

Number Sets

Name: Key

Date: _____

1. Given: $\sqrt{81}$, $\sqrt{164}$, $\sqrt{196}$

Identify the expression that is a rational number and explain why it is rational.

$\sqrt{196}$ is rational B/C it can be written as the ratio of 2 integers where the denominator is not 0.

2. Given:

$L = \sqrt{2}$

$M = 3\sqrt{3}$

$N = \sqrt{16}$

$P = \sqrt{9}$

Which expression results in a rational number?

~~A.~~ $L + M$

$\sqrt{2} + 3\sqrt{3}$

$I + I$

~~B.~~ $M + N$

$3\sqrt{3} + \sqrt{16}$

$I + R$

C. $N + P$

$\sqrt{16} + \sqrt{9}$

$R + R$

D. $P + L$



3. Which statement is not always true?

A. The product of two irrational numbers is irrational.

B. The product of two rational numbers is rational.

C. The sum of two rational numbers is rational.

D. The sum of a rational number and an irrational number is irrational.

$I \cdot I = R$
 ex $\sqrt{3} \cdot \sqrt{3} = \sqrt{9} = 3$

Sometimes



4. Ms. Fox asked her class "Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?" Patrick answered that the sum would be irrational.

$4.2 + \sqrt{2} = 5.614213562...$ ← messy here

State whether Patrick is correct or incorrect. Justify your reasoning.

Patrick is correct that the sum is irrational B/C

① B/C the sum of a rational # and an irrational # is always irrational.

or ② B/C the sum is a non-terminating and non-repeating decimal

or ③ B/C it can't be written as the ratio of 2 integers when the denominator is not 0.

5. Which statement is not always true?

Sometimes
(Be careful)

A. The sum of two rational numbers is rational.

B. The product of two irrational numbers is rational.

ex $\sqrt{3} \cdot \sqrt{2} = \sqrt{6}$ Irrat

C. The sum of a rational number and an irrational number is irrational.

D. The product of a nonzero rational number and an irrational number is irrational.

6. Determine if the product of $3\sqrt{2}$ and $8\sqrt{18}$ is rational or irrational. Explain your answer.

$3\sqrt{2} \cdot 8\sqrt{18} = 144$

The product of $3\sqrt{2}$ and $8\sqrt{18}$ is rational
B/c 144 can be written as the ratio of 2 integers
where the Denominator is not 0

7. Is the sum of $3\sqrt{2}$ and $4\sqrt{2}$ rational or irrational? Explain your answer.

$3\sqrt{2} + 4\sqrt{2} = 9.899494937\dots$ must have

The sum of $3\sqrt{2}$ and $4\sqrt{2}$ is irrational b/c
it is a non-terminating and non-repeating decimal
and it can't be written as the ratio of 2 integers where the denominator
is not 0.

8. For which value of P and W is $P + W$ a rational number?

A. $P = \frac{1}{\sqrt{3}}$ and $W = \frac{1}{\sqrt{6}}$

C. $P = \frac{1}{\sqrt{6}}$ and $W = \frac{1}{\sqrt{10}}$

B. $P = \frac{1}{\sqrt{4}}$ and $W = \frac{1}{\sqrt{9}}$

D. $P = \frac{1}{\sqrt{25}}$ and $W = \frac{1}{\sqrt{2}}$

$R + R = R$
 $\frac{1}{\sqrt{4}} + \frac{1}{\sqrt{9}}$
 $\frac{1}{2} + \frac{1}{3}$
 $\frac{5}{6} = R$