

Math 121 – Sample 1, Exam 2 Answers

1. (a) False. $(a + bi)(a - bi) = a^2 + b^2$
(b) False. $\frac{\ln(a \cdot b)}{\ln b} = \frac{\ln a + \ln b}{\ln b} = \frac{\ln a}{\ln b} + 1 \neq \ln a$
(c) False. Let $a = 3$ and $b = 1 \Rightarrow \sqrt{a - b} = \sqrt{4 - 1} = \sqrt{3}$ but $\sqrt{a} - \sqrt{b} = \sqrt{4} - \sqrt{1} = 2 - 1 = 1 \neq \sqrt{3}$.
(d) True. $\log\left(\frac{1}{a}\right) + \log a = \log 1 - \log a + \log a = 0$
(e) False. $e^{a+b} = e^a \cdot e^b$
2. (a) $x = \frac{2}{3}$
(b) $y = -\frac{2}{5}$
(c) $x = -\frac{5}{2}$
(d) $y = \frac{3}{2}$
3. (a) $P(x) = \frac{1}{9}(x + 1)^3(x - 3)^2$
(b) as $x \rightarrow -\infty$, $P(x) \rightarrow -\infty$
4. (a) $P(0) = 16$
(b) $t = 6.62$ days
(c) $t = 8.74$ days
5. $t = 12.603$ years
6. roots: $1, 1 + 2i, 1 - 2i$
7. $x = 5$