I.G.C.S.E. Arithmetic

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Question 1

Evaluate the following without the use of a calculator

a. $5.004+0.0327$ **b.** $5.8-0.07+2.3$ **c.** $(0.04)^2$ **d.** $0.034\times 10\,000$

e. $0.345\div 0.9$ **f.** $(11.2+4.4)\div 0.06$ **g.** $\dfrac{0.7\times 0.54}{0.09}$

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Solution to question 1

a.
$$\begin{array}{r} 5.0040 \\ +\ 0.0327 \\ \hline 5.0367 \end{array}$$

b.
$$\begin{array}{r} 5.{}^{7}\not{8}{}^{1}0 \\ -\ 0.\ 0\ 7 \\ \hline 5.\ 7\ 3 \end{array} \qquad \begin{array}{r} 5.73 \\ +\ 2.30 \\ \hline 8.03 \end{array}$$

c.
$$\begin{array}{r} 0.04 \\ \times\ 0.04 \\ \hline 0.0016 \end{array}$$

d. $0.034 \times 10\,000 = 340$

e. $\dfrac{0.345}{0.9} = \dfrac{3.45}{9}$

$$9\overline{)3.450} = 0.38\overline{3}$$

$$\begin{array}{r} 27 \\ \hline 75 \\ 72 \\ \hline 30 \\ 27 \\ \hline 3 \end{array}$$

f.
$$\begin{array}{r} 11.2 \\ +\ 4.4 \\ \hline 15.6 \end{array} \qquad \frac{15.6}{0.06} \qquad 6\overline{)1560} = 260$$

$$\begin{array}{r} 12 \\ \hline 36 \end{array}$$

g. $\dfrac{0.7 \times 0.54}{0.09} = \dfrac{0.7 \times \not{5}\not{4}^{6}}{\not{9}^{1}} = 4.2$

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Question 2

Evaluate the following and simplify the answers

a. $\frac{4}{7}+\frac{2}{5}$ **b.** $\frac{5}{6}-\frac{3}{8}$ **c.** $\frac{4}{15}\times\frac{10}{11}$ **d.** $\frac{5}{9}\div\frac{13}{27}$

e. $3\frac{3}{4}\times 2\frac{5}{6}$ **f.** $1\frac{6}{7}\div 2\frac{11}{14}$ **g.** $\dfrac{\frac{3}{4}+\frac{2}{9}}{\frac{5}{6}-\frac{3}{4}}$

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Solution to question 2

a. $\frac{4}{7}+\frac{2}{5}=\frac{4\times5+2\times7}{35}=\frac{20+14}{35}=\frac{34}{35}$

b. $\frac{5}{6}-\frac{3}{8}=\frac{5\times4+3\times4}{24}=\frac{20-9}{24}=\frac{11}{24}$

c. $\frac{4}{15}\times\frac{10}{11}=\frac{4}{\cancel{15}^{3}}\times\frac{\cancel{10}^{2}}{11}=\frac{8}{33}$

d. $\frac{5}{9}\div\frac{13}{27}=\frac{5}{\cancel{9}^{1}}\times\frac{\cancel{27}^{3}}{13}=\frac{15}{13}=1\frac{2}{13}$

e. $3\frac{3}{4}\times2\frac{5}{6}=\frac{\cancel{15}^{5}}{4}\times\frac{17}{\cancel{6}^{2}}=\frac{85}{8}=10\frac{5}{8}$

f. $1\frac{6}{7}\div2\frac{11}{14}=\frac{13}{7}\div\frac{39}{14}=\frac{\cancel{13}^{1}}{\cancel{7}^{1}}\times\frac{\cancel{14}^{2}}{\cancel{39}^{3}}=\frac{2}{3}$

g. $\frac{\frac{3}{4}+\frac{2}{9}}{\frac{5}{6}-\frac{3}{4}}=\frac{\frac{3\times9+2\times4}{36}}{\frac{5\times2-3\times3}{12}}=\frac{\frac{27+8}{36}}{\frac{10-9}{12}}=\frac{\frac{35}{36}}{\frac{1}{12}}=\frac{35}{\cancel{36}^{3}}\times\frac{\cancel{12}^{1}}{1}=\frac{35}{3}=11\frac{2}{3}$

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Question 3

Arrange the following fractions in order of size, showing clearly your working out.

a. $\frac{2}{3}, \frac{1}{2}, \frac{7}{12}$.

b. $\frac{3}{8}, \frac{5}{6}, \frac{7}{12}, \frac{3}{4}$.

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Solution to question 3

a.

$$\frac{2}{3},\ \frac{1}{2},\ \frac{7}{12}$$

Write the fractions with a common denominator

$$\frac{8}{12},\ \frac{6}{12},\ \frac{7}{12} \Rightarrow \frac{6}{12},\frac{7}{12},\frac{8}{12} \Rightarrow \frac{1}{2},\frac{7}{12},\frac{2}{3}$$

Write in order of size

b.

$$\frac{3}{8},\ \frac{5}{6},\ \frac{7}{12},\ \frac{3}{4}$$

Write the fractions with a common denominator

$$\frac{9}{24},\ \frac{20}{24},\ \frac{14}{24},\ \frac{18}{24} \Rightarrow \frac{9}{24},\frac{14}{24},\frac{18}{24},\frac{20}{24} \Rightarrow \frac{3}{8},\frac{7}{12},\frac{3}{4},\frac{5}{8}$$

Write in order of size

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Question 4

Change the following decimals to fractions, writing your answer in its simplest form.

a. 0.64 **b.** $0.\overline{45}$ **c.** $0.5\overline{6}$ **d.** $2.6\overline{23}$

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Solution to question 4

a. $0.64 = \frac{64}{100} = \frac{16}{25}$

b. $0.\overline{45} = \frac{45}{99} = \frac{5}{11}$ Pure periodic

c. $0.5\overline{6} = \frac{56-5}{90} = \frac{51}{90} = \frac{17}{30}$ Mixed periodic

d. $2.6\overline{23} = \frac{2623-26}{990} = \frac{2597}{990} = 2\frac{617}{990}$ Mixed periodic

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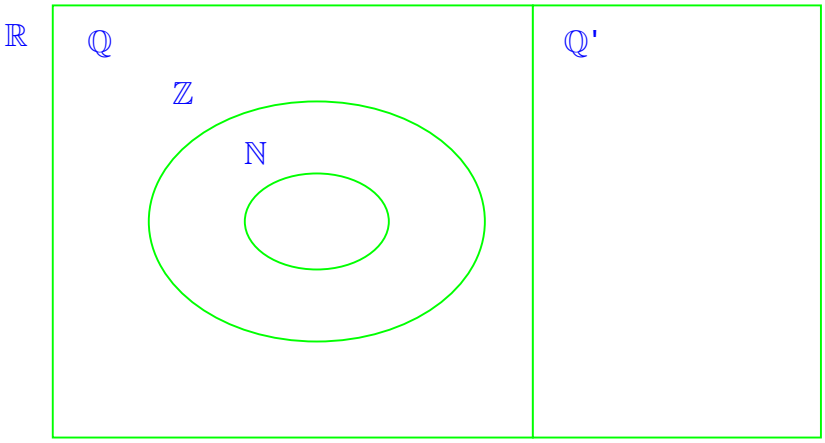
Question 5

Copy the Venn diagram below and write on the following numbers.

$$\left\{6, 0, \sqrt{3}, \frac{4}{7}, 2.3, -6, -0.9\overline{7}, \pi, 4.5\overline{67}, \frac{67}{3}, \sqrt{9}\right\}$$



Write down the name and definition of the set

a. $\mathbb{Q}$ **b.** $\mathbb{Q}'$

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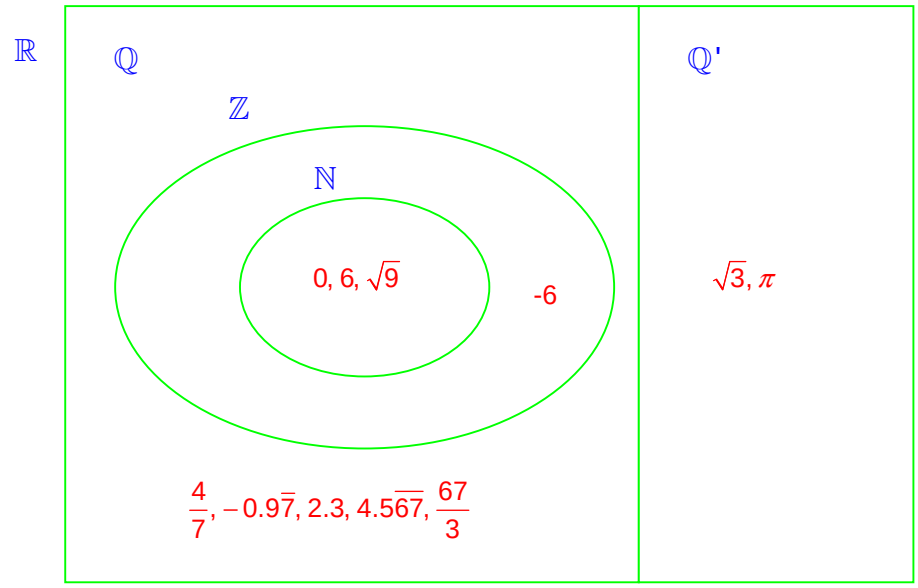
Solution to question 5



a. $\mathbb{Q}$ is the set of rational numbers. Rational numbers are numbers that can be written in the form $\frac{a}{b}$ where a and b are integers and $b \neq 0$

b. $\mathbb{Q}'$ is the set of irrational numbers. Irrational numbers are numbers that cannot be written in the form $\frac{a}{b}$.

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Question 6

Without working out the division, determine whether the following numbers are divisible by the number in brackets.

a. 1368 (3) **b.** 275232 (6) **c.** 1826 (4) **d.** 17192 (7)

e. 523183 (11)

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Solution to question 6

a. 1368 $1+3+6+8=18$, which is a multiple of 3, therefore 1368 is divisible by 3.

b. 275232 is divisible by 2 as the last digit is even. Summing the digits $2+7+5+2+3+2=21$, which is a multiple of 3, therefore 275232 is divisible by 3.
As 275232 is divisible by 2 and 3 it is divisible by 6.

c. 1826 is not divisible by 4 as 26 is not a multiple of 4.

d. 17192

$$
\begin{array}{l}
1719\,'2\times 2=4 \\
\underline{-\quad 4} \\
171\,'5\times 2=10 \\
\underline{-10} \\
16\,'1\times 2=2 \\
\underline{-2} \\
14 \text{ which is divisible by 7}
\end{array}
$$

17192 is divisible by 7.

e. 523183 $\left|(3+1+2)-(5+3+8)\right|=\left|6-16\right|=10$. which is not a multiple of 11. Therefore 523183 is not divisible by 11.

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