

Number Sense Cumulative Practice

Pages 1-2

1. $37 \times 11 =$ _____
2. $25 \times 36 =$ _____
3. $16 \times 50 =$ _____
4. $125 \times 24 =$ _____ -
5. $75 \times 24 =$ _____
6. $125 \times 56 =$ _____
7. $34 \times 11 =$ _____
8. $25 \times 44 =$ _____
9. $125 \times 64 =$ _____
10. $87 \times 11 =$ _____
11. $25 \times 29 =$ _____
12. $25 \times 37 =$ _____
13. $25 \times 18 =$ _____
14. $76 \times 11 =$ _____
15. $75 \times 12 =$ _____
16. $75 \times 16 =$ _____
17. $75 \times 36 =$ _____
18. $125 \times 32 =$ _____
19. $65 \times 11 =$ _____
20. $50 \times 24 =$ _____

Pages 3-4

1. $24 \times 26 =$ _____
2. $45^2 =$ _____
3. $103 \times 108 =$ _____
4. $105 \times 101 =$ _____
5. $65^2 =$ _____

6. $1002 \times 1007 =$ _____
7. $96 \times 95 =$ _____
8. $98 \times 99 =$ _____
9. $102 \times 105 =$ _____
10. $37 \times 33 =$ _____
11. $78 \times 72 =$ _____
12. $98 \times 92 =$ _____
13. $108 \times 109 =$ _____
14. $1008 \times 1009 =$ _____
15. $103 \times 104 =$ _____
16. $93 \times 95 =$ _____
17. $91 \times 94 =$ _____
18. $995 \times 996 =$ _____
19. $998 \times 997 =$ _____
20. $991 \times 993 =$ _____

Pages 1-4

1. $11 \times 63 =$ _____
2. $25 \times 32 =$ _____
3. $125 \times 48 =$ _____
4. $25 \times 30 =$ _____
5. $75 \times 24 =$ _____
6. $102 \times 105 =$ _____
7. $35^2 =$ _____
8. $53 \times 57 =$ _____
9. $88 \times 82 =$ _____
10. $50 \times 22 =$ _____
11. $95^2 =$ _____
12. $105 \times 108 =$ _____
13. $93 \times 95 =$ _____
14. $97 \times 99 =$ _____

15. $92 \times 91 =$ _____
16. $1002 \times 1007 =$ _____
17. $998 \times 999 =$ _____
18. $64 \times 66 =$ _____
19. $125 \times 24 =$ _____
20. $15^2 =$ _____

Pages 4-5

1. $998 \times 999 =$ _____
2. $101 \times 62 =$ _____
3. $101 \times 432 =$ _____
4. $15 \times 42 =$ _____
5. $12 \times 1234 =$ _____
6. $997 \times 995 =$ _____
7. $101 \times 43 =$ _____
8. $101 \times 123 =$ _____
9. $35 \times 18 =$ _____
10. $12 \times 31 =$ _____

Pages 1-5

1. $11 \times 87 =$ _____
2. $25 \times 12 =$ _____
3. $18 \times 50 =$ _____
4. $75 \times 24 =$ _____
5. $125 \times 32 =$ _____
6. $46 \times 44 =$ _____
7. $75^2 =$ _____
8. $103 \times 107 =$ _____
9. $1002 \times 1005 =$ _____
10. $93 \times 98 =$ _____
11. $993 \times 998 =$ _____

12. $101 \times 32 =$ _____
13. $101 \times 427 =$ _____
14. $45 \times 16 =$ _____
15. $12 \times 34 =$ _____
16. $106 \times 109 =$ _____
17. $82 \times 88 =$ _____
18. $101 \times 63 =$ _____

Pages 6-7

1. $13 \times 321 =$ _____
2. $29 \times 31 =$ _____
3. $23 \times 62 =$ _____
4. $48 \times 68 =$ _____
5. $35 \times 10101 =$ _____
6. $3367 \times 18 =$ _____
7. $14 \times 1123 =$ _____
8. $28 \times 32 =$ _____
9. $36 \times 21 =$ _____
10. $57 \times 57 =$ _____
11. $23 \times 10101 =$ _____

Pages 1-7

1. $58 \times 11 =$ _____
2. $39 \times 11 =$ _____
3. $25 \times 84 =$ _____
4. $28 \times 25 =$ _____
5. $25 \times 49 =$ _____
6. $50 \times 14 =$ _____
7. $75 \times 36 =$ _____
8. $75 \times 44 =$ _____
9. $125 \times 72 =$ _____

10. $125 \times 88 =$ _____
11. $72 \times 78 =$ _____
12. $65^2 =$ _____
13. $106 \times 105 =$ _____
14. $109 \times 102 =$ _____
15. $1003 \times 1001 =$ _____
16. $95 \times 99 =$ _____
17. $99 \times 92 =$ _____
18. $993 \times 998 =$ _____
19. $101 \times 79 =$ _____
20. $101 \times 452 =$ _____
21. $101 \times 385 =$ _____
22. $35 \times 16 =$ _____
23. $45 \times 18 =$ _____
24. $12 \times 1231 =$ _____
25. $12 \times 46 =$ _____
26. $17 \times 211 =$ _____
27. $18 \times 132 =$ _____
28. $19 \times 2141 =$ _____
29. $39 \times 41 =$ _____
30. $42 \times 38 =$ _____
31. $73 \times 67 =$ _____
32. $23 \times 36 =$ _____
33. $24 \times 21 =$ _____
34. $41 \times 33 =$ _____
35. $82 \times 88 =$ _____
36. $73 \times 33 =$ _____
37. $54 \times 54 =$ _____
38. $53^2 =$ _____
39. $10101 \times 53 =$ _____
40. $10101 \times 46 =$ _____

Pages 8-9

1. $3367 \times 24 =$ _____
2. $1001 \times 47 =$ _____
3. $1001 \times 472 =$ _____
4. $143 \times 28 =$ _____
5. $143 \times 56 =$ _____
6. $* 142857 \times 43 =$ _____
7. $* 142857 \times 28 =$ _____
8. $5^4 \times 2^5 =$ _____
9. $5^3 \times 2^2 =$ _____
10. The product of the LCM and GCF of 12 and 15 = _____
11. The product of the LCM and the GCF of 22 and 46 = _____
12. $3367 \times 15 =$ _____
13. $1001 \times 17 =$ _____
14. $1001 \times 372 =$ _____
15. $143 \times 259 =$ _____
16. $143 \times 2184 =$ _____
17. $* 142857 \times 15 =$ _____
18. $5^5 \times 2^4 =$ _____
19. $5^5 \times 2^7 =$ _____

Pages 1-9

1. $11 \times 53 =$ _____
2. $11 \times 86 =$ _____
3. $25 \times 56 =$ _____
4. $25 \times 14 =$ _____
5. $50 \times 42 =$ _____
6. $50 \times 17 =$ _____
7. $75 \times 24 =$ _____
8. $75 \times 36 =$ _____

9. $125 \times 56 =$ _____
10. $125 \times 720 =$ _____
11. $84 \times 86 =$ _____
12. $43 \times 47 =$ _____
13. $45^2 =$ _____
14. $65^2 =$ _____
15. $102 \times 107 =$ _____
16. $103 \times 109 =$ _____
17. $1002 \times 1003 =$ _____
18. $1004 \times 1002 =$ _____
19. $97 \times 95 =$ _____
20. $96 \times 92 =$ _____
21. $998 \times 995 =$ _____
22. $999 \times 994 =$ _____
23. $101 \times 54 =$ _____
24. $101 \times 63 =$ _____
25. $101 \times 321 =$ _____
26. $101 \times 459 =$ _____
27. $101 \times 682 =$ _____
28. $15 \times 22 =$ _____
29. $35 \times 18 =$ _____
30. $12 \times 321 =$ _____
31. $12 \times 335 =$ _____
32. $13 \times 231 =$ _____
33. $17 \times 116 =$ _____
34. $34 \times 26 =$ _____
35. $29 \times 31 =$ _____
36. $37 \times 43 =$ _____
37. $23 \times 42 =$ _____
38. $53 \times 27 =$ _____
39. $48 \times 68 =$ _____

40. $72 \times 32 =$ _____
41. $84 \times 24 =$ _____
42. $10101 \times 23 =$ _____
43. $10101 \times 56 =$ _____
44. $3367 \times 36 =$ _____
45. $3367 \times 45 =$ _____
46. $1001 \times 43 =$ _____
47. $1001 \times 32 =$ _____
48. $1001 \times 125 =$ _____
49. $1001 \times 346 =$ _____
50. $143 \times 56 =$ _____
51. $143 \times 49 =$ _____
52. Estimate: $142857 \times 33 =$ _____
53. Estimate: $142857 \times 45 =$ _____
54. $5^3 \times 2^4 =$ _____
55. $5^5 \times 2^4 =$ _____
56. $2^5 \times 5^3 =$ _____

Pages 10-11

1. Product of LCM and GCF of 111 and 422 = _____
2. Product of LCM and GCF of 35 and 18 = _____
3. $111^2 =$ _____
4. $11111^2 =$ _____
5. $1234 \times 9 + 5 =$ _____
6. $123 \times 9 + 4 =$ _____
7. $\frac{2}{3} + \frac{3}{4} =$ _____
8. $\frac{1}{2} + \frac{5}{7} =$ _____
9. $\frac{7}{8} - \frac{1}{5} =$ _____

10. $\frac{3}{5} + \frac{5}{3} =$ _____

11. $\frac{3}{4} + \frac{4}{3} =$ _____

12. $\frac{2}{3} + \frac{3}{4} = \frac{1}{x}$ $x =$ _____

13. $\frac{5}{8} + \frac{1}{3} = \frac{1}{x}$ $x =$ _____

14. $\frac{7}{10} + \frac{3}{7} = \frac{1}{x}$ $x =$ _____

15. $1111^2 =$ _____

Pages 1-11

1. $54 \times 11 =$ _____

2. $37 \times 25 =$ _____

3. $14 \times 50 =$ _____

4. $28 \times 75 =$ _____

5. $240 \times 125 =$ _____

6. $53 \times 57 =$ _____

7. $95^2 =$ _____

8. $112 \times 103 =$ _____

9. $1002 \times 1005 =$ _____

10. $94 \times 97 =$ _____

11. $994 \times 995 =$ _____

12. $38 \times 101 =$ _____

13. $349 \times 101 =$ _____

14. $45 \times 18 =$ _____

15. $322 \times 12 =$ _____

16. $13 \times 1134 = \underline{\hspace{2cm}}$
17. $48 \times 52 = \underline{\hspace{2cm}}$
18. $37 \times 23 = \underline{\hspace{2cm}}$
19. $48 \times 68 = \underline{\hspace{2cm}}$
20. $23 \times 10101 = \underline{\hspace{2cm}}$
21. $3367 \times 39 = \underline{\hspace{2cm}}$
22. $1001 \times 34 = \underline{\hspace{2cm}}$
23. $1001 \times 342 = \underline{\hspace{2cm}}$
24. $143 \times 56 = \underline{\hspace{2cm}}$
25. $*142857 \times 43 = \underline{\hspace{2cm}}$
26. $5^5 \times 2^3 = \underline{\hspace{2cm}}$
27. Product of LCM and GCF of 111 and 231 = $\underline{\hspace{2cm}}$
28. $111111^2 = \underline{\hspace{2cm}}$
29. $12345 \times 9 + 6 = \underline{\hspace{2cm}}$
30. $\frac{3}{4} + \frac{5}{7} = \underline{\hspace{2cm}}$

31. $\frac{3}{4} + \frac{4}{3} = \underline{\hspace{2cm}}$ Mixed #
32. $\frac{1}{5} + \frac{2}{3} = \frac{1}{x}$, $x = \underline{\hspace{2cm}}$

Pages 12-13

1. $\frac{17}{14} \times 17 = \underline{\hspace{2cm}}$ Mixed #
2. $\frac{15}{13} \times 15 = \underline{\hspace{2cm}}$ Mixed #
3. $\frac{17}{19} \times 17 = \underline{\hspace{2cm}}$ Mixed #
4. $\frac{7}{9} \times 7 = \underline{\hspace{2cm}}$ Mixed number
5. $6\frac{1}{3} \times 3\frac{1}{3} = \underline{\hspace{2cm}}$ Mixed #
6. $8\frac{1}{5} \times 7\frac{1}{5} = \underline{\hspace{2cm}}$ Mixed #
7. $6\frac{2}{3} \times 6\frac{1}{3} = \underline{\hspace{2cm}}$ Mixed #
8. $4\frac{1}{5} \times 4\frac{4}{5} = \underline{\hspace{2cm}}$ Mixed #

9. $\frac{16}{17} \times 16 = \underline{\hspace{2cm}}$ Mixed #

10. $\frac{11}{9} \times 11 = \underline{\hspace{2cm}}$ Mixed #

Pages 1-13

1. $11 \times 32 = \underline{\hspace{2cm}}$

2. $68 \times 11 = \underline{\hspace{2cm}}$

3. $25 \times 24 = \underline{\hspace{2cm}}$

4. $25 \times 124 = \underline{\hspace{2cm}}$

5. $25 \times 27 = \underline{\hspace{2cm}}$

6. $50 \times 27 = \underline{\hspace{2cm}}$

7. $75 \times 16 = \underline{\hspace{2cm}}$

8. $125 \times 56 = \underline{\hspace{2cm}}$

9. $82 \times 88 = \underline{\hspace{2cm}}$

10. $75^2 = \underline{\hspace{2cm}}$

11. $103 \times 108 = \underline{\hspace{2cm}}$

12. $1002 \times 1005 = \underline{\hspace{2cm}}$

13. $98 \times 97 = \underline{\hspace{2cm}}$

14. $95 \times 91 = \underline{\hspace{2cm}}$

15. $998 \times 993 = \underline{\hspace{2cm}}$

16. $101 \times 64 = \underline{\hspace{2cm}}$

17. $101 \times 234 = \underline{\hspace{2cm}}$

18. $15 \times 24 = \underline{\hspace{2cm}}$

19. $12 \times 3241 = \underline{\hspace{2cm}}$

20. $17 \times 121 = \underline{\hspace{2cm}}$

21. $32 \times 28 = \underline{\hspace{2cm}}$

22. $67 \times 73 = \underline{\hspace{2cm}}$

23. $23 \times 54 = \underline{\hspace{2cm}}$

24. $21 \times 32 = \underline{\hspace{2cm}}$

25. $54 \times 54 = \underline{\hspace{2cm}}$

26. $82 \times 22 = \underline{\hspace{2cm}}$

27. $10101 \times 36 = \underline{\hspace{2cm}}$
28. $3367 \times 39 = \underline{\hspace{2cm}}$
29. $3367 \times 24 = \underline{\hspace{2cm}}$
30. $1001 \times 35 = \underline{\hspace{2cm}}$
31. $1001 \times 325 = \underline{\hspace{2cm}}$
32. $143 \times 42 = \underline{\hspace{2cm}}$
33. $143 \times 56 = \underline{\hspace{2cm}}$
34. $* 142857 \times 36 = \underline{\hspace{2cm}}$
35. $* 142857 \times 44 = \underline{\hspace{2cm}}$
36. $5^4 \times 2^3 = \underline{\hspace{2cm}}$
37. $5^5 \times 2^6 = \underline{\hspace{2cm}}$
38. Product of GCF and LCM of 12 and 18 = $\underline{\hspace{2cm}}$
39. Product of GCF and LCM of 75 and 24 = $\underline{\hspace{2cm}}$
40. $1111^2 = \underline{\hspace{2cm}}$
41. $11111^2 = \underline{\hspace{2cm}}$
42. $12345 \times 9 + 6 = \underline{\hspace{2cm}}$
43. $\frac{2}{3} + \frac{4}{7} = \underline{\hspace{2cm}}$
44. $\frac{2}{3} - \frac{4}{7} = \underline{\hspace{2cm}}$
45. $\frac{2}{3} + \frac{3}{2} = \underline{\hspace{2cm}}$ Mixed number
46. $\frac{1}{3} + \frac{6}{7} = \frac{1}{x}; x = \underline{\hspace{2cm}}$
47. $\frac{15}{13} \times 15 = \underline{\hspace{2cm}}$ Mixed number
48. $\frac{15}{17} \times 15 = \underline{\hspace{2cm}}$ Mixed number
49. $6\frac{1}{2} \times 2\frac{1}{2} = \underline{\hspace{2cm}}$ Mixed number
50. $3\frac{2}{3} \times 3\frac{1}{3} = \underline{\hspace{2cm}}$ Mixed number
51. $7\frac{3}{4} \times 7\frac{1}{4} = \underline{\hspace{2cm}}$ Mixed number
52. $11 \times 2356 = \underline{\hspace{2cm}}$
53. $111 \times 542 = \underline{\hspace{2cm}}$
54. $111 \times 321 = \underline{\hspace{2cm}}$

Pages 14-15

1. $1\frac{2}{7}\%$ = _____ fraction
2. Which is greater? $\frac{3}{5}$ or $\frac{7}{10}$? _____
3. $\frac{27}{40}$ = _____ decimal
4. $\frac{27}{40}$ = _____ %
5. $.1\overline{3}$ = _____ fraction
6. $3\frac{1}{7}\%$ = _____ fraction
7. Which is greater? $\frac{-2}{7}$ or $\frac{-3}{11}$ _____
8. $\frac{29}{40}$ = _____ decimal
9. $\frac{29}{40}$ = _____ percent
10. $.1\overline{4}$ = _____ fraction
11. $.23\overline{4}$ = _____ fraction
12. $\overline{.7}$ = _____ fraction
13. $\overline{.21}$ = _____ fraction

Pages 1-15

1. 67×11 = _____
2. 25×37 = _____
3. 48×50 = _____
4. 75×36 = _____
5. 125×640 = _____
6. 72×78 = _____
7. 95^2 = _____
8. 103×106 = _____
9. 1003×1006 = _____
10. 96×93 = _____

11. $996 \times 993 =$ _____
12. $101 \times 48 =$ _____
13. $101 \times 458 =$ _____
14. $16 \times 35 =$ _____
15. $12 \times 2213 =$ _____
16. $17 \times 112 =$ _____
17. $82 \times 78 =$ _____
18. $31 \times 48 =$ _____
19. $83 \times 23 =$ _____
20. $10101 \times 34 =$ _____
21. $3367 \times 45 =$ _____
22. $1001 \times 46 =$ _____
23. $1001 \times 456 =$ _____
24. $143 \times 49 =$ _____
25. Estimate: $142857 \times 17 =$ _____
26. $5^5 \times 2^3 =$ _____
27. Product of LCM and GCF of 11 and 341 = _____
28. $111^2 =$ _____
29. $1234 \times 9 + 5 =$ _____
30. $\frac{3}{7} + \frac{2}{5} =$ _____ fraction
31. $\frac{5}{2} + \frac{2}{5} =$ _____ mixed #
32. $\frac{3}{7} - \frac{2}{5} = \frac{1}{x}$; $x =$ _____
33. $\frac{17}{16} \times 17 =$ _____ mixed #
34. $\frac{17}{18} \times 17 =$ _____ mixed #
35. $5\frac{3}{5} \times 20\frac{3}{5} =$ _____ mixed #
36. $4\frac{3}{5} \times 4\frac{2}{5} =$ _____ mixed #
37. $3\frac{2}{9} \% =$ _____ fraction
38. Which is less? $\frac{11}{13}$ or $\frac{4}{5}$? _____
39. $\frac{3}{40} =$ _____ decimal

40. $\frac{19}{40} =$ _____ percent
41. $\overline{.23} =$ _____ fraction
42. $\overline{.2} =$ _____ fraction
43. $\overline{.42} =$ _____ fraction
44. $\overline{.25} =$ _____ fraction

Pages 16-18

1. $\frac{1}{6} + \frac{1}{12} + \frac{1}{20} = \frac{3}{10}$ fraction
2. $42^2 - 8^2 = 1700$
3. $11^2 + 33^2 = 1210$
4. $12^2 + 24^2 = 720$
5. $11^2 + 77^2 =$ _____
6. $58^2 + 75^2 =$ _____
7. $2342 \div 11$ has remainder _____
8. $31245 \div 9$ has remainder _____
9. $324106 \div 4$ has remainder _____

Hint, just divide 4 into the last two digits.

10. $123321 \div 3$ has remainder _____ Mentally mark out sums of 3.
11. $1236 \div 6$ has remainder _____
12. $54^2 - 46^2 =$ _____
13. $13^2 + 39^2 =$ _____
14. $17^2 + 34^2 =$ _____
15. $13^2 + 91^2 =$ _____
16. $68^2 + 27^2 =$ _____
17. $4115 \div 11$ has remainder _____
18. $3582 \div 9$ has remainder _____
19. $11116 \div 4$ has remainder _____
20. $32577008 \div 8$ has remainder _____ Hint: Divide 8 into last three digits

21. $13^2 + 29^2 =$ _____
22. $6231 \div 9 =$ _____ mixed #
23. $2413 \div 9 =$ _____ mixed #

Pages 1-18

1. $11 \times 58 =$ _____
2. $17 \times 25 =$ _____
3. $23 \times 50 =$ _____
4. $44 \times 75 =$ _____
5. $88 \times 125 =$ _____
6. $32 \times 38 =$ _____
7. $35^2 =$ _____
8. $102 \times 103 =$ _____
9. $1005 \times 1006 =$ _____
10. $93 \times 89 =$ _____
11. $998 \times 995 =$ _____
12. $42 \times 101 =$ _____
13. $548 \times 101 =$ _____
14. $22 \times 46 =$ _____
15. $12 \times 1126 =$ _____
16. $14 \times 2111 =$ _____
17. $49 \times 51 =$ _____
18. $71 \times 23 =$ _____
19. $72 \times 32 =$ _____
20. $10101 \times 36 =$ _____
21. $3367 \times 15 =$ _____
22. $1001 \times 54 =$ _____
23. $1001 \times 324 =$ _____
24. $143 \times 147 =$ _____
25. Estimate $142857 \times 19 =$ _____
26. $2^8 \times 5^5 =$ _____

27. Product of LCM and GCF of 125 and 56 = _____
28. $111111^2 =$ _____
29. $123456 \times 9 + 7 =$ _____
30. $\frac{1}{7} + \frac{2}{3} =$ _____
31. $\frac{3}{7} + \frac{7}{3} =$ _____ Mixed #
32. $\frac{1}{6} - \frac{2}{5} = \frac{1}{x}$; x = _____
33. $\frac{18}{17} \times 18 =$ _____ mixed #
34. $\frac{15}{17} \times 15 =$ _____ mixed #
35. $4\frac{3}{4} \times 20\frac{3}{4} =$ _____ mixed #
36. $7\frac{3}{5} \times 7\frac{2}{5} =$ _____ mixed #
37. $1\frac{2}{9} \% =$ _____ fraction
38. Which is less? $\frac{10}{11}$ or $\frac{2}{3}$? _____
39. $\frac{11}{40} =$ _____ decimal
40. $\frac{13}{40} =$ _____ percent
41. $\overline{.7} =$ _____ fraction
42. $\frac{1}{12} + \frac{1}{20} + \frac{1}{30} =$ _____ fraction
43. $48^2 - 47^2 =$ _____
44. $15^2 + 45^2 =$ _____
45. $8^2 + 16^2 =$ _____
46. $14^2 + 98^2 =$ _____
47. $56^2 + 46^2 =$ _____
48. $5612 \div 11$ has remainder _____
49. $63274 \div 9$ has remainder _____
50. $3217 \div 4$ has remainder _____
51. $1412 \div 3$ has remainder _____
52. $3336 \div 6$ has remainder _____
53. $3520167 \div 8$ has remainder _____
54. $1231 \div 9 =$ _____ mixed #

Pages 19-20

1. $(3 \times 13 + 7) \div 5$ has remainder of _____
2. $(13 \times 6 + 8) \div 6$ has remainder of _____
3. $15 \times 17 + 35 \times 17 =$ _____
4. How many diagonals from one vertex may be drawn in a heptagon?

5. How many diagonals from ALL vertices may be drawn in a heptagon?

6. What is the probability of rolling a 9 when rolling a pair of dice?

7. What are the odds of rolling a 9 when rolling a pair of dice? _____
8. $(4 + 11 \times 6) \div 5$ has remainder of _____
9. $(23 \times [7 + 8]) \div 6$ has remainder of _____
10. $23 \times 18 + 2 \times 18 =$ _____
11. How many diagonals from one vertex may be drawn in a octagon?

12. How many diagonals from ALL vertices may be drawn in a nonagon? _____
13. What is the probability of rolling a 3 when rolling a pair of dice?

14. What are the odds of rolling a 7 when rolling a pair of dice?

Pages 1-20

1. $11 \times 93 =$ _____
2. $47 \times 25 =$ _____
3. $28 \times 50 =$ _____
4. $64 \times 75 =$ _____
5. $56 \times 125 =$ _____
6. $43 \times 47 =$ _____

7. $85^2 =$ _____
8. $107 \times 102 =$ _____
9. $1006 \times 1003 =$ _____
10. $94 \times 89 =$ _____
11. $997 \times 994 =$ _____
12. $68 \times 101 =$ _____
13. $208 \times 101 =$ _____
14. $22 \times 15 =$ _____
15. $12 \times 1132 =$ _____
16. $16 \times 2111 =$ _____
17. $47 \times 53 =$ _____
18. $32 \times 23 =$ _____
19. $74 \times 34 =$ _____
20. $10101 \times 49 =$ _____
21. $3367 \times 21 =$ _____
22. $1001 \times 93 =$ _____
23. $1001 \times 312 =$ _____
24. $143 \times 49 =$ _____
25. Estimate $142857 \times 27 =$ _____
26. $2^6 \times 5^8 =$ _____
27. Product of LCM and GCF of 111 and 562 = _____
28. $1111111^2 =$ _____
29. $1234 \times 9 + 5 =$ _____
30. $\frac{1}{6} + \frac{4}{5} =$ _____
31. $\frac{2}{3} + \frac{3}{2} =$ _____ Mixed #
32. $\frac{3}{5} - \frac{6}{7} = \frac{1}{x}$; $x =$ _____
33. $\frac{19}{17} \times 19 =$ _____ mixed #
34. $\frac{15}{19} \times 15 =$ _____ mixed #
35. $8\frac{3}{4} \times 12\frac{3}{4} =$ _____ mixed #

36. $10\frac{2}{9} \times 10\frac{7}{9} =$ _____ mixed #
37. $1\frac{3}{11} \% =$ _____ fraction
38. Which is less? $\frac{9}{11}$ or $\frac{5}{6}$? _____
39. $\frac{21}{40} =$ _____ decimal
40. $\frac{9}{40} =$ _____ percent
41. $\overline{.25} =$ _____ fraction
42. $\frac{1}{12} + \frac{1}{20} + \frac{1}{30} + \frac{1}{42} =$ _____ fraction
43. $53^2 - 47^2 =$ _____
44. $18^2 + 54^2 =$ _____
45. $11^2 + 22^2 =$ _____
46. $15^2 + 105^2 =$ _____
47. $13^2 + 29^2 =$ _____
48. $561 \div 11$ has remainder _____
49. $3274 \div 9$ has remainder _____
50. $3218 \div 4$ has remainder _____
51. $412 \div 3$ has remainder _____
52. $3337 \div 6$ has remainder _____
53. $20161 \div 8$ has remainder _____
54. $12313 \div 9 =$ _____ mixed #
55. $(3 \times 14 + 6) \div 5$ has remainder of _____

56. $28 \times 16 + 12 \times 16 =$ _____
57. How many diagonals from one vertex may be drawn in a pentagon?

58. How many diagonals from ALL vertices may be drawn in a pentagon?

59. What is the probability of rolling a 3 when rolling a pair of dice?

60. What are the odds of rolling an 11 when rolling a pair of dice?

Pages 21-22

1. 3 ft. x 7 ft. x 4 ft. = _____ yd³
2. 5 ft. x 6 ft. x 12 ft. = _____ yd³
3. What is the LCM of 48 and 14? _____
4. How many subsets does {a,b,c} have? _____
5. How many improper subsets does {a,b,c} have? _____
6. How many proper subsets does {a,b,c} have? _____
7. 25° C = _____ °F
8. -40° F = _____ °C
9. 60 mph = _____ ft/sec
10. The acute angle formed by the hands of a clock at 2:20 = _____
11. 6 ft. x 18 ft. x 4 ft. = _____ yd³
12. What is the LCM of 45 and 60? _____
13. How many subsets does {a,b} have? _____
14. How many improper subsets does {a,b} have? _____
15. How many proper subsets does {a,b} have? _____
16. 35° C = _____ °F
17. 86° F = _____ °C
18. 75 mph = _____ ft/sec
19. The acute angle formed by the hands of a clock at 3:20 = _____
20. The acute angle formed by the hands of a clock at 1:10 = _____
21. What is the LCM of 16 and 12? _____
22. How many proper subsets does {1,2,3,4,5} have? _____
23. The acute angle formed by the hands of a clock at 4:20 - _____
24. 66 ft/sec = _____ mph

Pages 1-22

1. 52 x 11 = _____

2. $47 \times 25 =$ _____
3. $18 \times 50 =$ _____
4. $36 \times 75 =$ _____
5. $24 \times 125 =$ _____
6. $32 \times 38 =$ _____
7. $55^2 =$ _____
8. $102 \times 103 =$ _____
9. $1007 \times 1003 =$ _____
10. $98 \times 93 =$ _____
11. $997 \times 991 =$ _____
12. $59 \times 101 =$ _____
13. $394 \times 101 =$ _____
14. $55 \times 16 =$ _____
15. $32 \times 12 =$ _____
16. $13 \times 4311 =$ _____
17. $68 \times 72 =$ _____
18. $36 \times 21 =$ _____
19. $38 \times 78 =$ _____
20. $72 \times 10101 =$ _____
21. $3367 \times 42 =$ _____
22. $1001 \times 95 =$ _____
23. $1001 \times 832 =$ _____
24. $143 \times 98 =$ _____
25. $* 142857 \times 48 =$ _____
26. $5^4 \times 2^7 =$ _____
27. Product of LCM and GCF of 125 and 1600 = _____
28. $1111^2 =$ _____
29. $1234 \times 9 + 5 =$ _____
30. $\frac{5}{7} + \frac{3}{4} =$ _____

31. $\frac{2}{5} + \frac{5}{2} =$ _____ Mixed #
32. $\frac{4}{5} + \frac{2}{3} = \frac{1}{x}$, $x =$ _____
33. $\frac{13}{11} \times 13 =$ _____ Mixed number
34. $\frac{13}{17} \times 13 =$ _____ Mixed number
35. $3\frac{1}{2} \times 5\frac{1}{2} =$ _____ Mixed number
36. $8\frac{2}{7} \times 8\frac{5}{7} =$ _____ Mixed number
37. $2\frac{3}{4} \times 2\frac{1}{4} =$ _____ Mixed number
38. $11 \times 4356 =$ _____
39. $111 \times 568 =$ _____
40. $1\frac{3}{8} \% =$ _____ fraction
41. Which is less? $\frac{-4}{11}$ or $\frac{-5}{6}$? _____
42. $\frac{29}{40} =$ _____ decimal
43. $\frac{11}{40} =$ _____ percent
44. $\overline{.37} =$ _____ fraction
45. $\frac{1}{20} + \frac{1}{30} + \frac{1}{42} + \frac{1}{56} =$ _____ fraction
46. $58^2 - 42^2 =$ _____
47. $19^2 + 57^2 =$ _____
48. $18^2 + 36^2 =$ _____
49. $12^2 + 84^2 =$ _____
50. $52^2 + 15^2 =$ _____
51. $10435 \div 11$ has remainder _____
52. $3146 \div 9$ has remainder _____
53. $3212 \div 4$ has remainder _____
54. $412123 \div 3$ has remainder _____
55. $3546 \div 6$ has remainder _____
56. $777008 \div 8$ has remainder _____
57. $12314 \div 9 =$ _____ mixed #

58. $(2 \times 17 + 8) \div 5$ has remainder of _____
59. $38 \times 25 + 22 \times 25 =$ _____
60. How many diagonals from one vertex may be drawn in a decagon?

61. How many diagonals from ALL vertices may be drawn in a dodecagon? _____
62. What is the probability of rolling a 7 when rolling a pair of dice?

63. What are the odds of rolling a 6 when rolling a pair of dice?

64. $3 \text{ ft.} \times 9 \text{ ft.} \times 4 \text{ ft.} =$ _____ yd^3
65. $18 \text{ ft.} \times 6 \text{ ft.} \times 11 \text{ ft.} =$ _____ yd^3
66. What is the LCM of 111 and 9? _____
67. How many subsets does $\{a, b, c, d, e, f\}$ have? _____
68. How many improper subsets does $\{3\}$ have? _____
69. How many proper subsets does $\{3\}$ have? _____
70. $5^\circ \text{C} =$ _____ $^\circ \text{F}$
71. $59^\circ \text{F} =$ _____ $^\circ \text{C}$
72. $90 \text{ mph} =$ _____ ft/sec
73. The acute angle formed by the hands of a clock at 5:40 = _____

Pages 23-24

1. $\sqrt{1\frac{15}{49}} =$ _____
2. $\sqrt{2\frac{7}{9}} =$ _____ mixed #
3. The geometric mean of 16 and 4 is _____
4. The geometric mean of 1, 3, 9 = _____
5. The 5th triangular number is _____
6. The 8th triangular number is _____
7. $1 + 2 + 3 + \dots + 100 =$ _____

8. The 7th pentagonal number is _____
9. The 10th hexagonal number is _____
10. $1 + 3 + 5 + \dots + 39 =$ _____
11. $2 + 4 + 6 + \dots + 18 =$ _____

Final Review of 24 pages

1. $531 \times 11 =$ _____
2. $29 \times 25 =$ _____
3. $26 \times 50 =$ _____
4. $48 \times 75 =$ _____
5. $32 \times 125 =$ _____
6. $74 \times 76 =$ _____
7. $85^2 =$ _____
8. $107 \times 106 =$ _____
9. $1003 \times 1003 =$ _____
10. $91 \times 92 =$ _____
11. $994 \times 992 =$ _____
12. $93 \times 101 =$ _____
13. $391 \times 101 =$ _____
14. $15 \times 24 =$ _____
15. $42 \times 12 =$ _____
16. $14 \times 2115 =$ _____
17. $67 \times 73 =$ _____
18. $21 \times 24 =$ _____
19. $45 \times 65 =$ _____
20. $72 \times 10101 =$ _____
21. $3367 \times 48 =$ _____
22. $1001 \times 82 =$ _____
23. $1001 \times 722 =$ _____
24. $143 \times 42 =$ _____
25. $* 142857 \times 23 =$ _____

26. $5^5 \times 2^7 =$ _____
27. Product of LCM and GCF of 101 and 107 = _____
28. $1111111^2 =$ _____
29. $123 \times 9 + 4 =$ _____
30. $\frac{5}{11} + \frac{3}{4} =$ _____

31. $\frac{7}{11} + \frac{11}{7} =$ _____ Mixed #
32. $\frac{4}{11} + \frac{2}{3} = \frac{1}{x}$, $x =$ _____

33. $\frac{21}{19} \times 21 =$ _____ Mixed number
34. $\frac{19}{21} \times 19 =$ _____ Mixed number

35. $7\frac{1}{2} \times 5\frac{1}{2} =$ _____ Mixed number
36. $3\frac{3}{7} \times 3\frac{4}{7} =$ _____ Mixed number
37. $11 \times 4356 =$ _____
38. $111 \times 231 =$ _____
39. $1\frac{7}{8} \% =$ _____ fraction
40. Which is less? $\frac{-2}{11}$ or $\frac{-1}{6}$? _____
41. $\frac{7}{40} =$ _____ decimal
42. $\frac{21}{40} =$ _____ percent
43. $.1\overline{23} =$ _____ fraction
44. $\frac{1}{20} + \frac{1}{30} + \frac{1}{42} =$ _____ fraction
45. $78^2 - 77^2 =$ _____
46. $22^2 + 66^2 =$ _____
47. $22^2 + 44^2 =$ _____
48. $6^2 + 42^2 =$ _____
49. $53^2 + 25^2 =$ _____
50. $12225 \div 11$ has remainder _____

51. $3226 \div 9$ has remainder _____
52. $31232 \div 4$ has remainder _____
53. $4123 \div 3$ has remainder _____
54. $1116 \div 6$ has remainder _____
55. $70169 \div 8$ has remainder _____
56. $123 \div 9 =$ _____ mixed #
57. $(4 \times 17 + 6) \div 4$ has remainder of _____

58. $19 \times 25 + 31 \times 25 =$ _____
59. How many diagonals from one vertex may be drawn in an undecagon? _____
60. How many diagonals from ALL vertices may be drawn in an undecagon? _____
61. What is the probability of rolling a 4 when rolling a pair of dice?

62. What are the odds of rolling a 5 when rolling a pair of dice?

63. $4 \text{ ft.} \times 9 \text{ ft.} \times 9 \text{ ft.} =$ _____ yd^3
64. What is the LCM of 34 and 22? _____
65. How many subsets does $\{a,b,c,d,e,\}$ have? _____
66. How many improper subsets does the empty set have? _____
67. How many proper subsets does $\{2,3,4,5\}$ have? _____
68. $45^\circ \text{ C} =$ _____ $^\circ \text{ F}$
69. $68^\circ \text{ F} =$ _____ $^\circ \text{ C}$
70. $7.5 \text{ mph} =$ _____ ft/sec
71. The acute angle formed by the hands of a clock at 5:30 = _____
72. $\sqrt{1\frac{9}{16}} =$ _____ mixed number
73. The geometric mean of 12 and 3 is _____
74. The geometric mean of 2,4,8 = _____
75. The 10th triangular number is _____

76. $1 + 2 + 3 + \dots + 19 = \underline{\hspace{2cm}}$
77. The 8th pentagonal number is $\underline{\hspace{2cm}}$
78. The 11th hexagonal number is $\underline{\hspace{2cm}}$
79. $1 + 3 + 5 + \dots + 19 = \underline{\hspace{2cm}}$
80. $2 + 4 + 6 + \dots + 16 = \underline{\hspace{2cm}}$

Answers to Number Sense Cumulative Practice
(companion to Number Sense for Beginning Coaches and Students)

Pages 1-2

1. 407
2. 900
3. 800
4. 3000
5. 1800
6. 700
7. 374
8. 1100
9. 8000
10. 957
11. 725
12. 925
13. 450
14. 836
15. 900
16. 1200
17. 2700
18. 4000
19. 715
20. 1200

Pages 3-4

1. 624
2. 2025
3. 11124
4. 10605

5. 4225
6. 1009014
7. 9120
8. 9702
9. 10710
10. 1221
11. 5616
12. 9016
13. 11772
14. 1017072
15. 10712
16. 8835
17. 8554
18. 991020
19. 995006
20. 984063

Pages 1-4

1. 693
2. 800
3. 6000
4. 750
5. 1800
6. 10710
7. 1225
8. 3021
9. 7216
10. 1100
11. 9025
12. 11340

13. 8835
14. 9603
15. 8372
16. 009014
17. 997002
18. 4224
19. 3000
20. 225

Pages 4-5

1. 997002
2. 6262
3. 43632
4. 630
5. 14808
6. 992015
7. 4343
8. 12423
9. 630
10. 372

Pages 1-5

1. 957
2. 300
3. 900
4. 1800
5. 4000
6. 2024
7. 5625
8. 11021

9. 1007010
10. 9114
11. 991014
12. 3232
13. 43127
14. 720
15. 408
16. 11554
17. 7216
18. 6363

Pages 6-7

1. 4173
2. 899
3. 1426
4. 3264
5. 353535
6. 60606
7. 15722
8. 896
9. 756
10. 3249
11. 232323

Pages 1-7

1. 638
2. 429
3. 2100
4. 700
5. 1225

6. 700
7. 2700
8. 3300
9. 9000
10. 11000
11. 5616
12. 4225
13. 11130
14. 11118
15. 1004003
16. 9405
17. 9108
18. 991014
19. 7979
20. 45652
21. 38885
22. 560
23. 810
24. 14772
25. 552
26. 3587
27. 2376
28. 40679
29. 1599
30. 1596
31. 4891
32. 828
33. 504
34. 1353
35. 7216
36. 2409

- 37. 2916
- 38. 2809
- 39. 535353
- 40. 464646

Pages 8-9

- 1. 80808
- 2. 47047
- 3. 472472
- 4. 4004
- 5. 8008
- 6. 5835709-6449993
- 7. 3799997-4199996
- 8. 20000
- 9. 500
- 10. 180
- 11. 1012
- 12. 50505
- 13. 17017
- 14. 372372
- 15. 37037
- 16. 312312
- 17. 2035713-2249997
- 18. 50000
- 19. 400000

Pages 1-9

- 1. 583
- 2. 946
- 3. 1400

4. 350
5. 2100
6. 850
7. 1800
8. 2700
9. 7000
10. 90000
11. 7224
12. 2021
13. 2025
14. 4225
15. 10914
16. 11227
17. 1005006
18. 1006008
19. 9215
20. 8832
21. 993010
22. 993006
23. 5454
24. 6363
25. 32421
26. 46359
27. 68882
28. 330
29. 630
30. 3852
31. 4020
32. 3003
33. 1972
34. 884

- 35. 899
- 36. 1591
- 37. 966
- 38. 1431
- 39. 3264
- 40. 2304
- 41. 2016
- 42. 232323
- 43. 565656
- 44. 121212
- 45. 151515
- 46. 43043
- 47. 32032
- 48. 125125
- 49. 346346
- 50. 8008
- 51. 7007
- 52. 4478567-4949995
- 53. 6107137-6749993
- 54. 2000
- 55. 50000
- 56. 4000

Pages 10-11

- 1. 46842
- 2. 630
- 3. 12321
- 4. 123454321
- 5. 11111
- 6. 1111

7. $\frac{7}{12}$
8. $\frac{17}{14}$
9. $\frac{27}{40}$
10. $2\frac{4}{15}$
11. $2\frac{1}{12}$
12. $\frac{12}{17}$
13. $\frac{24}{23}$
14. $\frac{70}{79}$
15. 1234321

Pages 1-11

1. 594
2. 925
3. 700
4. 2100
5. 30000
6. 3021
7. 9025
8. 11536
9. 1007010
10. 9118
11. 989030
12. 3838
13. 35249
14. 810
15. 3864
16. 14742
17. 2496
18. 851

19. 3264
20. 232323
21. 131313
22. 34034
23. 342342
24. 8008
25. 5835709-6449993
26. 25000
27. 25641
28. 12345654321
29. 111111
30. $\frac{41}{28}$
31. $2\frac{1}{12}$
32. $\frac{15}{13}$

Pages 12-13

1. $20\frac{9}{14}$
2. $17\frac{4}{13}$
3. $15\frac{4}{19}$
4. $5\frac{4}{9}$
5. $21\frac{1}{9}$
6. $59\frac{1}{25}$
7. $42\frac{2}{9}$
8. $20\frac{4}{25}$
9. $15\frac{1}{17}$
10. $13\frac{4}{9}$

Pages 1-13

1. 352
2. 748
3. 600
4. 3100
5. 675
6. 1350
7. 1200
8. 7000
9. 7216
10. 5625
11. 11124
12. 1007010
13. 9506
14. 8645
15. 991014
16. 6464
17. 25634
18. 360
19. 38892
20. 2057
21. 896
22. 4891
23. 1242
24. 672
25. 2916
26. 1804
27. 363636
28. 131313
29. 80808
30. 35035
31. 325325

- 32. 6006
- 33. 8008
- 34. 4885710-5399994
- 35. 5971423-6599993
- 36. 5000
- 37. 200000
- 38. 216
- 39. 1800
- 40. 1234321
- 41. 123454321
- 42. 111111
- 43. $\frac{26}{21}$
- 44. $\frac{2}{21}$
- 45. $2\frac{1}{6}$
- 46. $\frac{21}{25}$
- 47. $17\frac{4}{13}$
- 48. $13\frac{4}{17}$
- 49. $16\frac{1}{4}$
- 50. $12\frac{2}{9}$
- 51. $56\frac{3}{16}$
- 52. 25916
- 53. 60162
- 54. 35631

Pages 14-15

- 1. $\frac{9}{700}$
- 2. $\frac{7}{10}$
- 3. .675

4. 67.5

5. $\frac{2}{15}$

6. $\frac{11}{350}$

7. $\frac{-3}{11}$

8. .725

9. 72.5

10. $\frac{13}{90}$

11. $\frac{211}{900}$

12. $\frac{7}{9}$

13. $\frac{7}{33}$

Pages 1-15

1. 737

2. 925

3. 2400

4. 2700

5. 80000

6. 5616

7. 9025

8. 10918

9. 1009018

10. 8928

11. 989028

12. 4848

13. 46258

14. 560

15. 26556

16. 1904

17. 6396

- 18. 1488
- 19. 1909
- 20. 343434
- 21. 151515
- 22. 46046
- 23. 456456
- 24. 7007
- 25. 2307141-2549997
- 26. 25000
- 27. 3751
- 28. 12321
- 29. 11111
- 30. $\frac{29}{35}$
- 31. $2\frac{9}{10}$
- 32. 35
- 33. $18\frac{1}{16}$
- 34. $16\frac{1}{18}$
- 35. $107\frac{9}{25}$
- 36. $20\frac{6}{25}$
- 37. $\frac{29}{900}$
- 38. $\frac{4}{5}$
- 39. .075
- 40. 47.5
- 41. $\frac{23}{99}$
- 42. $\frac{2}{9}$
- 43. $\frac{14}{33}$
- 44. $\frac{23}{90}$

Pages 16-18

1. $\frac{3}{10}$
2. 1700
3. 1210
4. 720
5. 6050
6. 8989
7. 10
8. 6
9. 2
10. 0
11. 0
12. 800
13. 1690
14. 1445
15. 8450
16. 5353
17. 1
18. 0
19. 0
20. 0
21. 1010
22. $692\frac{1}{3}$
23. $268\frac{1}{9}$

Pages 1-18

1. 638
2. 425
3. 1150
4. 3300

5. 11000
6. 1216
7. 1225
8. 10506
9. 1011030
10. 8277
11. 993010
12. 4242
13. 55348
14. 1012
15. 13512
16. 29554
17. 2499
18. 1633
19. 2304
20. 363636
21. 50505
22. 54054
23. 324324
24. 21021
25. 2378569-2849997
26. 800000
27. 7000
28. 12345654321
29. 1111111
30. $\frac{17}{21}$
31. $2\frac{16}{21}$
32. $\frac{-30}{7}$
33. $19\frac{1}{17}$
34. $13\frac{4}{17}$

- 35. $98\frac{9}{16}$
- 36. $56\frac{6}{25}$
- 37. $\frac{11}{900}$
- 38. $\frac{2}{3}$
- 39. .275
- 40. 32.5
- 41. $\frac{7}{9}$
- 42. $\frac{1}{6}$
- 43. 95
- 44. 2250
- 45. 320
- 46. 9800
- 47. 5252
- 48. 2
- 49. 4
- 50. 1
- 51. 2
- 52. 0
- 53. 1
- 54. $136\frac{7}{9}$

Pages 19-20

- 1. 1
- 2. 2
- 3. 850
- 4. 4
- 5. 14
- 6. $\frac{1}{9}$
- 7. $\frac{1}{8}$

8. 0
9. 3
10. 450
11. 5
12. 27
13. $\frac{1}{18}$
14. $\frac{1}{5}$

Pages 1-20

1. 1023
2. 1175
3. 1400
4. 4800
5. 7000
6. 2021
7. 7225
8. 10914
9. 1009018
10. 8366
11. 991018
12. 6868
13. 21008
14. 330
15. 13584
16. 33776
17. 2491
18. 736
19. 2516
20. 494949
21. 70707
22. 93093

- 23. 312312
- 24. 7007
- 25. 3664283-4049995
- 26. 25000000
- 27. 62382
- 28. 1234567654321
- 29. 11111
- 30. $\frac{29}{30}$
- 31. $2\frac{1}{6}$
- 32. $\frac{-35}{9}$
- 33. $21\frac{4}{17}$
- 34. $13\frac{4}{19}$
- 35. $111\frac{8}{16}$
- 36. $110\frac{14}{49}$
- 37. $\frac{7}{550}$
- 38. $\frac{9}{11}$
- 39. .525
- 40. 22..5
- 41. $\frac{25}{99}$
- 42. $\frac{4}{21}$
- 43. 600
- 44. 3240
- 45. 605
- 46. 11250
- 47. 1010
- 48. 0
- 49. 7
- 50. 2

- 51. 1
- 52. 1
- 53. 1
- 54. $1368\frac{1}{9}$
- 55. 3
- 56. 640
- 57. 2
- 58. 5
- 59. $\frac{1}{18}$
- 60. $\frac{1}{17}$

Pages 21-22

- 1. $3\frac{1}{9}$ or $\frac{28}{9}$
- 2. $13\frac{1}{3}$ or $\frac{40}{3}$
- 3. 336
- 4. 8
- 5. 1
- 6. 7
- 7. 77
- 8. -40
- 9. 88
- 10. 50
- 11. 16
- 12. 180
- 13. 4
- 14. 1
- 15. 3
- 16. 95
- 17. 30
- 18. 110

- 19. 20
- 20. 25
- 21. 48
- 22. 31
- 23. 10
- 24. 45

Pages 1-22

- 1. 572
- 2. 1175
- 3. 900
- 4. 2700
- 5. 3000
- 6. 1216
- 7. 3025
- 8. 10506
- 9. 1010021
- 10. 9114
- 11. 988027
- 12. 5959
- 13. 39794
- 14. 880
- 15. 384
- 16. 56043
- 17. 4896
- 18. 756
- 19. 2964
- 20. 727272
- 21. 141414
- 22. 95095
- 23. 832832

- 24. 14014
- 25. 6514280-7199992
- 26. 80000
- 27. 200000
- 28. 1234321
- 29. 11111
- 30. $\frac{41}{28}$
- 31. $2\frac{9}{10}$
- 32. $\frac{15}{22}$
- 33. $15\frac{4}{11}$
- 34. $9\frac{16}{17}$
- 35. $19\frac{1}{4}$
- 36. $72\frac{10}{49}$
- 37. $6\frac{3}{16}$
- 38. 47916
- 39. 63048
- 40. $\frac{11}{800}$
- 41. $\frac{-5}{6}$
- 42. .725
- 43. 27.5
- 44. $\frac{37}{99}$
- 45. $\frac{1}{8}$
- 46. 1600
- 47. 3610
- 48. 1620
- 49. 7200
- 50. 2929
- 51. 7

52. 5
53. 0
54. 1
55. 0
56. 0
57. $1368\frac{2}{9}$
58. 2
59. 1500
60. 7
61. 54
62. $\frac{1}{6}$
63. $\frac{5}{31}$
64. 4
65. 44
66. 333
67. 64
68. 1
69. 0
70. 41
71. 15
72. 132
73. 70

Pages 23-24

1. $\frac{8}{7}$ or $1\frac{1}{7}$
2. $1\frac{2}{3}$
3. 8
4. 3
5. 15
6. 36

- 7. 5050
- 8. 70
- 9. 190
- 10. 4
- 11. 90

Final Review of pages 1-24

1. 5841
2. 725
3. 1300
4. 3600
5. 4000
6. 5624
7. 7225
8. 11342
9. 1006009
10. 8372
11. 986048
12. 9393
13. 39491
14. 360
15. 504
16. 29610
17. 4891

18. 504
19. 2925
20. 727272
21. 161616
22. 82082
23. 722722
24. 6006
25. 3121426-3449996
26. 400000
27. 10807
28. 1234567654321
29. 1111
30. $\frac{53}{44}$
31. $2\frac{16}{77}$
32. $\frac{33}{34}$
33. $23\frac{4}{19}$
34. $17\frac{4}{19}$
35. $41\frac{1}{4}$
36. $12\frac{12}{49}$
37. 47916
38. 25641
39. $\frac{15}{800}$
40. $\frac{-2}{11}$
41. /175
42. 52.5
43. $\frac{61}{495}$
44. $\frac{3}{28}$
45. 155

- 46. 4840
- 47. 2420
- 48. 1800
- 49. 3434
- 50. 4
- 51. 4
- 52. 0
- 53. 4
- 54. 0
- 55. 1
- 56. $13\frac{2}{3}$
- 57. 2
- 58. 1250
- 59. 8
- 60. 44
- 61. $\frac{1}{12}$
- 62. $\frac{1}{8}$
- 63. 12
- 64. 374
- 65. 32
- 66. 1
- 67. 15
- 68. 113
- 69. 20
- 70. 11
- 71. 15
- 72. $1\frac{1}{4}$
- 73. 6
- 74. 4
- 75. 55

76.	190
77.	92
78.	231
79.	100
80.	72

Number Sense Tricks

Generally in number sense we work from right to left in case any carrying is involved.

I. Multiplying Tricks

Times 11: Write the digit farthest to the right. Then add the digits in pairs, moving right to left. The last step will be writing the digit farthest to the left. Sometimes you will have to carry.

Example: $43 \times 11 =$ _____ Write the 3; Add $4 + 3 = 7$; write the

4

Answer = 473

Example: $32134 \times 11 =$ _____ Write the **4**; Add $3 + 4 = 7$;
Add $1 + 3 = 4$; Add $2 + 1 = 3$; Add $3 + 2 = 5$; Write the **3**.

Answer = 353474

Example: $567 \times 11 =$ _____ This problem involves some carrying.

Use your fingers to keep track of the carrying. Write the **7**;
Add $6 + 7 = 13$ so write the **3** and carry the 1 on your finger;
 $5 + 6 (+ 1 \text{ carried}) = 12$; Write the **2** and carry the 1; $5 + 1(\text{carried})$
= **6**.

Answer: 6237

Try these: $25 \times 11 =$ _____ $83 \times 11 =$ _____
 $245 \times 11 =$ _____ $7231 \times 11 =$ _____
 $7384 \times 11 =$ _____ $6621 \times 11 =$ _____

Times 25: Rule: Divide by 4 and move the decimal two places to the right. If remainder is 1, the answer will end in 25. If remainder is 2, the

answer will end in 50. If remainder is 3, the answer will end in 75.

Example: $25 \times 36 = 900$ Since $36/4 = 9$ with no remainder

Example: $25 \times 37 = 925$ since $37/4 = 9$ with remainder of 1

Example: $25 \times 38 = 950$ since $38/4 = 9$ with remainder of 2

Example: $25 \times 39 = 975$ since $39/4 = 9$ with remainder of 3

Try these: $25 \times 21 =$ _____ $25 \times 48 =$ _____
 $25 \times 27 =$ _____ $25 \times 57 =$ _____
 $25 \times 132 =$ _____ $25 \times 87 =$ _____

Times 50: Rule: Divide by 2 and move decimal two places to the right.

Example: $50 \times 24 = 1200$ since $24/2 = 12$

Example: $50 \times 13 = 650$ since $13/2 = 6$ with remainder of 1

Example: $50 \times 260 = 13000$ since $260/2 = 130$

Try these: $50 \times 16 =$ _____ $50 \times 22 =$ _____
 $50 \times 104 =$ _____ $50 \times 82 =$ _____
 $50 \times 73 =$ _____ $50 \times 58 =$ _____

Times 75: Rule: Divide by 4, multiply by 3 (since $75\% = \frac{3}{4}$). Move decimal point two places to the right. Grades 4-8, the number is always divisible by 4.

Example: $75 \times 24 = 1800$ since $\frac{24}{4} \times 3 = 6 \times 3 = 18$

Example: $75 \times 36 = 2700$ since $\frac{36}{4} \times 3 = 9 \times 3 = 27$

Try these: $75 \times 16 =$ _____ $75 \times 28 =$ _____
 $75 \times 4400 =$ _____ $75 \times 124 =$ _____
 $75 \times 56 =$ _____ $75 \times 12 =$ _____

Multiplying by 125 Rule: divide by 8, move decimal three places to the right. In high school number sense, you may have remainders. JH doesn't have remainders.

Example: $125 \times 24 = \frac{24}{8} \times 1000 = 3000$

Example: $125 \times 32 = \frac{32}{8} \times 1000 = 4000$

Example: $125 \times 240 = \frac{240}{8} \times 1000 = 30000$

Example: $125 \times 1.6 = \frac{16}{8} \times 1000 = 200$

Try these: $125 \times 56 = \underline{\hspace{2cm}}$ $125 \times 64 = \underline{\hspace{2cm}}$
 $125 \times 480 = \underline{\hspace{2cm}}$ $125 \times .8 = \underline{\hspace{2cm}}$
 $125 \times 7.2 = \underline{\hspace{2cm}}$ $125 \times .16 = \underline{\hspace{2cm}}$

24 x 26

6 24

Two-digit numbers in form $n4 \times n6$ where ten's digits are the same and units digits add to be 10. Rule: multiply units digits; write **both** digits. Multiply $n(n+1)$.

Example: $24 \times 26 = 624$. $4 \times 6 = \mathbf{24}$; $2(3) = \mathbf{6}$

Example: $72 \times 78 = 5616$ since $2 \times 8 = \mathbf{16}$; $7(8) = \mathbf{56}$

Example: $31 \times 39 = 1209$ since $1 \times 9 = \mathbf{09}$ and $3(4) = \mathbf{12}$

Try these: $52 \times 58 = \underline{\hspace{2cm}}$ $21 \times 29 = \underline{\hspace{2cm}}$
 $82 \times 88 = \underline{\hspace{2cm}}$ $73 \times 77 = \underline{\hspace{2cm}}$
 $17 \times 13 = \underline{\hspace{2cm}}$ $64 \times 66 = \underline{\hspace{2cm}}$

Squaring a number ending in 5 The rule above works here.

Example: $45^2 = 2025$ since $5 \times 5 = \mathbf{25}$ and $4 \times 5 = \mathbf{20}$

Example: $115^2 = 13225$ since $5^2 = \mathbf{25}$ and $11 \times 12 = \mathbf{132}$

Try these: $65^2 = \underline{\hspace{2cm}}$ $15^2 = \underline{\hspace{2cm}}$
 $35^2 = \underline{\hspace{2cm}}$ $105^2 = \underline{\hspace{2cm}}$

Multiplying numbers over 100 and close to 100 Rule: Multiply the difference of each number from 100. Write both digits (if only one digit, write a zero in front of the digit). Add the difference of one of the numbers to 100 to the other number.

Example: $103 \times 104 = 10712$ since $3 \times 4 = \mathbf{12}$ and $103 + 4 = \mathbf{107}$

Example: $108 \times 105 = 11340$ since $8 \times 5 = \mathbf{40}$ and $108 + 5 = \mathbf{113}$

Example: $102 \times 103 = 10506$ since $2 \times 3 = 06$ and $102 + 3 = 105$

Example: $109 \times 112 = 12208$ since $9 \times 12 = 108$ (Write **08**, carry 1) and $109 + 12 + 1 = 122$

Try these: $104 \times 105 = \underline{\hspace{2cm}}$ $102 \times 107 = \underline{\hspace{2cm}}$
 $107 \times 111 = \underline{\hspace{2cm}}$ $110 \times 112 = \underline{\hspace{2cm}}$
 $107 \times 109 = \underline{\hspace{2cm}}$ $101 \times 102 = \underline{\hspace{2cm}}$

Multiplying numbers over 1000 and close to 1000 Rule: Multiply the difference of each number from 1000. Write three digits (if only two digits, write a zero in front of them). Add the difference of one of the numbers to 1000 to the other number.

Example: $1003 \times 1004 = 1007012$ since $3 \times 4 = 012$ and $1003 + 4 = 1007$

Example: $1008 \times 1009 = 1017072$ since $8 \times 9 = 072$ and $1008 + 9 = 1017$

Try these: $1005 \times 1006 = \underline{\hspace{2cm}}$ $1007 \times 1003 = \underline{\hspace{2cm}}$
 $1002 \times 1009 = \underline{\hspace{2cm}}$ $1003 \times 1008 = \underline{\hspace{2cm}}$

Multiply numbers less than 100 and close to 100: Rule: Multiply the difference of each number from 100. Write both digits. Subtract the difference that one number is from 100 FROM the other number.

Example: $97 \times 98 = 9506$ since $100 - 97 = 3$ and $100 - 98 = 2$.

So $3 \times 2 = 06$. $98 - 3 = 95$ or $97 - 2 = 95$

Example: $94 \times 92 = 8648$ since $100 - 94 = 6$ and $100 - 92 = 8$ and $6 \times 8 = 48$. $92 - 6 = 86$ or $94 - 8 = 86$.

Try these: $91 \times 94 = \underline{\hspace{2cm}}$ $95 \times 99 = \underline{\hspace{2cm}}$
 $93 \times 96 = \underline{\hspace{2cm}}$ $89 \times 99 = \underline{\hspace{2cm}}$
 $95 \times 96 = \underline{\hspace{2cm}}$ $92 \times 97 = \underline{\hspace{2cm}}$

Multiply numbers less than 1000 and close to 1000: Rule: Multiply the difference of each number from 1000. Write three digits. Subtract the

difference that one number is from 1000 FROM the other number.

Example: $997 \times 998 = 995006$ since $1000 - 997 = 3$ and $1000 - 998 = 2$.
So $3 \times 2 = \mathbf{006}$. $998 - 3 = \mathbf{995}$ or $997 - 2 = 995$

Example: $994 \times 992 = 986048$ since $1000 - 994 = 6$ and $1000 - 992 = 8$
And $6 \times 8 = \mathbf{048}$. $992 - 6 = 986$ or $994 - 8 = \mathbf{986}$.

Try these: $991 \times 994 = \underline{\hspace{2cm}}$ $995 \times 999 = \underline{\hspace{2cm}}$
 $993 \times 996 = \underline{\hspace{2cm}}$ $989 \times 999 = \underline{\hspace{2cm}}$
 $995 \times 996 = \underline{\hspace{2cm}}$ $992 \times 997 = \underline{\hspace{2cm}}$

Multiplying a two-digit number by 101: Rule: Write the two digit number

Example: $101 \times 34 = 3434$

Try these: $101 \times 73 = \underline{\hspace{2cm}}$ $86 \times 101 = \underline{\hspace{2cm}}$
 $48 \times 101 = \underline{\hspace{2cm}}$ $24 \times 101 = \underline{\hspace{2cm}}$

Multiplying a three-digit number by 101: Rule: Write the ten's and unit's digits down. Then add the hundred's digit to the three-digit number.

Example: $423 \times 101 = 42723$ since the last two digits are **23** and $423 + 4 = \mathbf{427}$.

Example: $568 \times 101 = 57368$ since the last two digits are 68 and $568 + 5 = 573$.

Try these: $101 \times 237 = \underline{\hspace{2cm}}$ $101 \times 588 = \underline{\hspace{2cm}}$
 $101 \times 349 = \underline{\hspace{2cm}}$ $101 \times 325 = \underline{\hspace{2cm}}$
 $101 \times 843 = \underline{\hspace{2cm}}$ $101 \times 936 = \underline{\hspace{2cm}}$

Double and Half: When at least one number is even, doubling one number and taking half of the other number is often easy. This is especially helpful when one number ends in 5.

Example: $15 \times 22 = 330$ since $15 \times 22 = 30 \times 11$

Example: $24 \times 35 = 12 \times 70 = 840$

Example: $36 \times 15 = 18 \times 30 = 540$

Try these: $45 \times 22 = \underline{\hspace{2cm}}$ $35 \times 14 = \underline{\hspace{2cm}}$
 $15 \times 14 = \underline{\hspace{2cm}}$ $35 \times 12 = \underline{\hspace{2cm}}$
 $55 \times 16 = \underline{\hspace{2cm}}$ $45 \times 14 = \underline{\hspace{2cm}}$

Multiplying by 12: Rule: Double every digit and add the digit to the right.

Example: $314 \times 12 = 3768$ Double 4 = **8**. Double 1 and add the 4 = **6**. Double 3 and add the 1 = **7**. Write the **3**.

Example: $32134 \times 12 = 385608$: Method: $4 \times 2 = \mathbf{8}$. $3 \times 2 + 4 = 10$ (Write the **0**, carry the 1); $1 \times 2 + 3 + 1$ (carried) = **6**; $2 \times 2 + 1 = \mathbf{5}$; $3 \times 2 + 2 = \mathbf{8}$; Write the **3**.

Example: $51235 \times 12 = 614820$: Method: $5 \times 2 = 10$ (Write the **0**, carry the 1); $3 \times 2 + 5 + 1$ (carried) = 12 (Write the **2**, carry the 1); $2 \times 2 + 3 + 1$ (carried) = **8**; $1 \times 2 + 2 = \mathbf{4}$; $5 \times 2 + 1 = 11$ (Write the **1**, carry the 1); $5 + 1$ (carried) = **6**

Try these: $321 \times 12 = \underline{\hspace{2cm}}$ $224 \times 12 = \underline{\hspace{2cm}}$
 $53 \times 12 = \underline{\hspace{2cm}}$ $442 \times 12 = \underline{\hspace{2cm}}$
 $12321 \times 12 = \underline{\hspace{2cm}}$ $73 \times 12 = \underline{\hspace{2cm}}$

Teen's trick: Works the same as the 12's trick except that instead of doubling each digit, you will use the multiple indicated by the units digit.

Example: $14 \times 531 = 7434$ (Multiply each digit by 4 and add the digit to the right.) $1 \times 4 = \mathbf{4}$; $3 \times 4 + 1 = 13$ (Write the **3**, carry the 1); $5 \times 4 + 3 + 1$ (carried) = 24 (Write **4**, carry 2); $5 + 2 = \mathbf{7}$.

Example: $13 \times 2451 = 31863$ (Multiply each digit by 3 and add the digit to the right.) $1 \times 3 = \mathbf{3}$; $5 \times 3 + 1 = 16$ (Write **6**, carry 1); $4 \times 3 + 5 + 1$ (carried) = 18 (Write **8**, carry 1); $2 \times 3 + 4 + 1$ (carried) = 11 (Write **1**, carry 1); $2 + 1$ (carried) = **3**

Try these: $13 \times 413 = \underline{\hspace{2cm}}$ $17 \times 221 = \underline{\hspace{2cm}}$
 $16 \times 1123 = \underline{\hspace{2cm}}$ $18 \times 3112 = \underline{\hspace{2cm}}$
 $13 \times 5213 = \underline{\hspace{2cm}}$ $17 \times 211 = \underline{\hspace{2cm}}$

Multiplying two numbers equidistant from a given number: Rule:

Square the number half-way between the two numbers. Square the distance the two numbers are from the middle number. Subtract the two squares. This uses the Algebra principle of difference of squares $(a+b)(a-b) = a^2 - b^2$

Example: $49 \times 51 = 50^2 - 1^2 = 2500 - 1 = 2499$

Example: $42 \times 38 = 40^2 - 2^2 = 1600 - 4 = 1596$

Example: $73 \times 67 = 70^2 - 3^2 = 4900 - 9 = 4891$

Example: $98 \times 102 = 100^2 - 2^2 = 10000 - 4 = 9996$

Example: $16 \times 18 = 17^2 - 1^2 = 289 - 1 = 288$

Try these: $29 \times 31 = \underline{\hspace{2cm}}$ $47 \times 53 = \underline{\hspace{2cm}}$
 $65 \times 55 = \underline{\hspace{2cm}}$ $52 \times 48 = \underline{\hspace{2cm}}$
 $103 \times 97 = \underline{\hspace{2cm}}$ $64 \times 76 = \underline{\hspace{2cm}}$

Multiplying two-digit numbers using FOIL Rule: **L** means multiply the unit's digits; **O** means multiply the Outer digits; **I** means multiply the Inner digits; Find the sum of **O and I**; **F** means to multiply the 10's digits.

Example: $32 \times 41 = 1312$; Method: **L:** $2 \times 1 = 2$; **O** $= 3 \times 1 = 3$;
I $= 2 \times 4 = 8$; **O + I** $= 3 + 8 = 11$ (Write **1**, carry 1); **F** $= 3 \times 4 + 1(\text{carried})$
= 13

Example: $27 \times 34 = 918$; **L** $= 7 \times 4 = 28$ (Write **8**, carry 2); **O + I** $=$
 $2 \times 4 + 7 \times 3 + 2(\text{carried}) = 31$ (Write **1**, carry 3); **F** $= 2 \times 3 + 3(\text{carried})$
= 9

Try these: $23 \times 45 = \underline{\hspace{2cm}}$ $42 \times 31 = \underline{\hspace{2cm}}$
 $53 \times 62 = \underline{\hspace{2cm}}$ $41 \times 33 = \underline{\hspace{2cm}}$
 $28 \times 75 = \underline{\hspace{2cm}}$ $32 \times 61 = \underline{\hspace{2cm}}$

Multiplying two-digit numbers with units digits the same and ten's digits add to be 10. Rule: Multiply unit's digits. Write the two digit product. Multiply ten's digits and add one of the units digits.

Example: $48 \times 68 = 3264$ Method: $8 \times 8 = \mathbf{64}$; $4 \times 6 + 8 = \mathbf{32}$

Example: $36 \times 76 = 2736$ Method: $6 \times 6 = \mathbf{36}$; $3 \times 7 + 6 = \mathbf{27}$

Example: $84 \times 24 = 2016$ Method: $4 \times 4 = \mathbf{16}$; $8 \times 2 + 4 = \mathbf{20}$

Try these: $72 \times 32 = \underline{\hspace{2cm}}$ $61 \times 41 = \underline{\hspace{2cm}}$

$52 \times 52 = \underline{\hspace{2cm}}$ $57 \times 57 = \underline{\hspace{2cm}}$

Note that this trick works for squaring a number in the 50's

$43 \times 63 = \underline{\hspace{2cm}}$ $85 \times 25 = \underline{\hspace{2cm}}$

Two-digit number times 10101 Rule write the two digits three times

Example: $23 \times 10101 = 232323$

Example: $54 \times 10101 = 545454$

Try these: $62 \times 10101 = \underline{\hspace{2cm}}$ $21 \times 10101 = \underline{\hspace{2cm}}$

Multiplying 3367 by a multiple of 3: Rule: $3367 \times 3 = 10101$ so divide the multiple of 3 by 3 and multiply the result by 10101.

Example: $39 \times 3367 = (13 \times 3) \times 3367 = 13 \times (3 \times 3367) = 131313$

Example: $69 \times 3367 = 23 \times 3 \times 3367 = 23 \times 10101 = 232323$

Try these: $81 \times 3367 = \underline{\hspace{2cm}}$ $51 \times 3367 = \underline{\hspace{2cm}}$

$45 \times 3367 = \underline{\hspace{2cm}}$ $57 \times 3367 = \underline{\hspace{2cm}}$

$126 \times 3367 = \underline{\hspace{2cm}}$ $63 \times 3367 = \underline{\hspace{2cm}}$

Multiplying 1001 by two-digit number Rule: Write the two digits twice with zero between both pairs.

Example: $23 \times 1001 = 23023$

Example: $89 \times 1001 = 89089$

Try these: $56 \times 1001 = \underline{\hspace{2cm}}$ $67 \times 1001 = \underline{\hspace{2cm}}$

$12 \times 1001 = \underline{\hspace{2cm}}$ $93 \times 1001 = \underline{\hspace{2cm}}$

Multiplying 1001 by three-digit number: Write the three digits twice.

Example: $125 \times 1001 = 125125$

Try these: $436 \times 1001 = \underline{\hspace{2cm}}$ $832 \times 1001 = \underline{\hspace{2cm}}$

Multiplying 143 by a multiple of 7 Rule: Since $143 \times 7 = 1001$, divide the multiple of 7 by 7 and use the 1001 trick.

Example: $143 \times 56 = 8008$ since $143 \times 56 = 143 \times 7 \times 8 = 1001 \times 8$

Example: $143 \times 161 = 23023$ since $143 \times 161 = 143 \times 7 \times 23 = 1001 \times 23 = 23023$

Example: $143 \times 280 = 40040$ since $143 \times 280 = 1001 \times 40$

Try these: $143 \times 63 = \underline{\hspace{2cm}}$ $143 \times 42 = \underline{\hspace{2cm}}$
 $143 \times 147 = \underline{\hspace{2cm}}$ $143 \times 224 = \underline{\hspace{2cm}}$
 $143 \times 1477 = \underline{\hspace{2cm}}$ $143 \times 2184 = \underline{\hspace{2cm}}$

Multiplying by 142857 (an estimating problem in JH) Rule: Divide the number by 7. The whole number of the quotient is the first digit of the answer. The next digits follow the pattern 142857 but don't always start with 1. Examples will help explain this.

Example: 142857×37 as an estimate: $\frac{37}{7} = 5 \text{ remainder } 2$. Write the **5**. Then since the remainder is 2, find the 2nd largest digit in 142857 (this digit is 2). Begin writing the digits of 142857 starting with 2 and wrapping around until you end with 4. Very close

estimate

is 5285714. The exact answer is **5285714** minus the leading digit of

5

= **5285709**.

Example: $142857 \times 67 = 9571428$ as an estimate. The actual answer is 9571419. Method: $\frac{67}{7} = 9 \text{ remainder } 4$. Write the **9**, then start

with the 4th highest digit of 142857 (that digit is 5) begin writing
digits

571428. The exact answer is the estimated answer $9571428 - 9 = 9571419$

Example: $142857 \times 42 = 6000000$ as an estimate since $42/7 = 6$ with no remainder. Exact answer is $6000000 - 6 = 5999994$

Try these as estimates *:

* $142857 \times 27 =$ _____

* $142857 \times 33 =$ _____

* $142857 \times 45 =$ _____

* $142857 \times 60 =$ _____

* $142857 \times 35 =$ _____

Try to get the exact answer:

$142857 \times 27 =$ _____

$142857 \times 33 =$ _____

$142857 \times 45 =$ _____

$142857 \times 60 =$ _____

$142857 \times 35 =$ _____

Products of powers of 5 and 2 Rule: Factor the numbers so that there is a common power for 2 and 5. Using the associative property, multiply.

Examples will help explain this.

Example: $5^4 \times 2^5 = 5^4 \times 2^4 \times 2 = 10^4 \times 2 = 20000$

Example: $5^7 \times 2^9 = 5^7 \times 2^7 \times 2^2 = 10^7 \times 4 = 40000000$

Example: $5^5 \times 2^3 = 5^2 \times 5^3 \times 2^3 = 25 \times 10^3 = 25000$

Try these: $5^4 \times 2^6 =$ _____ $5^5 \times 2^2 =$ _____

$2^7 \times 5^6 =$ _____ $2^6 \times 5^5 =$ _____

$5^4 \times 2^3 =$ _____ $5^8 \times 2^6 =$ _____

Product of the LCM and GCF Rule: Multiply the two numbers.

Example: Find the product of the LCM and GCF of 111 and 243.

Using 111 trick, the product is 26973

Example: The product of the LCM and GCF of 24 and 25 = 600

Try these: The product of the LCM and GCF of 15 and 12 =

The product of the LCM and GCF of 24 and 35 =

The product of the LCM and GCF of 36 and 34 =

Squaring numbers with only 1's as digits: Rule: For “n” 1's, write increasing consecutive natural numbers “1 to n” and then decrease the natural numbers back to 1.

Example: $11111^2 = 123454321$

Example: $111111^2 = 12345654321$

Try these: $1111^2 =$ _____ $111^2 =$ _____

$1111111^2 =$ _____ $11111111^2 =$ _____

Multiplying n consecutive integers by 9 (plus n + 1)

Rule: Write “n+1” 1's

Example: $12345 \times 9 + 6 = 111111$

Example: $1234 \times 9 + 5 = 11111$

Try these: $123456 \times 9 + 7 =$ _____ $123 \times 9 + 4 =$ _____

$1234567 \times 9 + 8 =$ _____ $12345678 \times 9 + 9 =$ _____

II . Fraction Problems.

Many beginning number sense tests require basic knowledge of operations of fractions and mixed numbers but there are some shortcuts.

Adding or subtracting proper fractions quickly (works best when denominators are relatively prime-{no common factor other than 1})

Rule: $\frac{a}{b} + \frac{c}{d} = \frac{ad+bc}{bd}$ or $\frac{a}{b} - \frac{c}{d} = \frac{ad-bc}{bd}$

Example: $\frac{2}{3} + \frac{3}{4} = \frac{2 \times 4 + 3 \times 3}{3 \times 4} = \frac{17}{12}$

Example: $\frac{5}{8} + \frac{2}{5} = \frac{5 \times 5 + 8 \times 2}{8 \times 5} = \frac{41}{40}$

Example: $\frac{4}{5} - \frac{7}{8} = \frac{4 \times 8 - 5 \times 7}{5 \times 8} = \frac{-3}{40}$

Try these: $\frac{3}{4} + \frac{3}{5} = \underline{\hspace{2cm}}$

$\frac{1}{2} + \frac{2}{3} = \underline{\hspace{2cm}}$

$\frac{5}{8} + \frac{1}{3} = \underline{\hspace{2cm}}$

$\frac{2}{5} - \frac{4}{7} = \underline{\hspace{2cm}}$

$\frac{2}{3} - \frac{1}{2} = \underline{\hspace{2cm}}$

$\frac{7}{9} - \frac{4}{5} = \underline{\hspace{2cm}}$

Adding a number plus its reciprocal Rule: $\frac{a}{b} + \frac{b}{a} = 2\frac{(b-a)^2}{ab}$ This

answer is always requested in Mixed number form. The whole number is always 2 (unless the fraction comes out to be improper).

Example: $\frac{3}{5} + \frac{5}{3} = 2\frac{(5-3)^2}{3 \times 5} = 2\frac{4}{15}$

Example: $\frac{7}{12} + \frac{12}{7} = 2\frac{(12-7)^2}{12 \times 7} = 2\frac{25}{84}$

Example: $\frac{6}{7} + \frac{7}{6} = 2\frac{(7-6)^2}{7 \times 6} = 2\frac{1}{42}$

Example: $\frac{4}{11} + \frac{11}{4} = 2\frac{49}{44} = 3\frac{5}{44}$ This is rare in JH testing

Try these: $\frac{3}{7} + \frac{7}{3} = \underline{\hspace{2cm}}$

$\frac{4}{7} + \frac{7}{4} = \underline{\hspace{2cm}}$

$\frac{5}{8} + \frac{8}{5} = \underline{\hspace{2cm}}$

$\frac{10}{11} + \frac{11}{10} = \underline{\hspace{2cm}}$

$\frac{2}{5} + \frac{5}{2} = \underline{\hspace{2cm}}$

$\frac{2}{7} + \frac{7}{2} = \underline{\hspace{2cm}}$

Fraction problems of form $\frac{a}{b} - \frac{c}{d} = \frac{1}{x}$ Solve for x. Rule: Combine the fractions. Then use the reciprocal of the simplified fraction.

Example: $\frac{2}{3} + \frac{4}{5} = \frac{1}{x}; x = \underline{\hspace{2cm}}$ $\frac{2}{3} + \frac{4}{5} = \frac{22}{15} \quad x = \frac{15}{22}$

Example: $\frac{5}{8} + \frac{2}{3} = \frac{1}{x}$ $x = \frac{5}{8} + \frac{2}{3} = \frac{31}{24}$ $x = \frac{24}{31}$

Example: $\frac{6}{7} - \frac{5}{6} = \frac{1}{x}$ $x = \frac{6}{7} - \frac{5}{6} = \frac{1}{42}$ $x = 42$

Try these: $\frac{5}{7} + \frac{1}{3} = \frac{1}{x}$ $x =$ _____

$\frac{4}{5} + \frac{5}{6} = \frac{1}{x}$ $x =$ _____

$\frac{4}{9} - \frac{3}{5} = \frac{1}{x}$ $x =$ _____

$\frac{7}{8} - \frac{2}{3} = \frac{1}{x}$ $x =$ _____

Fraction problems of form $\frac{a}{b} \times a =$ _____ Mixed number, $a > b$

Rule: When $a > b$, the whole number is $a \div (a-b)$. The fraction is $\frac{(a-b)^2}{b}$

Example: $\frac{17}{15} \times 17 = [17 \div (17-15)] \frac{(17-15)^2}{15} = 19 \frac{4}{15}$

Example: $\frac{16}{13} \times 16 = [16 \div (16-13)] \frac{(16-13)^2}{13} = 19 \frac{9}{13}$

Try these: $\frac{14}{11} \times 14 =$ _____ Mixed number

$\frac{15}{11} \times 15 =$ _____ Mixed number

$\frac{15}{13} \times 15 =$ _____ Mixed number

$\frac{23}{21} \times 23 =$ _____ Mixed number

Fraction problems of form $\frac{a}{b} \times a =$ _____ Mixed number, $a < b$

Rule: When $a < b$, the whole number is $a \div (b-a)$. The fraction is $\frac{(b-a)^2}{b}$

Example: $\frac{15}{17} \times 15 = [15 \div (17-15)] \frac{(17-15)^2}{17} = 13 \frac{4}{17}$

Example: $\frac{13}{16} \times 13 = [13 \div (16-13)] \frac{(16-13)^2}{16} = 10 \frac{9}{16}$

Try these: $\frac{11}{14} \times 11 =$ _____ Mixed number

$\frac{11}{15} \times 11 =$ _____ Mixed number

$$\frac{13}{15} \times 13 = \underline{\hspace{2cm}} \text{ Mixed number}$$

$$\frac{21}{23} \times 21 = \underline{\hspace{2cm}} \text{ Mixed number}$$

Mixed number products (using the same fractions) using FOIL: Apply

FOIL where **L** is the product of the fractions; **O** = product of first whole number and 2nd fraction; **I** = product of first fraction and 2nd whole number; **F** = product of whole numbers.

Example: $4\frac{1}{2} \times 8\frac{1}{2} = \underline{\hspace{2cm}}$ Mixed number; **L:** $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$ Write

$\frac{1}{4}$

O = $4(\frac{1}{2}) = 2$; **I** = $\frac{1}{2}(8) = 4$; **O + I** = $2 + 4 = 6$ carry the 6 to **F** = 4

$\times 8 =$

$$32 + 6 \text{ (carried)} = 38 \frac{1}{4}$$

Example: $5\frac{2}{5} \times 15\frac{2}{5} = \underline{\hspace{2cm}}$ Mixed number. $\frac{2}{5} \times \frac{2}{5} = \frac{4}{25}$;

$5 \times \frac{2}{5} + \frac{2}{5} \times 15 = \frac{40}{5} = 8$. Carry the 8. $5 \times 15 = 75 + 8 \text{ carried} =$

$$83 \frac{4}{25}$$

Example: $3\frac{2}{3} \times 12\frac{2}{3} = \underline{\hspace{2cm}}$ Mixed number. $\frac{2}{3} \times \frac{2}{3} = \frac{4}{9}$;

$3 \times \frac{2}{3} + \frac{2}{3} \times 12 = \frac{30}{3} = 10$. Carry the 10. $3 \times 12 = 36 + 10 \text{ (carried)} =$

$$46 \frac{4}{9}$$

Multiplying mixed numbers when whole numbers are the same and fractions add to be 1 and answer must be in mixed number form.

Rule: Multiply the fractions. Multiply the whole number times the whole number plus 1.

Example: $5\frac{2}{5} \times 5\frac{3}{5} = 5(5+1)$; $\frac{2}{5} \times \frac{3}{5} = 30\frac{6}{25}$

Example: $7\frac{3}{4} \times 7\frac{1}{4} = 7(7+1)$; $\frac{3}{4} \times \frac{1}{4} = 56\frac{3}{16}$

Example: $11\frac{3}{8} \times 11\frac{5}{8} = 11(11+1) \frac{3}{8} \times \frac{5}{8} = 132\frac{15}{64}$

Try these: $4\frac{1}{3} \times 4\frac{2}{3} = \underline{\hspace{2cm}}$ Mixed number

$6\frac{2}{5} \times 6\frac{3}{5} = \underline{\hspace{2cm}}$ Mixed number

$10\frac{3}{8} \times 10\frac{5}{8} = \underline{\hspace{2cm}}$ Mixed number

Changing Mixed number percent to fraction Rule: Write mixed number as an improper fraction. Divide by 100 and simplify.

Example: $1\frac{2}{3} \% = \frac{1}{60}$ fraction since $1\frac{2}{3} = \frac{5}{3}$; $\frac{5}{3} \div 100 = \frac{5}{300} = \frac{1}{60}$

Example: $2\frac{3}{7} \% = \frac{17}{700}$ fraction since $2\frac{3}{7} = \frac{17}{7}$; $\frac{17}{7} \div 100 = \frac{17}{700}$

Example: $5\frac{1}{5} \% = \frac{13}{250}$ fraction since $5\frac{1}{5} = \frac{26}{5}$; $\frac{26}{5} \div 100 = \frac{26}{500} = \frac{13}{250}$

Comparing fractions Rule: $\frac{a}{b} ? \frac{c}{d}$ Cross multiply. If $ad > bc$, then

$\frac{a}{b} > \frac{c}{d}$, If $ad < bc$, then $\frac{a}{b} < \frac{c}{d}$

Example: Which fraction is larger? $\frac{2}{3}$ or $\frac{5}{9}$? _____. Since $2(9) > 3(5)$, $\frac{2}{3}$ is larger.

Example: Which fraction is larger? $\frac{3}{11}$ or $\frac{2}{7}$? _____. Since $2(11) > 3(7)$, $\frac{2}{7}$ is larger.

Example: Which fraction is larger? $\frac{5}{7}$ or $\frac{8}{11}$? _____. Since $8(7) > 11(5)$, $\frac{8}{11}$ is larger.

Changing $\frac{n}{40}$ to a decimal. Rule: Divide the numerator by 4. Write the quotient in decimal form, but move the decimal point one place to the left.

Example: $\frac{11}{40} = .275$ decimal since $\frac{11}{4} = 2\frac{3}{4} = 2.75$

Example: $\frac{23}{40} = .575$ decimal since $\frac{23}{4} = 5\frac{3}{4} = 5.75$

Example: $\frac{17}{40} = .425$ decimal since $\frac{17}{4} = 4\frac{1}{4} = 4.25$

Try these: Change all to a decimal

$$\frac{13}{40} = \underline{\hspace{2cm}} \text{ decimal}$$

$$\frac{21}{40} = \underline{\hspace{2cm}} \text{ decimal}$$

$$\frac{9}{40} = \underline{\hspace{2cm}} \text{ decimal}$$

Changing $\frac{n}{40}$ to a percent. Rule: Divide the numerator by 4. Write the quotient in decimal form, but move the decimal point one place to the right.

Example: $\frac{11}{40} = 27.5\%$ since $\frac{11}{4} = 2\frac{3}{4} = 2.75$

Example: $\frac{23}{40} = 57.5\%$ since $\frac{23}{4} = 5\frac{3}{4} = 5.75$

Example: $\frac{17}{40} = 42.5\%$ since $\frac{17}{4} = 4\frac{1}{4} = 4.25$

Try these: Write all as a percent.

$$\frac{19}{40} = \underline{\hspace{2cm}} \%$$

$$\frac{37}{40} = \underline{\hspace{2cm}} \%$$

$$\frac{33}{40} = \underline{\hspace{2cm}} \%$$

Changing repeating decimals to fractions: Rule: The denominator consists of 9's and 0's. The number of digits that repeat dictates the number of 9's. The number of digits that do not repeat dictates the number of 0's. The numerator is obtained by subtracting the non-repeating digits from all of the digits.

Example: $.1\overline{6} = \frac{16-1}{90} = \frac{15}{90} = \frac{1}{6}$

Example: $.02\overline{3} = \frac{23-2}{900} = \frac{21}{900} = \frac{7}{300}$

Example: $.1\overline{23} = \frac{123-1}{990} = \frac{122}{990} = \frac{61}{495}$

Addition of fractions in form $\frac{1}{x(x+1)} + \frac{1}{(x+1)(x+2)} + \frac{1}{(x+2)(x+3)} = \frac{3}{x(x+3)}$

$$\frac{1}{x(x+1)} + \frac{1}{(x+1)(x+2)} + \frac{1}{(x+2)(x+3)} + \frac{1}{(x+3)(x+4)} = \frac{4}{x(x+4)}$$

Example: $\frac{1}{3 \times 4} + \frac{1}{4 \times 5} + \frac{1}{5 \times 6} = \frac{3}{3 \times 6} = \frac{3}{18} = \frac{1}{6}$

Example: $\frac{1}{20} + \frac{1}{30} + \frac{1}{42} = \frac{3}{4 \times 7} = \frac{3}{28}$

Try these: $\frac{1}{6} + \frac{1}{12} + \frac{1}{20} = \underline{\hspace{2cm}}$

$$\frac{1}{12} + \frac{1}{20} + \frac{1}{30} + \frac{1}{42} = \underline{\hspace{2cm}}$$

$$\frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} = \underline{\hspace{2cm}}$$

$$\frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \frac{1}{30} = \underline{\hspace{2cm}}$$

III. Sums and differences of Squares

Difference of squares: Rule $a^2 - b^2 = (a + b)(a - b)$

Example: $52^2 - 48^2 = (52 + 48)(52 - 48) = 100 \times 4 = 400$

Example: $37^2 - 23^2 = (37 + 23)(37 - 23) = 60 \times 14 = 840$

Try these: $63^2 - 37^2 = \underline{\hspace{2cm}}$ $48^2 - 47^2 = \underline{\hspace{2cm}}$

$$38^2 - 36^2 = \underline{\hspace{2cm}} \quad 28^2 - 25^2 = \underline{\hspace{2cm}}$$

$$85^2 - 84^2 = \underline{\hspace{2cm}} \quad 17^2 - 18^2 = \underline{\hspace{2cm}}$$

Sum of squares in form $x^2 + (3x)^2$: Rule: Square the smaller base. Then multiply the result by 10. JH should memorize squares to 30.

Example: $12^2 + 36^2 = 12^2 \times 10 = 1440$

Example: $18^2 + 54^2 = 18^2 \times 10 = 3240$

Try these: $17^2 + 51^2 = \underline{\hspace{2cm}}$ $11^2 + 33^2 = \underline{\hspace{2cm}}$

$$13^2 + 39^2 = \underline{\hspace{2cm}} \quad 15^2 + 45^2 = \underline{\hspace{2cm}}$$

$$21^2 + 63^2 = \underline{\hspace{2cm}} \quad 25^2 + 75^2 = \underline{\hspace{2cm}}$$

Sum of squares in form $x^2 + (2x)^2$: Rule: Square the smaller base. Then multiply the result by 5. Actually, you can do the trick above and then divide the answer by 2.

Example: $11^2 + 22^2 = 11^2(10) \div 2 = 1210 \div 2 = 605$

Example: $17^2 + 34^2 = 17^2(10) \div 2 = 2890 \div 2 = 1445$

Try these:

$21^2 + 42^2 = \underline{\hspace{2cm}}$	$12^2 + 24^2 = \underline{\hspace{2cm}}$
$14^2 + 28^2 = \underline{\hspace{2cm}}$	$18^2 + 36^2 = \underline{\hspace{2cm}}$
$23^2 + 26^2 = \underline{\hspace{2cm}}$	$8^2 + 16^2 = \underline{\hspace{2cm}}$

Sum of squares in form $x^2 + (7x)^2$ Rule: Square the smaller base. Then multiply the result by 50. This would be the same trick as above, times 10 or x^2 times $100 \div 2$

Example: $6^2 + 42^2 = 36(100) \div 2 = 3600 \div 2 = 1800$

Example: $8^2 + 56^2 = 64(100) \div 2 = 6400 \div 2 = 3200$

Try these:

$11^2 + 77^2 = \underline{\hspace{2cm}}$	$9^2 + 63^2 = \underline{\hspace{2cm}}$
$12^2 + 84^2 = \underline{\hspace{2cm}}$	$5^2 + 35^2 = \underline{\hspace{2cm}}$
$4^2 + 28^2 = \underline{\hspace{2cm}}$	$7^2 + 49^2 = \underline{\hspace{2cm}}$

Sum of squares when either outer digits (or inner digits) add to be 10 and other digits have a difference of 1. Rule: Find the digits (either inner or outer) whose difference is 1. Select the higher of these. Use the two digit number that this digit is a part of. Find the sum of the squares of both digits. Write them twice.

Example: $52^2 + 15^2 = \underline{\hspace{2cm}}$ This fits the pattern since the outer digits add to be 10 and the inner digits have a difference of 1.

Select

the 52 (since the 2 is higher than the 1). $5^2 + 2^2 = 25 + 4 = 29$.

Answer = 2929

Example: $43^2 + 26^2 = \underline{\hspace{2cm}}$. Since $4 + 6 = 10$ and difference of 3 and 2 is 1, this fits the pattern. 3 is larger than 2 so $4^2 + 3^2 = 16 + 9 =$

25. Answer is 2525

Try these: $23^2 + 28^2 = \underline{\hspace{2cm}}$ $56^2 + 46^2 = \underline{\hspace{2cm}}$
 $13^2 + 29^2 = \underline{\hspace{2cm}}$ $68^2 + 27^2 = \underline{\hspace{2cm}}$
 $58^2 + 75^2 = \underline{\hspace{2cm}}$ $66^2 + 47^2 = \underline{\hspace{2cm}}$

IV. Dividing tricks

Divisibility rules:

1. A number is divisible by 2 if it is even.
2. A number is divisible by 3 if the sum of the digits is a multiple of 3.
3. A number is divisible by 4 if the last two digits are divisible by 4.
4. A number is divisible by 5 if the last digit is 5 or 0.
5. A number is divisible by 6 if it is divisible by 2 and 3.
6. A number is divisible by 8 if the last three digits are divisible by 8.
7. A number is divisible by 9 if the sum of the digits is divisible by 9.
8. Divisibility by 11: Start from the one's digit and add every other digit. Then add the remaining digits. Subtract the first total from the 2nd total. If this value is 0, then the number is divisible by 11. If not, then you have the remainder. If you get a difference of more than 11, subtract 11 to get the remainder. If your difference is negative, add 11 to get the remainder.

Example: $23587 \div 11$ has a remainder of 3
because $(7+5+2) - (8+3) = 3$.

Example: $15632 \div 11$ has a remainder of 1
because $(2+6+1) - (5+3) = 1$

Example: $18293 \div 11$ has no remainder
because $(3+2+1) - (8+9) = -11$; $-11 + 11 = 0$

Example: $182937 \div 11$ has a remainder of 7
Because $(7+9+8) - (3+2+1) = 18$; $18-11 = 7$

Try these: $274 \div 11$ has remainder of $\underline{\hspace{2cm}}$

9482 ÷ 11 has remainder of _____

15346 ÷ 11 has remainder of _____

211934 ÷ 11 has remainder of _____

9. A number is divisible by 12 if it is divisible by 3 and 4.

Dividing by 9 and writing the answer as a mixed number Rule: For the fraction, add all digits. If the sum is larger than 9, subtract 9. The result will be the numerator of the mixed number. 9 will be the denominator. For the whole number, add all digits (excluding the units digit). Write the last digit of the sum and carry if necessary. For the next digit, add all digits (excluding the units digit and ten's digit). Write the last digit of the sum and carry if necessary. Continue this pattern until there are no more digits to add.

Example: $2141 \div 9 = \underline{\hspace{1cm}}$ Mixed number. The fraction is $\frac{2+1+4+1}{9} = \frac{8}{9}$. Work from right to left. The whole number comes from adding $2+1+4 = 7$, then add $2 + 1 = 3$, then write the **2**. The answer is: $237\frac{8}{9}$.

Example: $42311 \div 9 = \underline{\hspace{1cm}}$ Mixed number. The fraction is $\frac{1+1+3+2+4}{9} = \frac{11}{9} = 1\frac{2}{9}$. You will need to carry the 1 to the next step. $4+2+3+1 + 1(\text{carried}) = 11$. Write **1** and carry the other 1. $4+2+3 + 1(\text{carried}) = 10$. Write the **0**, carry the 1. $4 + 2 + 1(\text{carried}) = 7$. Write the **4**. Answer: $4701\frac{2}{9}$

Try these: Write all as mixed numbers:

$$325 \div 9 = \underline{\hspace{1cm}}$$

$$122 \div 9 = \underline{\hspace{1cm}}$$

$$2330 \div 9 = \underline{\hspace{1cm}}$$

$$1325 \div 9 = \underline{\hspace{1cm}}$$

$$3547 \div 9 = \underline{\hspace{1cm}}$$

$$12345 \div 9 = \underline{\hspace{1cm}}$$

Remainders with numerous operations: Rule: Divide each number by the divisor and calculate with remainders only.

Example: $(5 \times 14 + 3) \div 2$ has a remainder of _____. Dividing 5, 14 and 3 by 2 gives remainders of 1, 0 + 1 so answer is remainder of

1.

Example: $[37 \times (14 + 13)] \div 5$ is same as $[2 \times (4 + 3)] \div 5 = 2(7) \div 5 =$ remainder 4.

Try these: $(18 \times 13 + 8) \div 5$ has remainder of _____
 $(17 \times 21 + 6) \div 4$ has a remainder of _____
 $(12 \times 15 + 7) \div 3$ has a remainder of _____
 $(24 \times 36 + 5) \div 6$ has a remainder of _____

V. Miscellaneous

Using the distributive property $ab + ac = a(b+c)$ or $ab - ac = a(b-c)$

Example: $17 \times 13 + 17 \times 27 = 17(13 + 27) = 17(40) = 680$

Example: $34 \times 25 + 34 \times 15 = 34(25 + 15) = 34(40) = 1360$

Example: $63 \times 17 - 53 \times 17 = 17(63-53) = 17(10) = 170$

Try these: $18 \times 24 + 18 \times 26 =$ _____
 $21 \times 85 + 21 \times 15 =$ _____
 $53 \times 16 - 3 \times 16 =$ _____
 $36 \times 19 - 19 \times 26 =$ _____

Diagonals of a polygon from one vertex: Rule: number of sides minus 3

Example: How many diagonals may be drawn from one vertex on the following polygons? A hexagon = 3; A dodecagon = 9;

Try these: How many diagonals can be drawn from one vertex on the following polygons? A heptagon _____, an undecagon _____, a pentagon _____, an octagon _____

Diagonals of a polygon from all vertices: $n(n-3)$

Example: An undecagon (11 sides) has $11(11-3) = 11(8) = 88$

Diagonals

Try these: Find the number of diagonals from all vertices of:

Decagon _____ icosagon (20 sides) _____

Heptagon (7) _____ septagon (7) _____

Pentagon _____ nonagon (9) _____

Probability when rolling two dice: memorize this pattern

Roll	2	3	4	5	6	7	8	9	10	11	12
Ways	1	2	3	4	5	6	5	4	3	2	1

Notice rolls 2-7 the number of ways is one less than the roll. From 7-12 the

number of ways is 13 minus the roll. The total number of possible rolls is 36. So the probability is number of favorable ways ÷ 36.

Example: What is the probability that a 5 will roll when rolling two dice? $\frac{4}{36} = \frac{1}{9}$

Example: What is the probability that an 8 will roll when rolling two dice? $\frac{13-8}{36} = \frac{5}{36}$

Try these: What is the probability of rolling a 7 when rolling two dice? _____

What is the probability of rolling a 6 when rolling two dice? _____

What is the probability of rolling a 4 when rolling two dice? _____

Odds: number of favorable outcomes ÷ number of unfavorable outcomes.

Example: The odds of rolling an even number is 1:1. (3 evens ÷ 3 not even)

$$\frac{4}{48} = \frac{1}{12}$$

Example: The odds of drawing a King from a deck of cards:

Example: The odds of rolling a 3 on one die: $1/5$

Example: The odds of rolling a sum of three when rolling two dice:

$$\frac{2}{34} = \frac{1}{17} \quad (\text{Two ways to get a 3 and 34 ways to not get a 3})$$

Try these: What are the odds of being dealt a heart from a deck of 52 cards _____

What are the odds of getting heads when flipping a coin once? _____

What are the odds of choosing the letter "Z" from the alphabet? _____

Converting ft³ to yd³: Rule: Divide each ft measurement by 3 & simplify.

Example: $6 \text{ ft.} \times 5 \text{ ft.} \times 9 \text{ ft.} = \frac{6}{3} \times \frac{5}{3} \times \frac{9}{3} \text{ yd}^3 = 10 \text{ yd}^3$

Example: $2 \text{ ft.} \times 18 \text{ ft} \times 6 \text{ ft} = \frac{2}{3} \times \frac{18}{3} \times \frac{6}{3} \text{ yd}^3 = 8 \text{ yd}^3$

Try these: $3 \text{ ft} \times 4 \text{ ft} \times 9 \text{ ft} = \text{_____} \text{ yd}^3$

$12 \text{ ft} \times 4 \text{ ft} \times 9 \text{ ft} = \text{_____} \text{ yd}^3$

Find the LCM of two numbers: Rule: Divide one number by the GCF.

Multiply the other number by the result.

Example: The LCM of 42 and 56 = $\frac{42}{14} \times 56 = 3 \times 56 = 168$

Example: The LCM of 18 and 24 = $\frac{18}{6} \times 24 = 3 \times 24 = 72$

Try these: The LCM of 12 and 33 = _____

The LCM of 15 and 25 = _____

The LCM of 36 and 48 = _____

Subsets of a set: Rule: A set with "n" elements has 2^n subsets. One subset (the set itself) is always improper. $2^n - 1$ subsets are proper.

Example: {a,b,c} has 8 subsets; one is improper; 7 are proper
Example: {1,2,3,4,5} has 32 subsets; one- improper; 31 – proper
Try these: {m,a,t,h} has _____ subsets
 {g,o} has _____ proper subsets
 {t,e,a,m} has _____ improper subsets
 {s,m,a,r,t} has _____ proper subsets

Convert Celsius to Fahrenheit: Rule $F = \frac{9}{5}C + 32$

Example: $15^{\circ}\text{C} = \text{_____}^{\circ}\text{F}$; $\frac{9}{5}(15) + 32 = 27 + 32 = 59^{\circ}\text{F}$

Example: $20^{\circ}\text{C} = \text{_____}^{\circ}\text{F}$; $\frac{9}{5}(20) + 32 = 36 + 32 = 68^{\circ}\text{F}$

Try these: $5^{\circ}\text{C} = \text{_____}^{\circ}\text{F}$. $10^{\circ}\text{C} = \text{_____}^{\circ}\text{F}$
 $-40^{\circ}\text{C} = \text{_____}^{\circ}\text{F}$ $-20^{\circ}\text{C} = \text{_____}^{\circ}\text{F}$

Convert Fahrenheit to Celsius: Rule: $C = \frac{5}{9}(F - 32)$

Example: $41^{\circ}\text{F} = \text{_____}^{\circ}\text{C}$; $C = \frac{5}{9}(41 - 32) = \frac{5}{9}(9) = 5^{\circ}\text{C}$

Example: $59^{\circ}\text{F} = \text{_____}^{\circ}\text{C}$; $C = \frac{5}{9}(59 - 32) = \frac{5}{9}(27) = 15^{\circ}\text{C}$

Example: $77^{\circ}\text{F} = \text{_____}^{\circ}\text{C}$; $C = \frac{5}{9}(77 - 32) = \frac{5}{9}(45) = 25^{\circ}\text{C}$

Try these: $5^{\circ}\text{F} = \text{_____}^{\circ}\text{C}$ $32^{\circ}\text{F} = \text{_____}^{\circ}\text{C}$
 $86^{\circ}\text{F} = \text{_____}^{\circ}\text{C}$ $95^{\circ}\text{F} = \text{_____}^{\circ}\text{C}$

Miles per hour to feet per second: Rule: $15\text{mph} = 22\text{ft/sec}$

Example: $45\text{ mph} = 66\text{ ft/sec}$

Example: $30\text{ mph} = 44\text{ ft/sec}$

Example: $90\text{ mph} = 132\text{ ft/sec}$

Try these: $11\text{ ft/sec} = \text{_____}\text{mph}$ $60\text{ mph} = \text{_____}\text{ft/sec}$
 $75\text{ mph} = \text{_____}\text{ft/sec}$ $220\text{ft/sec} = \text{_____}\text{mph}$

Angle formed by hands on a clock: $|30H - \frac{11}{2}M|$

Example: The acute angle formed by the hands of a clock at 3:16

=

$$|30(3) - \frac{11}{2}(16)| = |90 - 88| = 2^{\circ}$$

Example: The acute angle formed by the hands of a clock at 2:20

=

$$|30(2) - \frac{11}{2}(20)| = |60 - 110| = 50^{\circ}$$

Try these: The acute angle formed by the hands of a clock at 5:24 =

The acute angle formed by the hands of a clock at 3:14 =

The acute angle formed by the hands of a clock at 2:12 =

Square roots of mixed numbers: Rule: Make improper; take square root.

Example: $\sqrt{1\frac{24}{25}} = \sqrt{\frac{49}{25}} = \frac{7}{5}$

Example: $\sqrt{2\frac{1}{4}} = \sqrt{\frac{9}{4}} = \frac{3}{2}$

Example: $\sqrt{1\frac{7}{9}} = \sqrt{\frac{16}{9}} = \frac{4}{3}$

Try these: $\sqrt{1\frac{11}{25}} = \underline{\hspace{2cm}}$

$\sqrt{1\frac{9}{16}} = \underline{\hspace{2cm}}$

Mixed #

$\sqrt{1\frac{15}{49}} = \underline{\hspace{2cm}}$

$\sqrt{3\frac{6}{25}} = \underline{\hspace{2cm}}$

Mixed #

Geometric Mean: Rule: \sqrt{ab} ; $\sqrt[3]{abc}$;

Example: The geometric mean of 4 and 9 = $\sqrt{4(9)} = \sqrt{36} = 6$

Example: The geometric mean of 8, 2, and 4 = $\sqrt[3]{8 \times 2 \times 4} = \sqrt[3]{64} = 4$

Try these: The geometric mean of 8 and 2 = $\underline{\hspace{2cm}}$

The geometric mean of 18 and 2 = $\underline{\hspace{2cm}}$

The geometric mean of 9, 6 and 4 = $\underline{\hspace{2cm}}$

Triangular numbers: $n(n+1)/2$ Also $1 + 2 + 3 + \dots + n$

Example: The 6th triangular number is $6(7)/2 = 21$

Example: The 10th triangular number is $10(11)/2 = 5(11) = 55$

Example: $1 + 2 + 3 + \dots + 10 = 10(11)/2 = 55$

Example: $1 + 2 + 3 + 4 + \dots + 100 = 100(101)/2 = 50(101) = 5050$

Try these: The 5th triangular number is _____

The 11th triangular number is _____

$1 + 2 + 3 + \dots + 20 = \underline{\hspace{2cm}}$ $1 + 2 + 3 + \dots + 24 = \underline{\hspace{2cm}}$

Pentagonal numbers: $n(3n-1)/2$

Example: The 5th pentagonal number is $5(15-1)/2 = 5(7) = 35$

Example: The 10th pentagonal number is $10(30-1)/2 = 5(29) = 145$

Try these: The 3rd pentagonal number is _____

The 4th pentagonal number is _____

The 6th pentagonal number is _____

Hexagonal number: $n(4n-2)/2$ Or $n(2n-1)$

Example: The 5th hexagonal number is $5(20-2)/2 = 5(9) = 45$

Example: The 8th hexagonal number is $8(30)/2 = 4(30) = 120$

Try these: The 3rd hexagonal number is _____

The 4th hexagonal number is _____

The 2nd hexagonal number is _____

Adding sequence $1 + 3 + 5 + \dots + n$: Rule $\left(\frac{n+1}{2}\right)^2$

Example: $1 + 3 + 5 + \dots + 11 = \left(\frac{11+1}{2}\right)^2 = 6^2 = 36$

Example: $1 + 3 + 5 + \dots + 19 = \left(\frac{19+1}{2}\right)^2 = 10^2 = 100$

Try these: $1 + 3 + 5 + \dots + 21 = \underline{\hspace{2cm}}$ $1 + 3 + 5 + \dots + 99 = \underline{\hspace{2cm}}$

$$1 + 3 + 5 + \dots + 29 = \underline{\hspace{2cm}} \quad 1 + 3 + 5 + \dots + 49 = \underline{\hspace{2cm}}$$

Adding sequence $2 + 4 + 6 + \dots + n$: Rule $\frac{n(n+2)}{4}$

Example: $2 + 4 + 6 + \dots + 20 = \frac{20(20+2)}{4} = 5(22) = 110$

Example: $2 + 4 + 6 + \dots + 38 = \frac{38(38+2)}{4} = 38(10) = 380$

Try these: $2 + 4 + 6 + \dots + 28 = \underline{\hspace{2cm}}$ $2 + 4 + 6 + \dots + 18 = \underline{\hspace{2cm}}$

$$2 + 4 + 6 + \dots + 14 = \underline{\hspace{2cm}} \quad 2 + 4 + 6 + \dots + 24 = \underline{\hspace{2cm}}$$

Sum of roots of quadratic equation $ax^2 + bx + c = 0$: Rule $\frac{-b}{a}$

Example: The sum of the roots of $3x^2 - 4x + 7 = 0$ is $\frac{-(-4)}{3} = \frac{4}{3}$

Example: The sum of the roots of $2x^2 + 6x - 3 = 0$ is $\frac{-6}{2} = -3$

Try these: The sum of the roots of $4x^2 - 3x + 1 = 0$ is _____

The sum of the roots of $x^2 + 2x + 1 = 0$ is _____

Product of the roots of quadratic equation $ax^2 + bx + c = 0$: Rule $\frac{c}{a}$

Example: The product of the roots of $3x^2 - 4x + 7 = 0$ is $\frac{7}{3}$

Example: The product of the roots of $2x^2 + 6x - 3 = 0$ is $\frac{-3}{2}$

Try these: The product of the roots of $4x^2 - 3x + 1 = 0$ is _____

The product of the roots of $x^2 + 2x + 1 = 0$ is _____

When to use zeros after the decimal point

In number sense, no extra zeros are allowed after the decimal point except in money problems. In the case of money, the exact dollars and cents need to be included in the answer.

Example: The cost of driving 275 miles at 40 cents per mile is \$110.00 (\$110 would not be acceptable.)

Estimating problems: Every multiple of 10 will have a * in front of the problem. This is an indication that the problem is an estimation problem. The answer must be within 5% of the actual answer and must be given in integer form. Decimals, fractions, π are not allowed in these answers. Repeating decimals are never allowed on any answer.

VI. Helpful resources

www.math-magic.com (Great source of many tricks)

www.texasmath.org/downloads.html (tests are available to download)

www.tmsca.org (membership forms, opportunities to order practice materials.)

<http://www.uiltexas.org/academics/number-sense>

www.mathninja.org This site has video tutorials for beginning number sense and also has workbooks for purchase.

Larry White-State UIL coordinator: e-mail: texasmath@centex.net

What's your 5th Problem (math camp) during the summer for high school students and teachers.

Number Sense, calculator, math and science topics are addressed by some of the best coaches in the state. Contact information is (email):

jack.barton@ttu.edu or (phone) (806)-742-2350.

MATHCOUNTS (grades 6-8 only): www.mathcounts.org

**MATHCOUNTS/SPURS competition (San Antonio) October or
November: Jack Cuchran jcuchran@attcenter.com**

UIL and TMSCA have high school on-line meets-you mail in your scores.

