

Part I: Shade the letter of the correct answer on the scantron form provided. (11 Marks)

1. What is $4^{x-1} = y + 2$ written in logarithmic form?

- A) $\log_4(x - 1) = y + 2$ B) $\log_{x-1}(y + 2) = 4$
C) $\log_4(y + 2) = x - 1$ D) $\log_{y+2}(x - 1) = 4$

2. Solve for x : $\log_x 16 = \frac{2}{3}$

- A) $\frac{1}{8}$ B) 4 C) 8 D) 64

3. What is the domain of $y = \log_5(x + 2) - 3$?

- A) $\{x|x \in R\}$ B) $\{x|x > -2, x \in R\}$
C) $\{x|x \geq -2, x \in R\}$ D) $\{x|x > 0, x \in R\}$

4. What is the mapping rule for $y = -2\log_2(3x - 6) + 4$?

- A) $(x, y) \rightarrow \left(\frac{1}{3}x + 6, -2y + 4\right)$ B) $(x, y) \rightarrow \left(\frac{1}{3}x + 2, -2y + 4\right)$
C) $(x, y) \rightarrow \left(3x + 6, -\frac{1}{2}y + 4\right)$ D) $(x, y) \rightarrow (3x + 2, -2y + 4)$

5. What is $\frac{1}{2}\log a - \frac{3}{2}\log b$ written as a single logarithm?

- A) $\frac{1}{2}\left(\frac{\log a}{3\log b}\right)$ B) $\frac{1}{2}\left(\frac{\log a}{\log b^3}\right)$ C) $\sqrt{\log \frac{a}{b^3}}$ D) $\log \sqrt{\frac{a}{b^3}}$

6. What is the x-intercept of $y = \log_2(x + 4)$?

- A) -4 B) -3 C) 2 D) 16

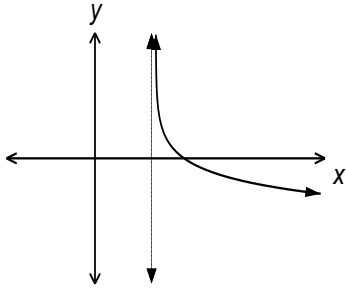
7. Solve for x : $7^{x+2} = 40$

- A) $x = \frac{\log 40}{\log 7} - 2$ B) $x = \frac{\log 7}{\log 40} - 2$
C) $x = \log \frac{40}{7} - 2$ D) $x = \frac{\log(40)-2}{\log 7}$

8. Solve for x : $\log_2 x^2 - \log_2 5 = \log_2 20$

- A) 2 B) ± 2 C) 10 D) ± 10

9. Which function best represents the graph shown below?



A) $y = -\log_5(x - 3)$

B) $y = -\log_5(x + 3)$

C) $y = \log_5(x - 3)$

D) $y = \log_5(x + 3)$

10. What is the inverse of $y = 8^x$?

A) $x = \log_y 8$

B) $x = \log_8 y$

C) $y = \log_x 8$

D) $y = \log_8 x$

11. The equation $A(t) = A_0 \left(\frac{1}{2}\right)^{t/3}$ represents the amount of a radioactive sample remaining after t years. How much time will it take for 15% of the sample to remain?

A) 0.7 years

B) 0.9 years

C) 8.2 years

D) 10.0 years

Part II: Show all workings in the space provided. (20 Marks)

1. Solve for x : (4 mks each)

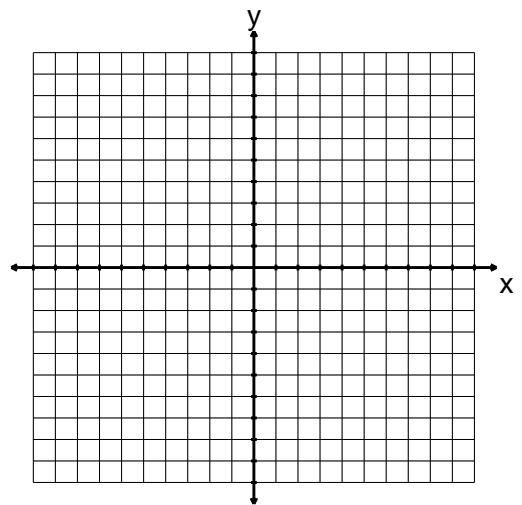
a) $\log_3(x - 4) + \log_3(x + 2) = \log_3 16$

b) $\log(2x + 6) = 1 + \log(x - 1)$

2. Solve for x: $2(6)^{x+2} = 3^{2x-3}$

(4 mks)

3. Graph the function $y = -\log_2\left(\frac{1}{2}x + 2\right) + 3$ using a mapping rule and appropriate tables of values. Label any asymptotes. (5 mks)



4. Sound level is measured in decibels using the formula $\beta = 10(\log I + 12)$, where β is measured in dB and I is the sound intensity measured in watts per metre squared (w/m^2). Algebraically determine the sound intensity of a lawn mower which has a sound level of 95dB. (3 mks)