Closed Operations

Part I - Identify the numbers below as RATIONAL or IRRATIONAL

Number	Rational or Irrational?	Reason for your conclusion.
5	Rational	Can be written as a fraction or decimal terminates
$\sqrt{5}$	Irrational	Decimal doesn't terminate or repeat.
$\frac{1}{8}$	Rational	It is a fraction or decimal terminates
$\frac{1}{3}$	Rational	It is a fraction or decimal repeats
2.312	Rational	Can be written as a fraction or decimal terminates
$\sqrt{49}$	Rational	Can be written as a fraction or decimal terminates
$2^{2/3}$	Irrational	Decimal doesn't terminate or repeat.
$8^{2/3}$	Rational	Can be written as a fraction or decimal terminates
$\sqrt[3]{27}$	Rational	Can be written as a fraction or decimal terminates
π	Irrational	Decimal doesn't terminate or repeat.

Part II - The number 10 is a rational number. **Add** each of the values above to 10 and classify the result

Number	Rational or Irrational?	Reason for your conclusion.
$10 + 5$	Rational	Can be written as a fraction or decimal terminates
$10 + \sqrt{5}$	Irrational	Decimal doesn't terminate or repeat.
$10 + \frac{1}{8}$	Rational	It is a fraction or decimal terminates
$10 + \frac{1}{3}$	Rational	It is a fraction or decimal repeats
$10 + 2.312$	Rational	Can be written as a fraction or decimal terminates
$10 + \sqrt{49}$	Rational	Can be written as a fraction or decimal terminates
$10 + 2^{2/3}$	Irrational	Decimal doesn't terminate or repeat.
$10 + 8^{2/3}$	Rational	Can be written as a fraction or decimal terminates
$10 + \sqrt[3]{27}$	Rational	Can be written as a fraction or decimal terminate
$10 + \pi$	Irrational	Decimal doesn't terminate or repeat.

Part III - The number 10 is a rational number. Multiply each of the values above to 10 and classify the result

Number	Rational or Irrational?	Reason for your conclusion.
$10 \cdot 5$	Rational	Can be written as a fraction or decimal terminates
$10 \cdot \sqrt{5}$	Irrational	Decimal doesn't terminate or repeat.
$10 \cdot \frac{1}{8}$	Rational	It is a fraction or decimal terminates
$10 \cdot \frac{1}{3}$	Rational	It is a fraction or decimal repeats
$10 \cdot 2.312$	Rational	Can be written as a fraction or decimal terminates
$10 \cdot \sqrt{49}$	Rational	Can be written as a fraction or decimal terminates
$10 \cdot 2^{\frac{2}{3}}$	Irrational	Decimal doesn't terminate or repeat.
$10 \cdot 8^{\frac{2}{3}}$	Rational	Can be written as a fraction or decimal terminates
$10 \cdot \sqrt[3]{27}$	Rational	Can be written as a fraction or decimal terminate
$10 \cdot \pi$	Irrational	Decimal doesn't terminate or repeat.

Complete the statements below based on your finding from Part I, II and III.

The **sum** of two **rational** numbers is a(n) __rational__ number.

The **sum** of a **rational** number and an **irrational** number is a(n) __irrational__ number.

The **product** of two **rational** numbers is a(n) __rational__ number.

The **product** of a **rational** number and an **irrational** number is a(n) __irrational__ number.