Algebraic expressions 1E

1 a $\sqrt{28} = \sqrt{4} \times \sqrt{7}$
$= 2\sqrt{7}$

b $\sqrt{72} = \sqrt{8} \times \sqrt{9}$
$= \sqrt{2} \times \sqrt{4} \times \sqrt{9}$
$= \sqrt{2} \times 2 \times 3$
$= 6\sqrt{2}$

c $\sqrt{50} = \sqrt{25} \times \sqrt{2}$
$= 5\sqrt{2}$

d $\sqrt{32} = \sqrt{16} \times \sqrt{2}$
$= 4\sqrt{2}$

e $\sqrt{90} = \sqrt{9} \times \sqrt{10}$
$= 3\sqrt{10}$

f $\frac{\sqrt{12}}{2} = \frac{\sqrt{4} \times \sqrt{3}}{2}$
$= \frac{2 \times \sqrt{3}}{2}$
$= \sqrt{3}$

g $\frac{\sqrt{27}}{3} = \frac{\sqrt{9} \times \sqrt{3}}{3}$
$= \frac{3 \times \sqrt{3}}{3}$
$= \sqrt{3}$

h $\sqrt{20} + \sqrt{80} = \sqrt{4}\sqrt{5} + \sqrt{16}\sqrt{5}$
$= 2\sqrt{5} + 4\sqrt{5}$
$= 6\sqrt{5}$

i $\sqrt{200} + \sqrt{18} - \sqrt{72}$
$= \sqrt{100}\sqrt{2} + \sqrt{9}\sqrt{2} - \sqrt{9}\sqrt{4}\sqrt{2}$
$= 10\sqrt{2} + 3\sqrt{2} - 6\sqrt{2}$
$= \sqrt{2}(10 + 3 - 6)$
$= 7\sqrt{2}$

j $\sqrt{175} + \sqrt{63} + 2\sqrt{28}$
$= \sqrt{25} \times \sqrt{7} + \sqrt{9} \times \sqrt{7} + 2 \times \sqrt{4} \times \sqrt{7}$
$= 5\sqrt{7} + 3\sqrt{7} + 4\sqrt{7}$
$= \sqrt{7}(5 + 3 + 4)$
$= 12\sqrt{7}$

k $\sqrt{28} - 2\sqrt{63} + \sqrt{7} = \sqrt{4}\sqrt{7} - 2\sqrt{9}\sqrt{7} + \sqrt{7}$
$= 2\sqrt{7} - 6\sqrt{7} + \sqrt{7}$
$= -3\sqrt{7}$

l $\sqrt{80} - 2\sqrt{20} + 3\sqrt{45}$
$= \sqrt{16}\sqrt{5} - 2\sqrt{4}\sqrt{5} + 3\sqrt{9}\sqrt{5}$
$= 4\sqrt{5} - 4\sqrt{5} + 9\sqrt{5}$
$= 9\sqrt{5}$

m $3\sqrt{80} - 2\sqrt{20} + 5\sqrt{45}$
$= 3\sqrt{16}\sqrt{5} - 2\sqrt{4}\sqrt{5} + 5\sqrt{9}\sqrt{5}$
$= 12\sqrt{5} - 4\sqrt{5} + 15\sqrt{5}$
$= 23\sqrt{5}$

n $\frac{\sqrt{44}}{\sqrt{11}} = \frac{\sqrt{4}\sqrt{11}}{\sqrt{11}}$
$= 2$

o $\sqrt{12} + 3\sqrt{48} + \sqrt{75}$
$= \sqrt{4}\sqrt{3} + 3\sqrt{16}\sqrt{3} + \sqrt{25}\sqrt{3}$
$= 2\sqrt{3} + 12\sqrt{3} + 5\sqrt{3}$
$= 19\sqrt{3}$

2 a $\sqrt{3}\left(2 + \sqrt{3}\right) = 2\sqrt{3} + \sqrt{3}\sqrt{3}$
$= 2\sqrt{3} + \sqrt{9}$
$= 2\sqrt{3} + 3$

b $\sqrt{5}\left(3 - \sqrt{3}\right) = 3\sqrt{5} - \sqrt{3}\sqrt{5}$
$= 3\sqrt{5} - \sqrt{15}$

c $\sqrt{2}\left(4 - \sqrt{5}\right) = 4\sqrt{2} - \sqrt{2}\sqrt{5}$
$= 4\sqrt{2} - \sqrt{10}$

2 d $(2-\sqrt{2})(3+\sqrt{5}) = 6+2\sqrt{5}-3\sqrt{2}-\sqrt{2}\sqrt{5}$
$= 6+2\sqrt{5}-3\sqrt{2}-\sqrt{10}$

e $(2-\sqrt{3})(3-\sqrt{7}) = 6-2\sqrt{7}-3\sqrt{3}+\sqrt{3}\sqrt{7}$
$= 6-2\sqrt{7}-3\sqrt{3}+\sqrt{21}$

f $(4+\sqrt{5})(2+\sqrt{5}) = 8+4\sqrt{5}+2\sqrt{5}+\sqrt{5}\sqrt{5}$
$= 8+6\sqrt{5}+\sqrt{25}$
$= 8+6\sqrt{5}+5$
$= 13+6\sqrt{5}$

g $(5-\sqrt{3})(1-\sqrt{3}) = 5-5\sqrt{3}-\sqrt{3}+\sqrt{3}\sqrt{3}$
$= 5-6\sqrt{3}+\sqrt{9}$
$= 5-6\sqrt{3}+3$
$= 8-6\sqrt{3}$

h $(4+\sqrt{3})(2-\sqrt{3}) = 8-4\sqrt{3}+2\sqrt{3}-\sqrt{3}\sqrt{3}$
$= 8-2\sqrt{3}-\sqrt{9}$
$= 8-2\sqrt{3}-3$
$= 5-2\sqrt{3}$

i $(7-\sqrt{11})(2+\sqrt{11})$
$= 14+7\sqrt{11}-2\sqrt{11}-\sqrt{11}\sqrt{11}$
$= 14+5\sqrt{11}-\sqrt{121}$
$= 14+5\sqrt{11}-11$
$= 3+5\sqrt{11}$

3 $\sqrt{75}-\sqrt{12} = \sqrt{25}\sqrt{3}-\sqrt{4}\sqrt{3}$
$= 5\sqrt{3}-2\sqrt{3}$
$= 3\sqrt{3}$