Year 10 · Number: Powers, Roots, Ratios & Rates

Name: _____ Date: _____

Kia ora! This sheet mixes exponent rules, roots, scientific notation, percentages, ratios and rates. Show your working and keep exact answers exact where you can, no calculator needed for most questions.

Warm-up

1. Use an exponent rule to simplify and then evaluate $2^3 \times 2^4$.

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

3. Write 0.75 as a fraction in simplest form and as a percentage.

4. Evaluate $(-2)^3$.

Practice

5. From this list, write down which numbers are irrational: $\sqrt{16}$, $\sqrt{10}$, π, $\sqrt[3]{27}$, 0.6.

6. Evaluate 3^{-2} and 5^0.

7. Write 45 600 in scientific notation to 3 significant figures.

8. Simplify $\sqrt{2} \times \sqrt{8}$, then simplify $\sqrt{50} - \sqrt{32}$.

9. At Pak'nSave in Avondale, a block of cheese went up from $12.00 to $15.00. What is the percentage increase?

10. Aria drives from Avondale to Hamilton, a distance of 120 km, in 1½ hours. What is her average speed in km/h? If 30% of the trip is on the motorway, how many kilometres is that?

11. A jacket is on sale for $68 after a 15% discount. What was the original price?

Challenge

12. Evaluate exactly, showing order of operations: $\sqrt{(3^2 + 4^2)} + (-2)^3 \times 2$.

13. Light travels at about 3.0×10^8 metres per second. The Sun is about 1.5×10^{11} metres from Earth. How long (in seconds) does sunlight take to reach Earth? Give your answer to 2 significant figures.