Grade 9 Number System

Q1) Insert 16 rational number between 2.1 and 2.2.

Q2) Is zero a rational number? Justify your answer.

Q3) i) Write $\frac{231}{625}$ as decimal form and state it's kind.

ii)Express $32.12\overline{35}$ in form $\frac{p}{q}$ where p, q are integers and q≠0.

Q4) Is the product of one rational number and one irrational always irrational number? What if both are irrational number? Is this true for addition also?

Justify your answer using suitable example.

Q5) Find the value of a and b if $\frac{7+3\sqrt{5}}{3+\sqrt{5}}$ - $\frac{7-3\sqrt{5}}{3-\sqrt{5}}$ =a+$\sqrt{5}b$

Q6) If x= 3+2$\sqrt{2}$, find the value of $\left(x^2 + \frac{1}{x^2}\right)$

Q7) Simplify $\left(\frac{x^p}{x^q}\right)^{p+q} . \left(\frac{x^q}{x^r}\right)^{q+r} . \left(\frac{x^r}{x^p}\right)^{r+p}$

Q8) Solve $\sqrt[4]{81x^8y^4z^{16}} \div \sqrt[3]{27x^3y^6z^9}$

Q9) Evaluate after rationalising the denominator of $\frac{25}{\sqrt{40}-\sqrt{80}}$

Given $\sqrt{10}$=3.162 and $\sqrt{5}$=2.236

Answer Key

A1) 2.105.2.11,2.115,2.12, …………2.175,2.18

A2) Yes, because 0 can be written as $\frac{0}{1}$ which is form of $\frac{p}{q}$, where p and q are integers and q≠0.

A3) i)0.3696; terminating

ii) $\frac{318023}{9900}$

A4) a) Yes, multiplying one terminating number with one non-terminating number is always non- terminating. E.g. 2.1x2.38967534678……

b) No $2\sqrt{2}$x$\sqrt{2}$=4 c) Yes, addition will always irrational number. E.g.$\sqrt{2}+\sqrt{3}$

A5) a=0, b=1

A6) Given, x= $3+2\sqrt{2} \Longrightarrow \frac{1}{x} = \frac{1}{3+2\sqrt{2}} \times \frac{3-2\sqrt{2}}{3-2\sqrt{2}} \Longrightarrow \frac{1}{x} = 3-2\sqrt{2}$

$$x+\frac{1}{x}=6 \Longrightarrow \left(x+\frac{1}{x}\right)^2 = 36 \Longrightarrow \left(x^2+\frac{1}{x^2}+2\right)=36 \Longrightarrow \left(x^2+\frac{1}{x^2}\right)=34$$

A7) $\left(\frac{x^p}{x^q}\right)^{p+q} . \left(\frac{x^q}{x^r}\right)^{q+r} . \left(\frac{x^r}{x^p}\right)^{r+p} = x^{(p-q)(p+q)} . x^{(q-r)(q+r)} . x^{(r-p)(r+p)}$

$$x^{p^2-q^2} . x^{q^2-r^2} . x^{r^2-p^2} = x^{(p^2-q^2+q^2-r^2+r^2-p^2)} \Longrightarrow x^0=1$$

A8) $\frac{xz}{y}\approx$

A9) -0.954