**Hwa Chong Institution**
**Integrated Programme**
**Secondary Three Mathematics**

***Name:*** _____ ***(  ) Class:*** _____ ***Date:*** _____

**Topical Revision Worksheet 3**

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**Topic: Logarithm**

| Question 1 [2008 EOY, Q7] | marks |
|---|---|
| Solve the following equations for $x$:<br>$\log_2(x+6)+\log_2(x-1)=1+\log_2(3x)$<br><br>**Answer:** $x=3$ (Note: $x=-2$ is rejected because $\log_2(3x)$ is undefined) | [4] |
| Question 2 [2009 EOY, Q10] | marks |
| Solve the following equations:<br>(a) $x^2-6=\lvert x\rvert$,<br><br>**Answer:** $x=\pm 3$ or $\pm 2$ (rej) | [4] |
| (b) $3^{2x-1}+3^{x-2}=3^x-\frac{4}{9}$,<br><br>**Answer:** $x=\frac{\lg 2}{\lg 3}$ or 0.631 or $x=\frac{\lg\frac{2}{3}}{\lg 3}$ or $-0.369$ | [5] |
| (c) $1+\lg(x+1.6)=\lg 2+\lg(2x^2+1)$.<br><br>**Answer:** $x=-1$ or $\frac{7}{2}$ | [4] |
| Question 3 [2010 EOY, Q13] | marks |
| Solve the following equations:<br>(a) $\log_8[2+\log_2(x-4)]=\log_{125}5$<br><br>**Answer:** $x=5$ | [3] |
| (b) $e^{2\ln y}=\lg 1.6$<br><br>**Answer** $y=0.452$ (3 s.f.) | [3] |

| Question 4 [2010 EOY, Q14] | marks |
|---|---|
| Solve the pair of simultaneous equations<br>$e^x(e^2) = (e^2)^y$<br>$\lg(x-1) + \lg(x+1) = \lg y + \lg(2x-y)$<br><br>**Answer:**<br><br>$y = 1$ or 3<br>But if $y = 1$, $x = 0$ and $\lg(x-1)$ will be undefined, hence Answer rejected<br>When $y = 3$, $x = 4$ | [6] |
| Question 5 [2011 EOY, Q13] | marks |
| Solve the following equations<br>(a) $\log_2\left(\frac{x^2}{4}+12\right) = 2\log_2(x+5) - 2$,<br><br>**Answer:** $x = 2\frac{3}{10}$ | [4] |
| (b) $\log_4(x^2) + 3\log_{x^2} 4 = 4$<br><br>**Answer:** $x = \pm 2$ | [4] |
| Question 6 [2012 EOY, Q3] | marks |
| Solve the equation $\log_x(2x+1) - 2\log_{x^2}(4x-1) + 1 = 0$.<br><br>**Answer:** $x = \frac{1}{2}$ or $x = 1$ $(\text{rej.} \because x \neq 1)$ | [4] |
| Question 7 [2013 EOY, Q1c] | marks |
| Solve the equation $\log_5 x + 1 = 6\log_x 5$.<br><br>**Answer:** $x = \frac{1}{125}$ or $x = 25$ | [3] |
| Question 8 [2014 EOY, Q3] | marks |
| (a) Solve the equations $\log_{(x-1)}(3x^2 - 7x - 2) = 2$<br><br>**Answer:** $x = -\frac{1}{2}$ (rejected) or 3 | [4] |

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|---|---|
| (b) $\ln\left\|\sqrt{x}-2\right\|+\frac{1}{2}\ln x=0,$ where $x>0$<br>**Answer:** $x=3+2\sqrt{2}$ or 1 | [5] |
| Question 9 [2015 EOY, Q6] | marks |
| Solve the following equations.<br>(a) $\log_3 x=\ln 2$,<br>**Answer:** $x=3^{\ln 2}\approx 2.14$ (3 s.f.) | [2] |
| (b) $1+\log_{\sqrt{2}}(y-1)=\log_2(22-7y)$.<br>**Answer:** $y=\frac{5}{2}$ or $-4$ (rej.) | [4] |