

1. Factor completely into primes:

(a) 242

(b) 3570

(c) 19500

(d) 1331

2. What's the largest 3-digit number that has exactly 3 different factors?

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

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

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

4. Using the prime factorization method, find:

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

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

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?

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

7. What's the largest 4-digit number that has exactly 4 different factors?

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

(a) $\frac{30}{315}$ (b) $\frac{98}{-63}$ (c) $\frac{627}{704}$ (d) $\frac{-1230}{-3888}$ (e) $\frac{126}{96}$ (f) $\frac{35^{10}}{21^{11}}$ (g) $\frac{101101}{539}$

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

10. Find a rational number inbetween: (a) $\frac{4}{13}$ and $\frac{6}{17}$; (b) $\frac{13}{14}$ and $\frac{14}{15}$.

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

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) $\frac{90}{x} = \frac{18}{17}$ (b) $\frac{x}{35} = \frac{-12}{7}$

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?

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

16. Express as mixed numbers: (a) $\frac{395}{18}$ (b) $\frac{-336}{4}$

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

(a) $\frac{9}{10} + \frac{14}{15}$ (b) $\frac{34}{35} - \frac{13}{14}$ (c) $\frac{-31}{7} + \frac{-24}{5}$ (d) $\frac{-24}{17} - \frac{-4}{7}$

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

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

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) $\frac{11}{43}$ (b) $\frac{3}{4333}$ (c) $\frac{34}{67}$ (d) $\frac{35}{67}$ (e) $\frac{34}{69}$ (f) $\frac{298}{400}$ (g) $\frac{304}{398}$ (h) $\frac{197}{398}$

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

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

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

(a) $\frac{9}{10} \cdot \frac{14}{15}$ (b) $\frac{34}{35} \div \frac{13}{14}$ (c) $\frac{-31}{7} \cdot \frac{-24}{5}$ (d) $\frac{-14}{17} \div \frac{-4}{7}$

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?

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?

25. Pop Tarts are on sale for $\frac{3}{4}$ of their original price of \$2.80 per box. What is the sale price per box?

26. Pop Tarts are on sale for $\frac{3}{4}$ of their original price. If the sale price per box is \$1.98, what's the original price?

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?

28. List the following numbers in increasing order:

(a) 1.333334, 1.33344, 1.34, 1.34443, 1.4, 1.3. (b) -12.123, -12.1229, -12, -12.13, -12.1, -12.2.

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) $\frac{3}{17}$ (b) $\frac{3}{64}$ (c) $\frac{3}{24}$ (d) $\frac{9}{625}$ (e) $\frac{49}{42}$

30. Write each of the following numbers in scientific notation.

(a) 320,000,000,000 (b) $\frac{647}{100000}$ (c) 0.000000000034345 (d) 51 (e) 320,000,000,001

31. Round 7.45454 to the nearest:

(a) ten-thousandth (b) thousandth (c) hundredth (d) tenth (e) integer

32. Perform by hand each of the following divisions. (Use long division; you can check your results by calculator if you want.)

(a) $7.29 \div 3$ (b) $818.18 \div 1.1$ (c) $0.3703 \div 23$ (d) $1.500002 \div 0.7$ (e) $0.023 \div 4.6$

33. List the following numbers in increasing order:

(a) 2.63, 2.636, 2.64, 2.635, 2.637, $2.\overline{63}$, $2.\overline{63}$, $2.63\overline{6}$, $2.63\overline{6}$, $2.63\overline{663}$.

(b) $0.\overline{1}$, $0.\overline{11}$, $0.1\overline{1}$, $0.\overline{111}$, $0.1\overline{11}$, $0.11\overline{1}$, $0.\overline{1111}$.

34. Find a decimal number between:

(a) $1.01\overline{6}$ and 1.017 (b) $1.01\overline{7}$ and 1.018 (c) $1.01\overline{8}$ and 1.019 (d) $1.01\overline{9}$ and 1.020

35. Express each of the following repeating decimals as a fraction:

(a) $23.\overline{4}$ (b) $2.\overline{34}$ (c) $0.\overline{234}$ (d) $0.2\overline{34}$ (e) $0.\overline{234}$

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) $\frac{4}{7}$ (b) $\frac{13}{24}$ (c) $\frac{15}{11}$ (d) $\frac{17}{27}$

37. Somebody claims that $14/17 = 0.\overline{823529411764705882351}$. How can you prove, without a calculator, that this is false?