

- Example 6**
- a. $0.4\overline{16} \approx 0.417$ (to the nearest thousandth)
 ≈ 0.42 (to the nearest hundredth)
- b. $0.4\overline{16} \approx 0.416$ (to the nearest thousandth)
 ≈ 0.42 (to the nearest hundredth)
- c. $0.\overline{53} \approx 0.54$ (to the nearest hundredth)
 ≈ 0.5 (to the nearest tenth)
- d. $3.\overline{481} \approx 3.5$ (to the nearest tenth)
 ≈ 3 (to the nearest unit)
- e. $0.\overline{681} \approx 0.7$ (to the nearest tenth)
 ≈ 1 (to the nearest unit)

Oral Exercises

Round each number to the nearest tenth.

1. 5.358 2. -0.729 3. $4.\overline{6}$ 4. $3.48\overline{2}$ 5. $-0.2\overline{7}$

6–10. Round the numbers in Exercises 1–5 to the nearest hundredth.

Tell whether the decimal form terminates or repeats.

11. $\frac{1}{2}$ 12. $-\frac{5}{6}$ 13. $\frac{7}{4}$ 14. $\frac{59}{2000}$ 15. $\frac{18}{7}$ 16. $-\frac{8}{13}$

Written Exercises

Express each rational number as a terminating or repeating decimal.

- A**
1. a. $\frac{2}{3}$ 2. a. $\frac{9}{2}$ 3. a. $-\frac{4}{9}$ 4. a. $-\frac{3}{5}$
b. $\frac{2}{30}$ b. $\frac{9}{200}$ b. $-\frac{4}{9000}$ b. $-\frac{3}{50}$
5. $\frac{11}{8}$ 6. $\frac{11}{12}$ 7. $\frac{15}{11}$ 8. $\frac{4}{7}$
9. $-\frac{7}{18}$ 10. $-\frac{15}{32}$ 11. $3\frac{9}{20}$ 12. $2\frac{5}{11}$
13. $\frac{3}{11}$ 14. $-6\frac{3}{4}$ 15. $-\frac{18}{37}$ 16. $\frac{22}{37}$

Express each rational number as a fraction in simplest form.

17. 0.2 18. 0.66 19. 0.325 20. 3.8
21. $0.\overline{4}$ 22. $1.\overline{15}$ 23. $-0.28\overline{3}$ 24. $2.3\overline{9}$
25. $0.0\overline{7}$ 26. $-1.\overline{36}$ 27. $-2.\overline{3}$ 28. $0.85714\overline{2}$

Find the number halfway between the given numbers.

Sample $\frac{3}{4}$ and 0.756

Solution $\frac{3}{4} = \frac{75}{100} = 0.75$

$$\begin{aligned} 0.75 + \frac{1}{2}(0.756 - 0.75) &= 0.75 + \frac{1}{2}(0.006) \\ &= 0.75 + 0.003 \\ &= 0.753 \quad \text{Answer} \end{aligned}$$

- B** 29. $\frac{1}{4}$ and 0.259 30. $\frac{5}{8}$ and 0.634 31. 0.44 and $0.\bar{4}$
32. 0.77 and $0.\bar{7}$ 33. 0.83 and $\frac{5}{6}$ 34. 0.121 and $\frac{1}{8}$

Express both numbers as fractions. Then find their product.

35. $\frac{3}{5}$ and 0.75 36. 0.875 and $\frac{5}{7}$ 37. $0.\bar{6}$ and $\frac{7}{12}$
38. $\frac{9}{20}$ and $0.\bar{5}$ 39. $0.\overline{407}$ and $0.2\bar{7}$ 40. $0.3\bar{5}$ and $1.3\bar{36}$

- C** 41. a. Express $\frac{1}{9}$, $\frac{5}{9}$, and $\frac{8}{9}$ as repeating decimals.
b. Express $\frac{1}{27}$, $\frac{5}{27}$, and $\frac{8}{27}$ as repeating decimals.
c. What is the relationship between the numbers in (a) and (b)?
42. a. Express $\frac{1}{7}$ and $\frac{6}{7}$ as repeating decimals.
b. What is the relationship between the blocks of digits that repeat in (a)?
c. Express $\frac{3}{7}$, $\frac{4}{7}$, and $\frac{5}{7}$ as decimals.
43. Since $\frac{1}{99} = 0.0\bar{1}$, $\frac{n}{99} = n(0.0\bar{1})$ for $1 \leq n < 100$.
a. Confirm the fact above by expressing $\frac{8}{99}$, $\frac{32}{99}$, and $\frac{87}{99}$ as decimals.
b. Express 1 as $\frac{99}{99}$ to show that $0.\bar{9} = 1$.
c. Use the method of Example 4 to show that $0.\bar{9} = 1$.

Mixed Review Exercises

Find the prime factorization of each number.

1. 200 2. 98 3. 1089 4. 2250 5. 392 6. 576

Solve.

7. $(y + 3)(y - 4) = 0$ 8. $(a + 5)^2 = 9$ 9. $y^2 = -36$
10. $k^3 - 16k = 0$ 11. $|x + 2| = 10$ 12. $k + 4 < 16$