Questions

1. Simplify $i\left(3-\sqrt{5}\ i\right)+\dfrac{1+6i}{2-i}$ in the form of $a+bi$, where a and b are real numbers

2. Find the possible values of x in the following equations

   a) $\log\left(x^2+3\right)=\log 2+\log(x+9)$
   b) $2^{2x+1}-2^{x+3}+6=0$

3. Solve
   a) $x(2x+3)>3(2x+3)$
   b) $\left|\dfrac{3-2x}{x+1}\right|<3$

4. The sum of the n terms of an arithmetic series is $\dfrac{n}{2}[2n+10]$. Find the first term and the common difference of the series

5. Expand $(1-7x)^{\frac{1}{2}}$ in ascending powers of x up to the term in x^3 and determine the range of x such that the expansion is valid. Hence, by substituting $x=\dfrac{1}{25}$, evaluate $\sqrt{2}$ correct to four decimal places

Final Answers:

1. $\dfrac{5\sqrt{5}-4}{5}+\dfrac{28}{5}i$
2. a) $x=5,\ -3$ b) $x=1.585,\ 0$
3. a) $\left(-\infty,-\dfrac{3}{2}\right)\cup(3,\infty)$
   b) $(-\infty,-6)\cup(0,\infty)$
4. $a=6,\quad d=2$
5. a) $1-\dfrac{7}{2}x-\dfrac{49}{8}x^2-\dfrac{343}{16}x^3+\ldots,\ |x|<\dfrac{1}{7}$, 1.4147

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