

1. **Without dividing**, answer each question yes or no, then **justify your answer** by **showing the divisibility test**.

a. Does $7 \mid 24192$? YES

Show test used:

Double the last digit and subtract from other digits.
Repeat as necessary until obviously divisible by 7, or not.

$$2419 - 4 = 2415$$

$$241 - 10 = 231$$

$$23 - 2 = 21$$

21 is divisible by 7.

b. Does $11 \mid 24192$? NO

Show test used:

Find the difference of the sums from alternate digits; see if multiple of 11.

$$(4 + 9) - (2 + 1 + 2) =$$

$$13 - 5 = 8$$

8 is not a multiple of 11

so 24192 is not a multiple of 11

3pts

2. Why do the divisibility tests for 2, 5, and 10 only depend on the number in the ones place?

Because 2, 5, and 10 divide into the place values of the other digits, thus it does not matter what number is in those places. Or

Because 2, 5, and 10 divide into any multiple of the place values $10, 10^2, 10^3$ etc, you only need to test the ones digit for divisibility (since 2, 5, and 10 do not divide into the place value of the ones digit.)

8pts

3. a. Use factor trees to show the prime factors of 84 and 120.

$$\begin{array}{cc} 4 \cdot 21 & 12 \cdot 10 \\ 2 \cdot 2 \cdot 3 \cdot 7 & 2 \cdot 2 \cdot 3 \cdot 2 \cdot 5 \end{array}$$

b. What is the greatest common factor of 84 and 120? 12

c. What is the least common multiple of 84 and 120? $2^3 \cdot 3 \cdot 5 \cdot 7 = 840$
or, using the "Build-up Method" $84 \cdot 10 = 840$
or $7 \cdot 120 = 840$

3pts

4. John plays tennis every other day, and Jennifer plays every third day. Some days they compete with each other. If they both played on Tuesday, on what day will John and Jennifer both play again? (Show all your work and list which problem solving strategy you used.)

They would both play again on Monday.

John plays every other day: Tuesday, Thursday, Saturday, **Monday**, Wednesday, Friday, etc.

Jennifer plays every third day: Tuesday, Friday, **Monday**, Thursday, etc.

Or: LCM: $(2, 3) = 6$ so Tuesday plus 6 days is Monday.

2pts

5. Which fraction is smaller, $\frac{5}{12}$ or $\frac{7}{16}$? _____ (Show what you did to determine this.)

Use the LCD and compare numerators: $\frac{5}{12} < \frac{7}{16}$ since $\frac{20}{48} < \frac{21}{48}$.

Or, use cross multiplication: $(5)(16) < (12)(7)$
 $80 < 84$

Or use decimals: $5/12 = 0.4161616 \dots$
 $7/16 = 0.4375$