Lesson 1-1: Rational Numbers as Decimals

1. Sample answer: Set the repeating decimal equal to a variable. Then, use a power of ten to write an equivalent equation. Subtract equivalent expressions of the variable and the repeating decimal from the equivalent equation to eliminate the repeating portion of the decimal. Lastly, solve for the variable.

2. Sample answer: Multiplying both sides of the equation by the same power of 10 makes an equivalent equation where the repeating decimal now has a whole number portion and a repeating decimal portion. By subtracting equivalent expressions of the variable and the repeating decimal, you are able to eliminate the repeating decimal portion. Then, you can solve for *x* which gives you the rational number in fraction form.

3. Sample answer: You multiply by the power of ten that matches the number of repeating digits. For example, if you are writing $0.1\overline{26}$ as a fraction, multiply by 10^2 because there are 2 repeating digits.

4. $\frac{7}{11}$

5. $\frac{1}{6}$

6. $2\frac{7}{22}$

7. 0.2121…
   21.2121…
   21.2121… - 0.2121…
   21
   $\frac{21}{99}$
   $\frac{21}{99}$ or $\frac{7}{33}$

8. 3.777…
   37.777…
   34
   $\frac{34}{9}$
   $3\frac{7}{9}$

9. $\frac{21}{90}$ or $\frac{7}{30}$

10. a. $\frac{84}{90}$ or $\frac{14}{15}$
    b. 14

11. $\frac{87}{99}$ or $\frac{29}{33}$

12. $\frac{8}{9}$

13. $1\frac{16}{33}$

14. $\frac{6}{9}$ or $\frac{2}{3}$

15. $\frac{214}{99}$; $2\frac{16}{99}$

16. No; sample answer: You can write as many repeating digits as you want; the difference will be zero once you subtract.

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17. Sample answer: You always subtract *x* from an equivalent expression whose constant is a power of ten, and end with a constant for *x* that is 9 or 99 or 999, and so on. Then you divide by that constant to solve for *x*. That is why there is always a 9 in the denominator. If there are 9s and 0s, then an equivalent fraction was written so that the numerator and denominator are integers.

18. A

19. (from top to bottom)
    $0.3\overline{51}$
    $0.35\overline{1}$
    $0.\overline{351}$
    $0.1\overline{7}$
    $0.\overline{17}$