

Number and Algebra Proof Revision

(a)	(b)	(c)	(d)
<p>Show that $8\frac{1}{2} - 3\frac{2}{3} = 4\frac{5}{6}$</p> $\frac{17}{2} - \frac{11}{3} = \frac{51}{6} - \frac{22}{6}$ $= \frac{29}{6} = 4\frac{5}{6}$	<p>Show that $\sqrt{80}$ can be written in the form $k\sqrt{5}$ where k is an integer to be found</p> $\sqrt{80} = \sqrt{16} \times \sqrt{5} = 4\sqrt{5}$ $k = 4$	<p>Show that $0.\dot{7}\dot{5} = \frac{25}{33}$</p> $x = 0.\dot{7}\dot{5}$ $100x = 75.\dot{7}\dot{5}$ $99x = 75$ $x = \frac{75}{99} = \frac{25}{33}$	<p>Show that $3\frac{5}{8} \div 1\frac{5}{6} = 1\frac{43}{44}$</p> $\frac{29}{8} \div \frac{11}{6} = \frac{29}{8} \times \frac{6}{11} = \frac{174}{88}$ $= \frac{87}{44} = 1\frac{43}{44}$
(e)	(f)	(g)	(h)
<p>Show that $0.3\dot{1} = \frac{14}{45}$</p> $x = 0.3\dot{1}$ $10x = 3.\dot{1}$ $100x = 31.\dot{1}$ $90x = 28$ $x = \frac{28}{90} = \frac{14}{45}$	<p>Show that $0.4\dot{2}\dot{7} = \frac{47}{110}$</p> $x = 0.4\dot{2}\dot{7}$ $10x = 4.\dot{2}\dot{7}$ $1000x = 427.\dot{2}\dot{7}$ $990x = 423$ $x = \frac{423}{990} = \frac{47}{110}$	<p>Show that $(7 - 5\sqrt{3})^2 = a + b\sqrt{3}$ where a and b are integers to be found</p> $(7 - 5\sqrt{3})(7 - 5\sqrt{3})$ $= 49 - 35\sqrt{3} - 35\sqrt{3} + 25\sqrt{9}$ $= 124 - 70\sqrt{3}$ $a = 124, b = -70$	<p>Show that the product of an even number and an odd number is always even.</p> <p>Let odd number = $2n + 1$ Let even number = $2m$ $2m(2n + 1) = 4mn + 2m$ $= 2(2mn + m)$ which is a multiple of 2 and hence even</p>
(i)	(j)	(k)	
<p>Show that the sum of three consecutive odd numbers is always a multiple of 3</p> <p>Let consecutive odd numbers be $2n + 1, 2n + 3$ and $2n + 5$</p> $2n + 1 + 2n + 3 + 2n + 5 = 6n + 9$ $= 3(2n + 3)$ <p>which is a multiple of 3</p>	<p>Show that $\frac{3\sqrt{12}}{2-\sqrt{3}}$ can be written in the form $c + d\sqrt{3}$, where c and d are integers to be found.</p> $\frac{3\sqrt{12}}{2-\sqrt{3}} \times \frac{2+\sqrt{3}}{2+\sqrt{3}} = \frac{6\sqrt{12} + 3\sqrt{36}}{4-3}$ $= \frac{6 \times 2\sqrt{3} + 3 \times 6}{1} = 12\sqrt{3} + 18$ $c = 18, d = 12$	<p>Show that $(3n + 4)(n - 3) + n(n - 3)$ is a multiple of 4 for all integer values of n</p> $(3n + 4)(n - 3) + n(n - 3)$ $3n^2 + 4n - 9n - 12 + n^2 - 3n$ $= 4n^2 - 8n - 12$ $= 4(n^2 - 2n - 3)$ <p>which is a multiple of 4</p>	