

4. The above formula can be used to find the magnitude of an earthquake if we know the intensity. It can also be used to find the intensity of an earthquake if we know the magnitude. In 1989, the Loma Prieta Earthquake hit the Bay Area during Game 3 of the World Series between the A's and the Giants. 63 people were killed and 3,700 were injured.



The Loma Prieta Earthquake had a Richter Magnitude of 6.9. What was the intensity of this earthquake?

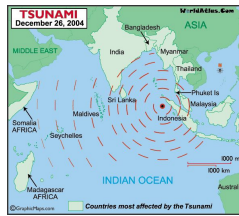
5. In 2011, an earthquake struck off the coast of Japan killing 16,000 people, injuring 6,000 and causing the a tsunami that led to the Fukushima Daiichi nuclear disaster.



This earthquake had a Richter Magnitude of 9.0. What was the intensity of this earthquake?

6. How many times stronger was the 9.0 earthquake than the magnitude 6.9 earthquake? To get this, divide the **intensity** of the stronger earthquake by the **intensity** of the weaker one.

7. In 2004, an earthquake struck in the Indian Ocean causing a tsunami that killed 280,000 people.



This earthquake had a Richter Magnitude of 9.2. How many times stronger was this earthquake than the magnitude 9.0 earthquake?

Properties of Logarithms Calculator Exploration

1. Use your calculator to evaluate each of the following.

$$(a) \log(2) + \log(3) = \qquad \qquad \qquad \log(2 \cdot 3) = \qquad \qquad \qquad .$$

$$(b) \log_5(4) + \log_5(6) = \qquad \qquad \qquad \log_5(4 \cdot 6) = \qquad \qquad \qquad .$$

$$(c) \log_3(7) + \log_3(2) = \qquad \qquad \qquad \log_3(7 \cdot 2) = \qquad \qquad \qquad .$$

2. What did you notice about each of your answers? Write a rule in the box below.

Product Property of Logarithms

For any positive numbers b , x and y ,

$$\log_b(x) + \log_b(y) =$$

3. Use your calculator to evaluate each of the following.

$$(a) \log(2) - \log(3) = \qquad \qquad \qquad \log\left(\frac{2}{3}\right) = \qquad \qquad \qquad .$$

$$(b) \log_5(4) - \log_5(6) = \qquad \qquad \qquad \log_5\left(\frac{4}{6}\right) = \qquad \qquad \qquad .$$

$$(c) \log_3(7) - \log_3(2) = \qquad \qquad \qquad \log_3\left(\frac{7}{2}\right) = \qquad \qquad \qquad .$$

4. What did you notice about each of your answers? Write a rule in the box below.

Quotient Property of Logarithms

For any positive numbers b , x and y ,

$$\log_b(x) - \log_b(y) =$$