

Name: _____

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| 1. Using the substitution $y = 3^x$, or otherwise, solve the equation $3^{2x} - 3(3^x) + 2 = 0$. | Using the substitution gives $y = 2$ or 1 . So $x = 0$ or $0.6309\dots$ |
| 2. Where do the lines $y = 2x + 3$ and $y = 6x - 2$ intersect? | $x = \frac{5}{4}, y = \frac{11}{2}$ |
| 3. Use calculus to find the coordinates of the maximum point on the curve with equation $y = \frac{4}{\sqrt{x}} - \frac{2}{x}$. Justify that your point is a maximum using further calculus. | Maximum point at $(1, 2)$ Justified by substituting $x = 1$ into second derivative and obtaining $-1 < 0$ |
| 4. A triangle ABC has $AB = 12$ cm and angle $BAC = 30^\circ$. Find BC | $27 = \frac{1}{2}(12)AC \sin 30 \Rightarrow AC = 9$ cm Now for BC we need to use the cosine rule $BC = \sqrt{12^2 + 9^2 - 2(12)(9)\cos 30} = 6.159\dots$ cm |