Making the Connection

If you know this…,	…what do you multiply it by to find this…?
$\sqrt{\frac{5}{4}}$	$\sqrt{5}$
$\sqrt{0.99}$	$\sqrt{11}$
$\sqrt{1.08}$	$\sqrt{3}$
$\sqrt{1.75}$	$\sqrt{7}$
$\sqrt{\frac{24}{25}}$	$\sqrt{6}$
$\sqrt{1.16}$	$\sqrt{29}$
$\sqrt[3]{1.024}$	$\sqrt[3]{2}$

What value of x can you use here…	…to find an approximation for this…?
$\sqrt{9-6x}$	$\sqrt{8.7}$
$\sqrt{1+\frac{x}{25}}$	$\sqrt{26}$
$\sqrt{1+\frac{x}{25}}$	$\sqrt{28}$
$\sqrt[3]{8+3x}$	$\sqrt[3]{9}$
$(1-3x)^{1.5}$	$(97)^{1.5}$
$\sqrt{1+3x}$	$\sqrt{7}$
$\sqrt{4-x}$	$\sqrt{35}$

(a) Find the binomial expansion of $(1+x)^{\frac{1}{3}}$ up to the term in x^2. *(2 marks)*

(b) (i) Show that $(8+3x)^{\frac{1}{3}} \approx 2+\frac{1}{4}x-\frac{1}{32}x^2$ for small values of x. *(3 marks)*

(ii) Hence show that $\sqrt[3]{9} \approx \frac{599}{288}$. *(2 marks)*

Making the Connection - Answers

If you know this…,	…what do you multiply it by to find this…?
$\sqrt{\frac{5}{4}}$	$\sqrt{5} = 2\sqrt{\frac{5}{4}}$
$\sqrt{0.99}$	$\sqrt{11} = \frac{10}{3}\sqrt{0.99}$
$\sqrt{1.08}$	$\sqrt{3} = \frac{5}{3}\sqrt{1.08}$
$\sqrt{1.75}$	$\sqrt{7} = 3\sqrt{1.75}$
$\sqrt{\frac{24}{25}}$	$\sqrt{6} = \frac{5}{2}\sqrt{\frac{24}{25}}$
$\sqrt{1.16}$	$\sqrt{29} = 5\sqrt{1.16}$
$\sqrt[3]{1.024}$	$\sqrt[3]{2} = \frac{5}{4}\sqrt[3]{1.024}$

What value of x can you use here…	…to find an approximation for this…?
$\sqrt{9-6x}$	$\sqrt{8.7}$, $x = 0.05$
$\sqrt{1+\frac{x}{25}}$	$\sqrt{26}$, $x = 1$
$\sqrt{1+\frac{x}{25}}$	$\sqrt{28}$, $x = 3$
$\sqrt[3]{8+3x}$	$\sqrt[3]{9}$, $x = \frac{1}{3}$
$(1-3x)^{1.5}$	$(97)^{1.5}$, $x = 0.01$
$\sqrt{1+3x}$	$\sqrt{7}$, $x = 0.25$
$\sqrt{4-x}$	$\sqrt{35}$, $x = \frac{1}{9}$