Maths IB_1

Pre - test 1b

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

Tuesday 10.9.2024

ANSWERS

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

1) $\sqrt{50}+\sqrt{18}=\boxed{8\sqrt{2}}$ **3)** $\frac{\sqrt{50}\times\sqrt{18}}{10\sqrt{9}}=\frac{30}{30}=\boxed{1}$

3) $\frac{\sqrt{50}}{\sqrt{18}}=\frac{5\sqrt{2}}{3\sqrt{2}}=\boxed{\frac{5}{3}}$ **4)** $\frac{(2+\sqrt{2})^2+(2-\sqrt{2})^2}{2}=\frac{4-2}{2}=\boxed{1}$

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

A] by the method of 'completing the square'

1) $\left(x+\frac{3}{2}\right)^2-\frac{9}{4}-28=0\Rightarrow\left(x+\frac{3}{2}\right)^2=\frac{121}{4}\Rightarrow\left(x+\frac{3}{2}\right)=\pm\sqrt{\frac{121}{4}}\Rightarrow\boxed{x=\frac{-3\pm11}{2}=-7\text{ or }4}$

2) $2\left[\left(x+\frac{3}{4}\right)^2-\frac{9}{16}-1\right]=0\ \Rightarrow\ \left(x+\frac{3}{4}\right)^2=\frac{25}{16}\ \Rightarrow\boxed{x=-\frac{3}{4}\pm\frac{5}{4}\Rightarrow S=\left\{-4;\frac{1}{2}\right\}}$

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

1) $\Delta=9+112>0\ \Rightarrow$ two solutions: $x=\frac{-3\pm\sqrt{121}}{2}$

2) $\Delta=9+16\ \Rightarrow$ two solutions: $x=\frac{-3\pm\sqrt{25}}{4}=\cdots$

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

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

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

3) $\log_9((x-2)^2)=1\Rightarrow(x-2)^2=9^1\Rightarrow x-2=\pm3\ \Rightarrow\ \boxed{S=\{5\}}$

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

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

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