AQA Level 2 Further mathematics Number & algebra

Section 1: Basic number and algebra

Section test

1) Work out $\left(4\frac{1}{4}-2\frac{2}{3}\right)\div 1\frac{1}{6}$

(a) $1\frac{13}{14}$
(b) $1\frac{27}{28}$
(c) $1\frac{5}{14}$
(d) $-\frac{3}{2}$
(e) I don't know

2) In a sale, a coat priced at £150 is reduced by 55%. What is the new price of the coat?

(a) £82.50
(b) £67.50
(c) £95.00
(d) £145.00
(e) I don't know

3) The expression $3(2x+3y-1)-2(3x-2y-4)$ can be simplified to give the expression

(a) $13y+5$
(b) $10y+5$
(c) $12x+5y-11$
(d) $y-5$
(e) I don't know

4) The expression $(2x-5)(x+3)$ is equivalent to

(a) $2x^2+x-15$
(b) $2x^2-x-15$
(c) $2x^2+11x-25$
(d) $2x^2-2x-15$
(e) I don't know

5) Simplify $\sqrt{75}-\sqrt{27}$

(a) $\sqrt{12}$
(b) $\sqrt{48}$
(c) $4\sqrt{3}$
(d) $2\sqrt{3}$
(e) I don't know

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6) Simplify $\sqrt{12} \times \sqrt{8} \times \sqrt{98}$

(a) $56\sqrt{6}$
(b) $56\sqrt{3}$
(c) $28\sqrt{3}$
(d) $28\sqrt{6}$
(e) I don't know

7) The ratio $\sqrt{8} : \sqrt{18} : \sqrt{50}$ can be written in its simplest form as

(a) 4 : 9 : 25
(b) 2 : 3 : 5
(c) 1 : 10 : 42
(d) $1 : \sqrt{10} : \sqrt{42}$
(e) I don't know

8) Multiply out $\left(2-\sqrt{3}\right)\left(1+2\sqrt{3}\right)$ and simplify as far as possible

(a) $-4+\sqrt{3}$
(b) $2+3\sqrt{3}$
(c) $-4+3\sqrt{3}$
(d) $2+\sqrt{3}$
(e) I don't know

In Questions 9 and 10, rationalise the denominator and simplify as far as possible.

9) $\dfrac{2}{3\sqrt{2}}$

(a) $\dfrac{\sqrt{2}}{3}$
(b) $\dfrac{2\sqrt{2}}{3}$
(c) $3\sqrt{2}$
(d) $\dfrac{3\sqrt{2}}{2}$
(e) I don't know

10) $\dfrac{2+\sqrt{3}}{1+\sqrt{2}}$

(a) 5
(b) $2+\sqrt{3}-2\sqrt{2}-\sqrt{6}$
(c) $2\sqrt{2}+\sqrt{6}-\sqrt{3}-2$
(d) $\dfrac{2+\sqrt{3}}{5}$
(e) I don't know

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Solutions to section test

1) The correct answer is (c)

$$4\frac{1}{4}-2\frac{2}{3}=2+\frac{1}{4}-\frac{2}{3}=2+\frac{3-8}{12}=2-\frac{5}{12}=1\frac{7}{12}$$

$$\left(3\frac{1}{4}-2\frac{2}{3}\right)\div 1\frac{1}{6}=1\frac{7}{12}\div\frac{7}{6}=\frac{19}{\cancel{12}^{2}}\times\frac{\cancel{6}}{7}=\frac{19}{14}=1\frac{5}{14}$$

2) The correct answer is (b)

The new price is 45% of the previous price.
$0.45 \times 150 = 67.5$
The new price is £67.50

3) The correct answer is (a)

$$3(2x+3y-1)-2(3x-2y-4)=6x+9y-3-6x+4y+8$$
$$=13y+5$$

4) The correct answer is (a)

$$(2x-5)(x+3)=2x^2+6x-5x-15$$
$$=2x^2+x-15$$

5) The correct answer is (d)

$$\sqrt{75}-\sqrt{27}=\sqrt{25\times 3}-\sqrt{9\times 3}$$
$$=5\sqrt{3}-3\sqrt{3}$$
$$=2\sqrt{3}$$

6) The correct answer is (b)

$$\sqrt{12}\times\sqrt{8}\times\sqrt{98}=\sqrt{3\times 4}\times\sqrt{2\times 4}\times\sqrt{2\times 49}$$
$$=2\sqrt{3}\times 2\sqrt{2}\times 7\sqrt{2}$$
$$=28\times 2\sqrt{3}$$
$$=56\sqrt{3}$$

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7) The correct answer is (b)

$$\sqrt{8} : \sqrt{18} : \sqrt{50} = \sqrt{4\times 2} : \sqrt{9\times 2} : \sqrt{25\times 2}$$
$$= 2\sqrt{2} : 3\sqrt{2} : 5\sqrt{2}$$
$$= 2 : 3 : 5$$

8) The correct answer is (c)

$$\left(2-\sqrt{3}\right)\left(1+2\sqrt{3}\right) = 2+4\sqrt{3}-\sqrt{3}-2\sqrt{3}\sqrt{3}$$
$$= 2+3\sqrt{3}-6$$
$$= -4+3\sqrt{3}$$

9) The correct answer is (a)

$$\frac{2}{3\sqrt{2}} = \frac{2}{3\sqrt{2}}\times\frac{\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{2}}{6} = \frac{\sqrt{2}}{3}$$

10) The correct answer is (c)

$$\frac{2+\sqrt{3}}{1+\sqrt{2}} = \frac{\left(2+\sqrt{3}\right)\left(1-\sqrt{2}\right)}{\left(1+\sqrt{2}\right)\left(1-\sqrt{2}\right)}$$
$$= \frac{2-2\sqrt{2}+\sqrt{3}-\sqrt{6}}{1-\sqrt{2}+\sqrt{2}-2}$$
$$= \frac{2-2\sqrt{2}+\sqrt{3}-\sqrt{6}}{-1}$$
$$= 2\sqrt{2}-\sqrt{3}+\sqrt{6}-2$$