Maths IB_1

Pre - test 1a

Revision *(factorisation, identities, expansion, roots ...)*

Tuesday 3.9.2024

ANSWERS

Problem 1 *Simplify the following expression* [/ 8 marks]

1) $\sqrt{72} = \boxed{6\sqrt{2}}$

2) $\frac{\sqrt{72}}{\sqrt{8}} = \frac{6\sqrt{2}}{2\sqrt{2}} = \boxed{3}$

3) $\frac{\sqrt{30}\times\sqrt{20}}{5\sqrt{6}} = \frac{\sqrt{6}\sqrt{100}}{5\sqrt{6}} = \boxed{2}$

4) $\frac{(3+\sqrt{8})^2+(3-\sqrt{8})^2}{2} = \frac{2\times 9+2\times 8}{2} = \boxed{17}$

Problem 2 *Solving quadratic equations* [/ 6 marks]

A] by the method of 'completing the square'

1) Start with : $\left(x-\frac{3}{2}\right)^2-\frac{9}{4}-28=0 \Rightarrow \left(x-\frac{3}{2}\right)^2=\frac{121}{4} \Rightarrow \left(x-\frac{3}{2}\right)=\pm\sqrt{\frac{121}{4}} \Rightarrow \boxed{x=\frac{3\pm 11}{2}}$

2) Start with : $-2[(x-5)^2-10]=0 \;\Rightarrow\; (x-5)^2=10 \;\Rightarrow\; \boxed{x=5\pm\sqrt{10}}$

B] using the discriminant (Δ or D....) $\Delta = b^2-4ac$

1) $\Delta = 121 > 0 \quad \Rightarrow$ two solutions: $\quad x=\frac{-b\pm\sqrt{\Delta}}{2a}$

2) $\Delta = 160 \quad \Rightarrow$ two solutions: $\quad x=\frac{-20\pm\sqrt{160}}{2(-2)}=\cdots$

Problem 3 *Solve the following logarithmic equations* [/ 12 marks]

1) $2\log_3(x-1)=4 \Rightarrow (x-1)=3^2 \quad \Rightarrow \boxed{x=10, \quad S=\{10\}}$

2) $\log_3(x-4)+\log_3(x+4)=2 \Rightarrow (x-4)(x+4)=3^2 \Rightarrow \quad \boxed{S=\{5\}}$

3) $\log_9((x-2)^2)=1 \Rightarrow (x-2)^2=9^1 \Rightarrow x-2=\pm 3 \quad \Rightarrow \quad \boxed{S=\{5\}}$

4) $\log_4(8x)-\log_4(x-7)=2 \quad \Rightarrow \frac{8x}{x-7}=4^2 \quad \Rightarrow x=2(x-7) \quad \boxed{S=\{14\}}$

5) $\log_2^2(x)-4\log_2(x)+3=0 \quad \Rightarrow \log_2(x)=1 \text{ or } 3 \quad \boxed{S=\{2,8\}}$

6) $\log_2(x^2-5x+10)=2 \Rightarrow x^2-5x+10=2^2 \Rightarrow \boxed{S=\{2,3\}}$