

CONVERTING A REPEATING DECIMAL NUMBER TO A FRACTION

Given: $0.\overline{4}$

First, we will express it as $n = 0.\overline{4}$ (1st equation).

First multiply both side of the equation by the number of digits that repeat, since the decimal repeats in the tenth place we use a value of 10:

$$10 \times n = 10 \times 0.\overline{4}$$

$$10n = 4.\overline{4} \quad (\text{results of our multiplication})$$

$$n = 0.\overline{4} \quad (\text{subtract 1st equation})$$

$$9n = 4.0 \quad (\text{eliminating the repeating decimal})$$

$$n = \frac{4}{9} \quad (\text{after division, the answer!})$$

Given: $1.\overline{63}$

First, we will express it as $n = 1.\overline{63}$ (1st equation).

First multiply both side of the equation by the number of digits that repeat, since the decimal repeats in the hundredths place we use a value of 100:

$$100 \times n = 100 \times 1.\overline{63}$$

$$100n = 163.\overline{63} \quad (\text{results of our multiplication})$$

$$n = 1.\overline{63} \quad (\text{subtract 1st equation})$$

$$99n = 162 \quad (\text{eliminating the repeating decimal})$$

$$n = \frac{162}{99} \text{ or } \frac{54}{33} \text{ or } \frac{18}{11} \quad (\text{after division, the answer!})$$

Given: $12.14\overline{2}$

First, we multiply both sides by 100 to move the repeating decimal to the immediate left of decimal.

$$100 \times n = 100 \times 12.14\overline{2} \quad (\text{moves the repeating decimal to the immediate left of decimal})$$

$$100n = 1214.\overline{2} \quad (1^{\text{st}} \text{ equation})$$

Second, we multiply both side of the equation by the number of digits that repeat, since the decimal repeats in the tenths place we use a value of 10:

$$10 \times 100n = 10 \times 1214.\overline{2}$$

$$1000n = 12142.\overline{2} \quad (\text{results of our multiplication})$$

$$100n = 1214.\overline{2} \quad (\text{subtract 1st equation})$$

$$900n = 10,928 \quad (\text{eliminating the repeating decimal})$$

$$n = \frac{10,928}{900} = \frac{2732}{900} \quad (\text{after division, the answer!})$$