

Classifying Rational and Irrational Numbers

1. For each of the numbers below, decide whether it is rational or irrational. Explain your answers.

| Number | Reasoning |
|------------------------------|-----------|
| 0.21 | |
| $\frac{3}{12}$ | |
| $\sqrt{12}-2$ | |
| $\frac{\sqrt{12}}{4}$ | |
| 4.125... | |
| $(\sqrt{12}-4)(4+\sqrt{12})$ | |
| 12.52 (rounded to 2 d.p.) | |

2. Some students were classifying numbers as rational and irrational. Decide whether you agree or disagree with each statement. Correct any errors. Explain your answers clearly.

| Student | Statement | Agree or disagree? |
|---------|---|--------------------|
| Otis | $\frac{\sqrt{3}}{8}$ is a rational number because it can be written as a fraction. | |
| Lulu | $\frac{\sqrt{3}}{8}$ is rational because $\sqrt{3}$ is irrational. | |
| Leon | 0.286 is rational because you can write it as the fraction $\frac{286}{1000}$. | |
| Joan | 0.286 is an irrational number because that decimal will carry on forever. | |
| Ray | 0.286 (rounded to three decimal places) might be rational or irrational. | |
| Aria | 0.286... is rational - the little dots show the digits carry on in the same pattern forever. | |

Classifying Rational and Irrational Numbers

1. For each of the numbers below, decide whether it is rational or irrational.

Explain your answers.

| Number | Reasoning |
|----------------------------------|---|
| 0.21 | Rational terminating decimal |
| $\frac{3}{12}$ | Rational can be written as a terminating decimal 0.25 |
| $\sqrt{12} - 2$ | Irrational when written as a decimal it doesn't repeat or terminate |
| $\frac{\sqrt{12}}{4}$ | Irrational when written as a decimal it doesn't repeat or terminate |
| 4.125... | Can't tell... There's no way of knowing how the decimal continues.. |
| $(\sqrt{12} - 4)(4 + \sqrt{12})$ | Rational The expression equals -4 |
| 12.52 (rounded to 2 d.p.) | Can't tell... 12.52 has been rounded it could have been an irrational or rational before it was rounded |

2. Some students were classifying numbers as rational and irrational.

Decide whether you agree or disagree with each statement.

Correct any errors. Explain your answers clearly.

| Student | Statement | Agree or disagree? |
|-----------------|---|---|
| Otis | $\frac{\sqrt{3}}{8}$ is a rational number because it can be written as a fraction. | Disagree It is irrational because when written as a decimal it doesn't repeat or terminate |
| Lulu | $\frac{\sqrt{5}}{8}$ is irrational because $\sqrt{5}$ is irrational. | |
| Leon | 0.286 is rational because you can write it as the fraction $\frac{286}{1000}$. | Disagree It is rational because it is a repeating decimal |
| Joan | 0.286 is an irrational number because that decimal will carry on forever. | Disagree It is rational because it is a repeating decimal |
| Ray | 0.286 (rounded to three decimal places) might be rational or irrational. | Agree Cannot tell whether it is rational or irrational |
| Arita | 0.286... is rational - the little dots show the digits carry on in the same pattern forever. | Disagree Not necessarily There's no way to tell what the dots mean |