Answer Key 3
1.4: 10, 12, 18, 24, 25, 31, 47, 54, 65, 81, 86
1.5: 11, 20, 30, 41, 45, 51, 58, 70, 73, 76, 90, 93, 109, 127, 139
1.4

10) Since the denominator is 3t+6, Domain = $\{t \mid t \in \mathbb{R}, t \neq -2\}$	12) Since the denominator is $\sqrt{x-1}$ $\{x \mid x \in \mathbb{R}, x > 1\}$
18) $$\frac{x^2 - x - 2}{x^2 - 1} = \frac{(x-2)(x+1)}{(x-1)(x+1)} = \frac{x-2}{x-1}$$	24) $$\frac{1-x^2}{x^3-1} = \frac{(1-x)(1+x)}{(x-1)(x^2+x+1)} = \frac{-(x+1)}{x^2+x+1}$$
25) $$\frac{4x}{x^2-4} \cdot \frac{x+2}{16x} = \frac{x+2}{(x+2)(x-2)4} = \frac{1}{4(x-2)}$$	31) $$\frac{x^2+7x+12}{x^2+3x+2} \cdot \frac{x^2+5x+6}{x^2+6x+9} =$$ $$\frac{(x+3)(x+4)}{(x+1)(x+2)} \cdot \frac{(x+2)(x+3)}{(x+3)(x+3)} = \frac{x+4}{x+1}$$
47) $$u + 1 + \frac{u}{u+1} = \frac{(u+1)^2 + u}{u+1} = \frac{u^2 + 3u + 1}{u+1}$$	54) $$\frac{x}{x^2+x-2} - \frac{2}{x^2-5x+4} =$$ $$\frac{x}{(x+2)(x-1)} - \frac{2}{(x-4)(x-1)} =$$ $$\frac{1}{x-1}\left[\frac{x}{x+2} - \frac{2}{x-4}\right] = \frac{1}{x-1}\left[\frac{x^2-4x-2x-4}{(x+1)(x-4)}\right] =$$ $$\frac{1}{x-1}\left[\frac{x^2-6x-4}{(x+2)(x-4)}\right]$$
65) $$\frac{x - \dfrac{x}{y}}{y - \dfrac{y}{x}} = \frac{\dfrac{xy-x}{y}}{\dfrac{xy-y}{x}} = \frac{\dfrac{x(y-1)}{y}}{\dfrac{y(x-1)}{x}} =$$ $$\frac{x(y-1)}{y} \cdot \frac{x}{y(x-1)} = \frac{x^2(y-1)}{y^2(x-1)}$$	81) $$\frac{2(1+x)^{1/2} - x(1+x)^{-1/2}}{x+1} \cdot \frac{(1+x)^{1/2}}{(1+x)^{1/2}} =$$ $$\frac{2(1+x)-x}{(x+1)^{3/2}} = \frac{x+2}{(x+1)^{3/2}}$$
86) $$\frac{3}{2-\sqrt{5}} \cdot \frac{2+\sqrt{5}}{2+\sqrt{5}} = \frac{6+3\sqrt{5}}{4-5} = -6 - 3\sqrt{5}$$	

1.5: 11, 20, 30, 41, 45, 51, 58, 70, 73, 76, 90, 93, 109, 127, 139

11)	20)
a) $\dfrac{1}{2}-\dfrac{1}{2-4}=\dfrac{1}{2}-\dfrac{-1}{2}=1$ Yes! b) $\dfrac{1}{4}-\dfrac{1}{4-4}=\dfrac{1}{4}-\dfrac{1}{0}$ Undefined so No!	$\left(\dfrac{2}{5}x-1\right)10=\left(\dfrac{3}{10}x+3\right)10$ $4x-10=3x+30$ $x=40$
30) $\left(\sqrt{3}x+\sqrt{12}\right)\cdot\sqrt{3}=\left(\dfrac{x+5}{\sqrt{3}}\right)\cdot\sqrt{3}$ $3x+\sqrt{36}=x+5$ $2x=-1$ $x=-\dfrac{1}{2}$	41) $a^2+b^2=c^2$ $b=\pm\sqrt{c^2-a^2}$
45) $x^2+x-12=0$ $(x-3)(x+4)=0$ $x=\{3,-4\}$	51) $3x^2+5x=2$ $3x^2+5x-2=0$ $(3x-1)(x+2)=0$ $x=\left\{\dfrac{1}{3},-2\right\}$
58) $x^2-4x+2=0$ $x^2-4x+4+2=4$ $(x-2)^2=2$ $x-2=\pm\sqrt{2}$ $x=2\pm\sqrt{2}$	70) $3x^2+7x+4=0$ $(3x+4)(x+1)=0$ $x=\left\{-\dfrac{4}{3},-1\right\}$
73) $9x^2+12x+4=0$ $(3x+2)^2=4$ $x=\left\{-\dfrac{2}{3}\right\}$	76) $x^2-4x+1=0$ $x^2-4x+4+1=4$ $(x-2)^2=3$ $x-2=\pm\sqrt{3}$ $x=2\pm\sqrt{3}$

90)	93)
$\left(\dfrac{x+5}{x-2}\right)(x^2-4)=\left(\dfrac{5}{x+2}+\dfrac{28}{x^2-4}\right)(x^2-4)$	$5=\sqrt{4x-3}$
$(x+5)(x+2)=5(x-2)+28$	$25=4x-3$
$x^2+7x+10=5x-10+28$	$4x=28$
$x^2+2x-8=0$	$x=7$
$(x+4)(x-2)=$	
$x=\{-4,2\}$	Note it is important to check that
But note: 2 is not in the domain of either the original right or left expressions, so the only solution is -4	$5=\sqrt{4\cdot 7-3}=\sqrt{25}=5$

109)	127)
$4(x+1)^{1/2}-5(x+1)^{3/2}+(x+1)^{5/2}=0$	$h=-16t^2+h_0$
$(x+1)^{1/2}\left[4-5(x+1)+(x+1)^2\right]=0$	$0=-16t^2+288$
$(x+1)^{1/2}\left[4-5x-5+x^2+2x+1\right]=0$	$t^2=\dfrac{288}{16}=18$
$(x+1)^{1/2}\left[x^2-3x\right]=0$	$t=\pm\sqrt{18}=\pm 3\sqrt{2}\approx\pm 4.24$
$x(x+1)^{1/2}(x-3)=0$	Note I approximate because this is a measurement.
$x=\{0,-1,3\}$	
	Also note the negative answer has no meaning so 4.24 seconds is the answer

139)	
The divide by x-1 step is illegitimate since x-1=0	