ALGEBRA 2

Solve the following equations:

1) $4x-5=\frac{x}{2}+16$

2) $\frac{x-3}{2}=2(1-x)$

3) $3x+2=5(x-2)+\frac{1}{2}$

4) $4+3\left(\frac{x}{2}-1\right)=4x-5$

5) $\frac{1}{2}(3x-4)+1=4x-\frac{1}{2}$

6) $3\left(x+\frac{x}{2}\right)=4+x$

7) $\frac{x-3}{2}-\frac{x-8}{12}=\frac{5-x}{4}-\frac{x}{3}$

8) $y+\frac{3y-1}{4}-\frac{y+1}{5}+1-\frac{y-2}{10}=2(y+1)$

9) $\frac{2(z-3)}{4}-\frac{3(2-z)}{5}=\frac{7-4z}{3}+\frac{z+1}{2}$

10) $\frac{x-9}{2}+\frac{2x+3}{5}=\frac{1}{3}-\frac{3(x-7)}{9}$

SOLUTION

1) $4x-5=\frac{x}{2}+16 \rightarrow \frac{8x-10}{2}=\frac{x}{2}+\frac{32}{2} \Rightarrow 8x-10=x+32$

$8x-x=32+10 \Rightarrow 7x=42 \Rightarrow x=6$

2) $\frac{x-3}{2}=2(1-x) \rightarrow \frac{x-3}{2}=2-2x \Rightarrow x-3=4-4x$

$x+4x=4+3 \Rightarrow 5x=7 \Rightarrow x=\frac{7}{5}$

3) $3x+2=5(x-2)+\frac{1}{2}$

$3x+2=5x-10+\frac{1}{2} \Rightarrow \frac{6x+4}{2}=\frac{10x-20}{2}+\frac{1}{2} \Rightarrow 6x+4=10x-20+1 \Rightarrow$

$6x-10x=-20+1-4 \Rightarrow -4x=-23 \Rightarrow x=\frac{23}{4}$

4) $4+3\left(\frac{x}{2}-1\right)=4x-5$

$4+\frac{3x}{2}-3=4x-5 \Rightarrow \frac{8}{2}+\frac{3x}{2}-\frac{6}{2}=\frac{8x-10}{2} \Rightarrow 8+3x-6=8x-10 \Rightarrow$

$3x-8x=-10-8+6 \Rightarrow -5x=-12 \Rightarrow x=\frac{12}{5}$

5) $\frac{1}{2}(3x-4)+1=4x-\frac{1}{2}$

$\frac{3x-4}{2}+1=4x-\frac{1}{2} \Rightarrow \frac{3x-4}{2}+\frac{2}{2}=\frac{8x}{2}-\frac{1}{2} \Rightarrow 3x-4+2=8x-1 \Rightarrow 3x-8x=-1+4-2$

$\Rightarrow -5x=1 \Rightarrow x=-\frac{1}{5}$

6) $3\left(x+\frac{x}{2}\right)=4+x \rightarrow 3x+\frac{3x}{2}=4+x \Rightarrow \frac{6x}{2}+\frac{3x}{2}=\frac{8+2x}{2} \Rightarrow 6x+3x=8+2x$

$6x+3x-2x=8 \Rightarrow 7x=8 \Rightarrow x=\frac{8}{7}$

7) $\frac{x-3}{2}-\frac{x-8}{12}=\frac{5-x}{4}-\frac{x}{3}$

$\frac{6x-18}{12}-\frac{x-8}{12}=\frac{15-3x}{12}-\frac{4x}{12} \Rightarrow 6x-18-x+8=15-3x-4x \Rightarrow$

$5x-10=15-7x \Rightarrow 5x+7x=15+10 \Rightarrow 12x=25 \Rightarrow x=\frac{25}{12}$

8) $y+\frac{3y-1}{4}-\frac{y+1}{5}+1-\frac{y-2}{10}=2(y+1)$

$$\frac{20y}{20}+\frac{15y-5}{20}-\frac{4y+4}{20}+\frac{20}{20}-\frac{2y-4}{20}=\frac{40y+40}{20}\Rightarrow 20y+15y-5-4y-4+20-2y+4=40y+40$$
$$\Rightarrow 20y+15y-4y-2y-40y=40+5+4-20-4\Rightarrow -11y=25\Rightarrow y=-\frac{25}{11}$$

9) $\frac{2(z-3)}{4}-\frac{3(2-z)}{5}=\frac{7-4z}{3}+\frac{z+1}{2}$

$$\frac{2z-6}{4}-\frac{6-3z}{5}=\frac{7-4z}{3}+\frac{z+1}{2}\Rightarrow\frac{30z-90}{60}-\frac{72-36z}{60}=\frac{140-80z}{60}+\frac{30z+30}{60}$$
$$\Rightarrow 30z-90-72+36z=140-80z+30z+30\Rightarrow 30z+36z+80z-30z=170+90+72$$
$$\Rightarrow 116z=332\Rightarrow z=\frac{332}{116}=\frac{83}{29}$$

10) $\frac{x-9}{2}+\frac{2x+3}{5}=\frac{1}{3}-\frac{3x-21}{9}$ m.cm. $=90$

$$\frac{45x-405}{90}+\frac{36x+54}{90}=\frac{30}{90}-\frac{30x-210}{90}\Rightarrow 45x-405+36x+54=30-30x+210$$

$$\Rightarrow 45x+36x+30x=30+210+405-54\Rightarrow 111x=591\Rightarrow x=\frac{591}{111}=\frac{197}{37}$$