Set 28 (credit) (Q1-6 should be straight forward)

Q7. $-42 \div (-3)$

$\frac{+42}{+3} = \underline{14}$

Q8. $-18 \times (+5)$

90

4

Q9. $10\% = £250$

$30\% = £250 \times 3 = £750$

$= \underline{£750}$

Q10. $-38 + (-26)$

$= -38 - 26$

$= \underline{-64}$

Rules of two signs next to one another:

$+ + = +$ } Same sign +ve

$- - = +$ }

$+ - = -$ } different negature

$- + = -$ }

Q11 Top tip

Always convert mixed fractions to top heavy first eg.

$12\frac{1}{5} - 8\frac{2}{3}$

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

$= \frac{61 \times 3}{5 \times 3} - \frac{26 \times 5}{3 \times 5}$

Common denominator

$\frac{183}{15} - \frac{130}{15}$

$61 \times 3 = 183$

$26 \times 5 = 130$

$= \frac{53}{15}$

$= 3\frac{8}{15}$ > 53 ÷ 15

$\underline{\underline{\quad}}$

Q12. $2\frac{1}{7} \times \frac{14}{15}$

$= \frac{2\times7+1}{7} \times \frac{14}{15}$

$= \frac{15}{7} \times \frac{14}{15}$

$= \frac{210}{105}$

$= 2$

$\begin{array}{r} 15 \\ \times 7 \\ \hline 105 \\ \hline 3 \end{array}$

$\begin{array}{r} 15 \\ \times 10 \quad \times 4 \\ \hline 150 + 60 \end{array}$

$= 210$

Q13 $\left(6\frac{2}{5} \times 2\frac{1}{2}\right) \div \frac{1}{6}$

BIDMAS

$\left(\frac{6\times5+2}{5} \times \frac{2\times2+1}{2}\right) \div \frac{1}{6}$

$\left(\frac{32}{5} \times \frac{5}{2}\right) \div \frac{1}{6}$

$\begin{array}{r} 32 \\ \times 5 \\ \hline 160 \\ \hline 1 \end{array}$

$\left(\frac{160}{10}\right) \times \frac{6}{1}$

$= 16 \times 6$

$= 96$

$\begin{array}{r} 16 \\ \times 6 \\ \hline 96 \\ \hline 3 \end{array}$

Q14 $\left(1\frac{1}{10} \times \frac{4}{11}\right) \div \frac{3}{8}$

$= \left(\frac{1\times10+1}{10} \times \frac{4}{11}\right) \div \frac{3}{8}$

$= \left(\frac{11}{10} \times \frac{4}{11}\right) \div \frac{3}{8}$

$= \left(\frac{44}{110}\right) \times \frac{8}{3}$

$= \frac{352}{330}$

$= 1\frac{22}{330}$

$= 1\frac{1}{15}$

$\begin{array}{r} 44 \\ \times 8 \\ \hline 352 \\ \hline 3 \end{array}$

Q15. $80-(3\cdot2\times20)$ BIDMAS

$=80-64$ $3\cdot2\times2\times10$

$=\underline{16}$ $=6\cdot4\times10$

$=\underline{64}$

Q17. $2x^{1/3}-5=1$

$+5 \quad +5$

$2x^{1/3}=6$

$x^{1/3}=\frac{6}{2}$ (*) $x^{1/3}$ $\sqrt[3]{x}$

(*) $x^{1/3}=3$

$\sqrt[3]{x}=3$ (cube root of something equals 3)

$x=\underline{27}$

Q18 $\frac{2p^2+3p-9}{4p-6}$ > Factorise $2p^2+3p-9$

t+e

$(2p-3)(p+3)$

-3

$+6$

$\frac{(2p-3)^1(p+3)}{2(p-3)^1}$

$=\frac{p+3}{2}$

Q19 $12x^2-5x-25=0$

$ax^2+bx+c=0$ } quadratic equation

$(3x-5)(4x+5)=0$ (factorise + solve)

$3x-5=0$ $4x+5=0$

$3x=5$ $4x=-5$

$x=\frac{5}{3}$ $x=\frac{-5}{4}$

$\frac{12}{1\times12}$ $\frac{25}{1\times25}$

2×6 5×5

3×4

t+e

$(3\ -5)-20x$

$(4\ +5)+10x$

$-5x$

20. $\frac{3}{\sqrt{6}-2} \times \frac{\sqrt{6}+2}{\sqrt{6}+2}$

We want to get rid of the surd on the denominator.

$$\frac{3(\sqrt{6}+2)}{(\sqrt{6}-2)(\sqrt{6}+2)}$$

$$= \frac{3\sqrt{6}+6}{\sqrt{36}+2\sqrt{6}-2\sqrt{6}-4}$$

$$= \frac{3\sqrt{6}+6}{6-4}$$

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

Q21 $\frac{\sqrt{32}+\sqrt{8}}{\sqrt{16\times2}+\sqrt{4\times2}}$ (we can only collect like terms)

$$= \sqrt{16}\times\sqrt{2}+\sqrt{4}\times\sqrt{2}$$

$$= 4\sqrt{2}+2\sqrt{2}$$

$$= 6\sqrt{2}$$

Q22 $5(4-3x)-2(2x-1) = 2-9x$

$20-15x-4x+2 = 2-9x$

$22-19x = 2-9x$

$-2+19x \quad\quad -2+19x$

$20 = 10x$

$\frac{20}{10} = \frac{10x}{10}$

$x = 2$

Q24 $[(x-2y)(x-2y)](x-2y)$

FOIL

$(x^2-2xy-2xy+4y^2)(x-2y)$

$=(x^2-4xy+4y^2)(x-2y)$ FOIL

$=x^3-4x^2y+4y^2x-2x^2y+8xy^2-8y^3$

$=x^3-6x^2y+12xy^2-8y^3$

Q26. $7c+5d=1$ ① $\times 4$

$3c+4d=6$ ② $\times 5$

$\Rightarrow 28c+20d=4$ ③

$15c+20d=30$ ④

$5-4$

$20d+20d=40d$

$\checkmark 20d-20d=0$

$13c=-26$

$c=-2$

Sub to find d

$7\times(-2)+5d=1$

$-14+5d=1$

$+14 \quad +14$

$5d=15$

$d=3$

check:

$3\times(-2)+4\times(3)=6$

$-6+12=6$ $\rightarrow$ $6=6$ ∴ true

Q22. $\frac{(x+5)}{4} \times 3 + \frac{2x+1}{12} = 3$

$\frac{3(x+5)}{12} + \frac{2x+1}{12} = 3$ (common denominator)

$= \frac{3x+15+2x+1}{12} = 3 \times 12$

$5x + 16 = 36$

$-16 \quad -16$

$5x = 20$

$x = 4$

Q23 $q = 6 - \frac{p^2}{3}$

$6 - \frac{p^2}{3} = q$ (always get rid of anything added on or subtracted if no brackets)

$-6 \quad -6$

$-\frac{p^2}{3} \times 3 = q - 6 \times 3$

$-p^2 = 3q - 18$ We want +ve value of p

$\div(-1) \quad \div(-1)$

$p^2 = 18 - 3q$

$p = \sqrt{18 - 3q}$

27. $\frac{4z^4 \times 2z^{-2}}{z^{-1}}$

$= \frac{8z^{4+(-2)}}{z^{-1}}$

$= \frac{8z^2}{z^{-1}}$ (Rule 1)

$= 8z^2 \div z^{(-1)}$ (Rule 2)

$= 8z^{2-(-1)}$

$= \underline{\underline{8z^3}}$

28. $\frac{3x-2}{4} \times 5 + \frac{2-x}{5} \times 4$

$\frac{5(3x-2)}{20} + \frac{4(2-x)}{20}$

$= \frac{15x - 10 + 8 - 4x}{20}$

$= \underline{\underline{\frac{11x - 2}{20}}}$

28. $2(q^2 - 25)$

$= 2(q-5)(q+5)$

1. Is linear
2. difference of squares
3. Trinomial

29. $n(x) = 3 \cdot x^{2/3}$

$n(64) = 3(64^{2/3})$ *

$= 3 \times 16$

$= 48$

* $(4^3)^{2/3}$ (Rule 3 indices)

$= 4^{\frac{2}{3} \times \frac{3}{3}}$ $(a^m)^n = a^{m \times n}$

$= 4^{6/3}$

$= 4^2$

$= 16$