

Topic: Fractions

Topic/Skill	Definition/Tips	Example	
1. Add and subtract	<ul style="list-style-type: none"> Write equivalent fractions with a common denominator. Add or subtract the numerators For mixed numbers, you can add the integers and fractions separately, or convert to top heavy (improper) fractions. If subtracting, convert to improper fractions first. 	$\frac{2}{5} + \frac{5}{12}$ $= \frac{24}{60} + \frac{25}{60}$ $= \frac{24+25}{60}$ $= \frac{49}{60}$	$5\frac{3}{4} - 2\frac{5}{8}$ $= \frac{23}{4} - \frac{21}{8}$ $= \frac{46}{8} - \frac{21}{8}$ $= \frac{25}{8}$
2. Multiply	<p>Multiply fractions by multiplying numerators together and denominators together. Simplify, if possible, by cancelling common factors.</p> <p>Mixed fractions MUST be converted to improper fractions first.</p> <p>Method 2 shows cancelling common factors from the numerator and denominator of any fractions, before multiplying.</p>	<p><u>Method 1</u></p> $\frac{2}{5} \times \frac{3}{8}$ $= \frac{2 \times 3}{5 \times 8}$ $= \frac{6}{40}$ $= \frac{3}{20}$	<p><u>Method 2</u></p> $3\frac{1}{8} \times 5\frac{3}{5}$ $= \frac{25}{8} \times \frac{28}{5}$ $= \frac{5}{8} \times \frac{28}{1}$ $= \frac{5}{2} \times \frac{7}{1}$ $= \frac{35}{2}$ $= 17\frac{1}{2}$
3. Divide	<p>To divide by any fraction, we can change the calculation to a multiplication by flipping the 2nd fraction. (KFC - keep, flip, change)</p> <p>To understand why, think about working out $\frac{1}{4}$ of 5 - we can do $5 \div 4$.</p> <p>This means that $5 \times \frac{1}{4} = 5 \div \frac{4}{1}$</p> <p>In other words, dividing by a number is the same as multiplying by its reciprocal.</p>	<p><i>Keep (the first fraction)</i></p> $\frac{4}{9} \div \frac{2}{15}$ $= \frac{4}{9} \times \frac{15}{2}$ $= \frac{2}{3} \times \frac{5}{1}$ $= \frac{10}{3}$	<p><i>Flip (the 2nd fraction)</i></p> <p><i>Change (to x)</i></p>
4. Reciprocals	<p>The reciprocal of any number is 1 divided by that number.</p> <ul style="list-style-type: none"> The reciprocal of n is $\frac{1}{n}$ The reciprocal of $\frac{a}{b}$ is $\frac{b}{a}$ On a calculator this is often shown as x^{-1} 	<p><u>Number</u></p>	<p><u>Reciprocal</u></p>

5. Recurring decimals	You will know the equivalent fractions for some recurring decimals (eg $0.\dot{3} = \frac{1}{3}$)	First, you need to understand the dot notation for recurring decimals. Examples: One dot $0.\dot{5} = 0.55555\dots$ $0.2\dot{3} = 0.233333\dots$ Two dots $0.\dot{1}\dot{4} = 0.141414\dots$ $0.25\dot{3} = 0.253253253\dots$
6. Converting recurring decimals to fractions	There is a formal algebraic method to convert any recurring decimal to a fraction. <ul style="list-style-type: none"> • First write the decimal in 'full' and let a letter equal this number • Then multiply by 10, 100, 1000 etc so that there is a whole number, and the decimal part is just the recurring digits • Once you have two equations with identical decimal 'tails', subtract one from the other (remember to do this with both sides of the equations) • You should now have an integer on one side and can simply divide by the coefficient of x. You may be able to simplify the fraction 	Convert $0.\dot{5}$ into a fraction. Solution: Let $x = 0.55555\dots$ $10x = 5.55555\dots$ $10x - x = 5.55555\dots - 0.55555\dots$ $9x = 5$ $x = \frac{5}{9}$ <i>don't need to show this line</i>
	Convert $0.2\dot{3}$ into a fraction. Solution: Let $x = 0.23333\dots$ $10x = 2.33333\dots$ $100x = 23.33333\dots$ $100x - 10x = 23.33333\dots - 2.33333\dots$ $90x = 21$ $x = \frac{21}{90}$ $x = \frac{7}{30}$	Convert $0.\dot{1}\dot{4}$ into a fraction. Solution: Let $x = 0.141414\dots$ $100x = 14.141414\dots$ $100x - x = 14.141414\dots - 0.141414\dots$ $99x = 14$ $x = \frac{14}{99}$