Math 1110 **Review for the Final Exam: ANSWER KEY** **Fall 2008**

1. Factor completely into primes:

(a) $242 = 2 \cdot 11^2$ **(b)** $3570 = 2 \cdot 3 \cdot 5 \cdot 7 \cdot 17$ **(c)** $19500 = 2^2 \cdot 3 \cdot 5^3 \cdot 13$ **(d)** $1331 = 11^3$

2. What's the largest 3-digit number that has exactly 3 different factors? $961 = 31^2$

3. Using the intersection-of-sets method, find:

(a) $\text{GCD}(9, 15) = 3$ and $\text{LCM}(9, 15) = 45$

(b) $\text{GCD}(12, 32) = 4$ and $\text{LCM}(12, 32) = 96$

4. Using the prime factorization method, find:

(a) $\text{GCD}(30, 1470) = 30$ and $\text{LCM}(30, 1470) = 1470$

(b) $\text{GCD}(54, 3300) = 6$ and $\text{LCM}(54, 3300) = 29700$

5. Vanilla Ice has a nervous tic that makes him say "Yup yup" every 10 minutes and shave his eyebrows every 14 minutes. If he simultaneously says "Yup yup" and shaves his eyebrows at 12 noon, what time will it be when he next does these things simultaneously? 1:10 PM

6. Find two numbers a and b such that $\text{GCD}(a, b) = \text{LCM}(a, b)$. $a = 27, b = 27$

7. What's the largest 4-digit number that has exactly 4 different factors? $8633 = 89 \cdot 97$

8. Express each of the following fractions in simplest form:

(a) $\frac{30}{315} = \frac{2}{21}$ **(b)** $\frac{98}{-63} = \frac{-14}{9}$ **(c)** $\frac{627}{704} = \frac{57}{64}$ **(d)** $\frac{-1230}{-3888} = \frac{205}{648}$

(e) $\frac{126}{96} = \frac{21}{16}$ **(f)** $\frac{35^{10}}{21^{11}} = \frac{5^{10}}{3^{11} \cdot 7}$ **(g)** $\frac{101101}{539} = \frac{1313}{7}$

9. List the following fractions in increasing order: $\frac{-2}{7}, \frac{-6}{20}, \frac{3}{5}, \frac{-4}{15}, \frac{23}{35}, \frac{2}{3}, \frac{13}{21}, \frac{100}{140}$.

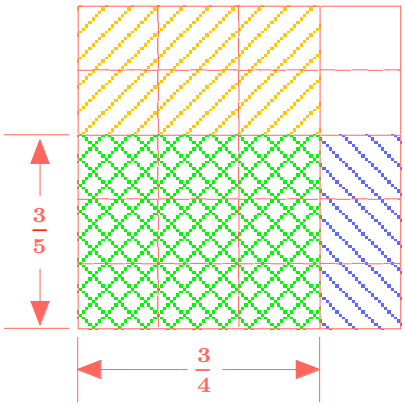
$\frac{-6}{20}, \frac{-2}{7}, \frac{-4}{15}, \frac{3}{5}, \frac{13}{21}, \frac{23}{35}, \frac{2}{3}, \frac{100}{140}$.

10. Find a rational number inbetween:

(a) $\frac{4}{13}$ and $\frac{6}{17}$ $\frac{73}{221}$; **(b)** $\frac{13}{14}$ and $\frac{14}{15}$ $\frac{391}{420}$.

11. Find two rational numbers inbetween $\frac{13}{14}$ and $\frac{14}{15}$ $\frac{586}{630}, \frac{587}{630}$.

12. Draw an area model to show that $\frac{3}{5} \cdot \frac{3}{4} = \frac{9}{20}$.



13. Solve for x in each of the following: **(a)** $\frac{90}{x} = \frac{18}{17}$ $x = 85$ **(b)** $\frac{x}{35} = \frac{^-12}{7}$ $x = {}^-60$

14. Britney Spears got 7 out of 16 answers correct on her driver's license exam, and her lawyer, Jackie Chiles, got 42 out of 99 answers correct on his bar exam. Who did better? Britney did.

15. Express as improper fractions: **(a)** $9\frac{5}{8} = \frac{77}{8}$ **(b)** $^-7\frac{3}{4} = \frac{^-31}{4}$

16. Express as mixed numbers: **(a)** $\frac{395}{18} = 21\frac{17}{18}$ **(b)** $\frac{^-336}{4} = {}^-84$

17. Perform the following additions and subtractions (express all answers as fractions in reduced form):

(a) $\frac{9}{10} + \frac{14}{15} = \frac{11}{6}$ **(b)** $\frac{34}{35} - \frac{13}{14} = \frac{3}{70}$ **(c)** $\frac{^-31}{7} + \frac{^-24}{5} = \frac{^-323}{35}$ **(d)** $\frac{^-24}{17} - \frac{^-4}{7} = \frac{-100}{119}$

18. Perform the following additions and subtractions (express all answers as mixed numbers):

(a) $3\frac{1}{3} - 1\frac{2}{3} = 1\frac{2}{3}$ **(b)** $21\frac{3}{8} + 13\frac{1}{4} = 8\frac{1}{8}$ **(c)** $-3\frac{1}{7} + 4\frac{4}{5} = 1\frac{23}{35}$ **(d)** $15\frac{1}{3} - 7\frac{5}{6} - 2\frac{1}{5} = 5\frac{3}{10}$

19. Approximate each of the following fractions by 0, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, or 1. State whether your estimate is high or low. Explain.

(a) $\frac{11}{43}$ $\frac{1}{4}$; low **(b)** $\frac{3}{4333}$ 0; low **(c)** $\frac{34}{67}$ $\frac{1}{2}$; low **(d)** $\frac{35}{67}$ $\frac{1}{2}$; low

20. By estimating, determine whether the given sum is closer to 0, to $\frac{1}{2}$, or to 1.

(a) $-\frac{1}{2} - \frac{46}{95} + \frac{133}{70} - \frac{4}{7}$ 0 **(b)** $\frac{1}{200} - \frac{1}{95} - \frac{1}{70} + \frac{4}{7}$ $\frac{1}{2}$ **(c)** $\frac{77}{150} - \frac{90}{95} - \frac{9}{71} + \frac{15}{7}$ 1

21. Multiply or divide and express the answer in reduced form:

(a) $\frac{9}{10} \cdot \frac{14}{15} = \frac{21}{25}$ **(b)** $\frac{34}{35} \div \frac{13}{14} = \frac{68}{65}$ **(c)** $\frac{^-31}{7} \cdot \frac{^-24}{5} = \frac{744}{35}$ **(d)** $\frac{^-14}{17} \div \frac{^-4}{7} = \frac{49}{34}$

22. Multiply or divide and express the answer as a mixed number:

(a) $3\frac{1}{3} \div 1\frac{2}{3}$ **(b)** $21\frac{3}{8} \div 13\frac{1}{4}$ **(c)** $^-3\frac{1}{7} \cdot 4\frac{4}{5}$ **(d)** $15\frac{1}{3} \div 7\frac{5}{6} \cdot 2\frac{1}{5}$

23. Each Mariah Carey CD sells $\frac{1}{3}$ as many copies as the previous one. If her 15th CD sells 12 copies, how many copies did her 8th sell? It sold $12 \cdot 3^7 = 78732$ copies

24. Martha bought 1232 shares of Enron stock at $17\frac{1}{4}$ a share and sold them at $224\frac{1}{8}$ a share. What was her profit on these stocks? Her profit was $\$254,870$

25. Pop Tarts are on sale for 3/4 of their original price of \$2.80 per box. What is the sale price per box? The sale price is \$2.10 a box

26. Pop Tarts are on sale for 3/4 of their original price. If the sale price per box is \$1.98, what's the original price? The original price was \$2.64 a box

27. Stade bought the new Fergie CD used for \$10. (Not really.) If used CD's sell for $\frac{2}{3}$ of new price, what is the new price of Fergie's CD? The new price is \$15

28. List the following numbers in increasing order:
(a) 1.333334, 1.33344, 1.34, 1.34443, 1.4, 1.3. 1.3, 1.333334, 1.33344, 1.34, 1.34443, 1.4.
(b) $^-12.123$, $^-12.1229$, $^-12$, $^-12.13$, $^-12.1$, $^-12.2$. $^-12.2$, $^-12.13$, $^-12.123$, $^-12.1229$, $^-12.1$, $^-12$.

29. Determine whether each of the given fractions can be written as a terminating decimal. If it can, write it as one; if it can't, explain why. (You can check your answer on your calculator if you want, but show the work that you would do WITHOUT a calculator.)
(a) $\frac{3}{17}$ not terminating **(b)** $\frac{3}{64}$ 0.046875 **(c)** $\frac{3}{24}$ 0.125 **(d)** $\frac{9}{625}$ 0.0144 **(e)** $\frac{49}{42}$ not terminating

30. Write each of the following numbers in scientific notation.
(a) $320,000,000,000$ 3.2×10^{11} **(b)** $\frac{647}{100000}$ 6.47×10^{-3} **(c)** 0.000000000034345 3.4345×10^{-11} **(d)** 51 5.1×10^{1} **(e)** $320,000,000,001$ $3.20000000001\times10^{11}$

31. Round 7.45454 to the nearest:
(a) ten-thousandth 7.4545 **(b)** thousandth 7.455 **(c)** hundredth 7.45 **(d)** tenth 7.5 **(e)** integer 7

32. Perform by hand each of the following divisions. (Use long division; you can check your results by calculator if you want.)
(a) $7.29\div3$ 2.43 **(b)** $818.18\div1.1$ 743.8 **(c)** $0.3703\div23$ 0.0161 **(d)** $1.500002\div0.7$ 2.14286 **(e)** $0.023\div4.6$ 0.005

33. List the following numbers in increasing order:
(a) 2.63, 2.636, 2.64, 2.635, 2.637, $2.6\overline{3}$, $2.\overline{63}$, $2.63\overline{6}$, $2.6\overline{36}$, $2.\overline{636}$, $2.\overline{63663}$.
2.63, $2.6\overline{3}$, 2.635, 2.636, $2.\overline{63}$, $2.6\overline{36}$, $2.\overline{63663}$, $2.\overline{636}$, $2.63\overline{6}$, 2.637, 2.64. NOTE that $2.\overline{63}$ and $2.6\overline{36}$ are actually the SAME.
(b) $0.\overline{1}$, $0.\overline{11}$, $0.1\overline{1}$, $0.\overline{111}$, $0.1\overline{11}$, $0.11\overline{1}$, $0.\overline{1111}$. They're all the same.

34. Find a decimal number between:
(a) $1.01\overline{6}$ and 1.017 1.0167 **(b)** $1.01\overline{7}$ and 1.018 1.0178 **(c)** $1.01\overline{8}$ and 1.019 1.0189
(d) $1.01\overline{9}$ and 1.020 There aren't any

35. Express each of the following repeating decimals as a fraction:
(a) $23.\overline{4}$ $\frac{211}{9}$ **(b)** $2.\overline{34}$ $\frac{232}{99}$ **(c)** $0.\overline{234}$ $\frac{234}{999}\left(=\frac{26}{111}\right)$ **(d)** $0.23\overline{4}$ $\frac{211}{900}$ **(e)** $0.2\overline{34}$ $\frac{232}{990}\left(=\frac{116}{495}\right)$

36. Express each of the following fractions as a repeating decimal (do the long division by hand; you can check your work with your calculator):
(a) $\frac{4}{7}$ $0.\overline{571428}$ **(b)** $\frac{13}{24}$ $0.541\overline{6}$ **(c)** $\frac{15}{11}$ $1.\overline{36}$ **(d)** $\frac{17}{27}$ $0.\overline{629}$

37. Somebody claims that $14/17 = 0.\overline{8235294117647058823 51}$. How can you prove, without a calculator, that this is false? If you divide a whole number by 17, the length of your repetend is at most $17-1=16$. But the length of the given repetend is 21, which is larger than 16, so the claim must be false.