$

equivalent mult. question and sign rules for mult.

$4 \times (?) = -12$, so $(?)$ must be a negative no.

Rationals

$x \div y = x$ times the mult. inv. of $y = x \times \left(\frac{1}{y}\right)$.

"to divide by y, $y \neq 0$, multiply by the mult. inv. of y."

80

4010 Number activity

Organize these numbers into sets and justify why you organized them in the way you did.

0	97	.78	$0\bar{9}$	.142857142857....	
3/4	π	38%	$\overline{.43}$	-1	
$.\bar{2}$	.121121112.....	$\frac{22}{7}$	$\sqrt{16}$	$-\frac{2}{3}$	1
-.32	$\frac{8}{2}$	3.14	$\sqrt{2}$	$\sqrt{-5}$	

80