

MHF 4U Quiz 5.1-5.5

$$\frac{28}{2} + \frac{1}{2}$$

Name Solutions

1. Evaluate [9]

a) $\log_4 256 = 4$ b) $\log_5 \sqrt[4]{5} = \frac{1}{4}$ c) $\log_3 \frac{1}{81} = -4$ d) $\log_8 1 = 0$ e) $\log_{16} 4 = \frac{1}{2}$

2 each f) $\log_6 12 + \log_6 3$

$$= \log_6 (12 \cdot 3) \checkmark$$

$$= \log_6 36$$

$$= 2 \checkmark$$

g) $\log_2 (32)(\sqrt[4]{2})$

$$= \log_2 (2^5 \cdot 2^{\frac{1}{4}}) \checkmark$$

$$= \log_2 (2^{\frac{21}{4}})$$

$$= \frac{21}{4} \checkmark$$

2. Express as a single logarithm $\log_5 12 + \frac{1}{2} \log_5 7 - \log_5 2$ [2]

$$= \log_5 \left(\frac{12 \cdot 7^{\frac{1}{2}}}{2} \right) \checkmark$$

$$= \log_5 (6\sqrt{7}) \checkmark$$

3. Solve

a) $2^{4x-1} + 4 = 12$

[3,2]

$$2^{4x-1} = 8 \checkmark$$

$$2^{4x-1} = 2^3 \checkmark$$

$$\therefore 4x-1 = 3 \checkmark$$

$$4x = 4$$

$$x = 1 \checkmark$$

b) $\log_x 6 = \frac{1}{2}$

$$x^{\frac{1}{2}} = 6 \checkmark$$

$$(x^{\frac{1}{2}})^2 = 6^2 \checkmark$$

$$x = 36 \checkmark$$

$$x > 0$$

4. Describe the transformations that take the graph of $f(x) = \log_2 x$ to the graph of $g(x) = \log_2(16x^4)$ [3]

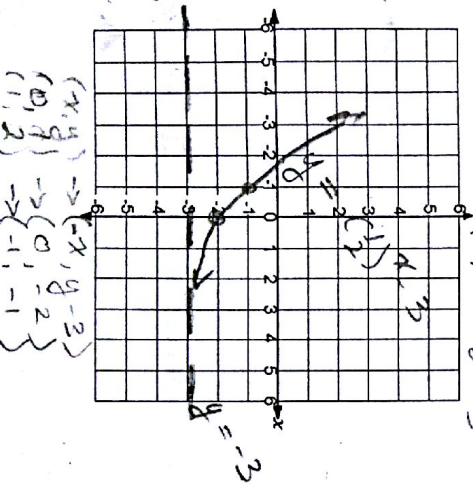
- Vertical stretch factor of 4 \checkmark
 - Horizontal stretch factor of $\frac{1}{2}$ \checkmark

$$= \log_2 [(2x)^4] \checkmark$$

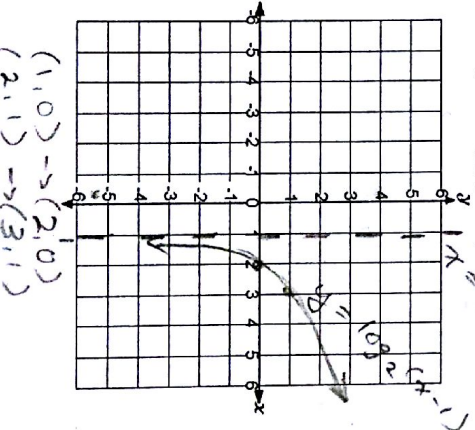
$$= 4 \log_2 (2x)$$

5. Sketch the following, clearly labeling base points and equations of the asymptotes. [9]

a) $g(x) = \left(\frac{1}{2}\right)^{-x} - 3 = 2^{-x} - 3$



b) $y = \log_2(x-1)$



c) $y = -\log_2(-x-1) + 2$
 - $\log_2[(-x-1)] + 2$

