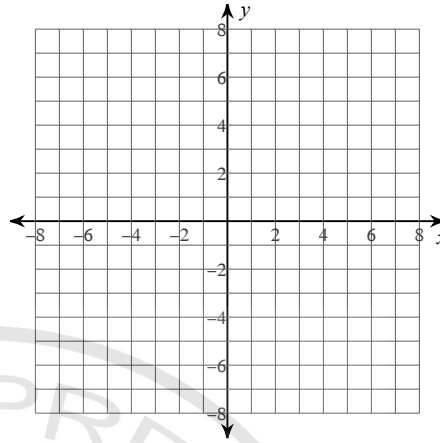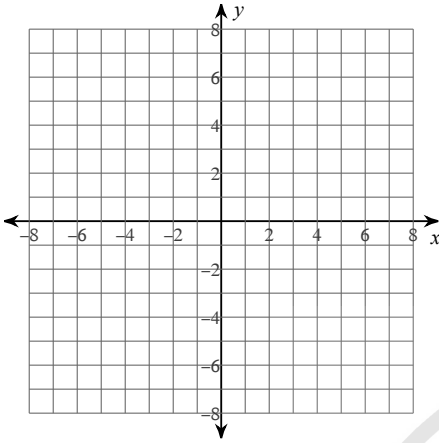# Assignment : Logarithmic and Exponential Function

Date_____

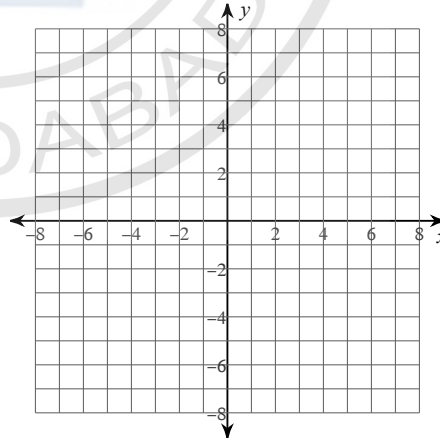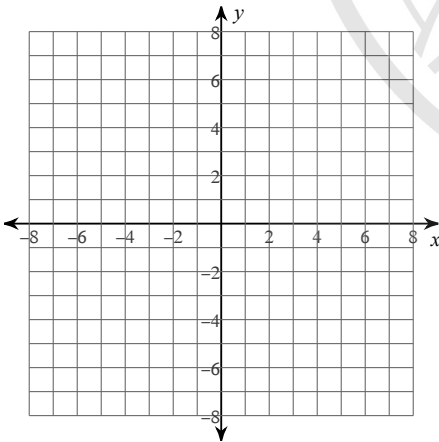**Identify the domain and range of each. Then sketch the graph.**

1) $f(x) = \log_5 (3x + 7) + 1$
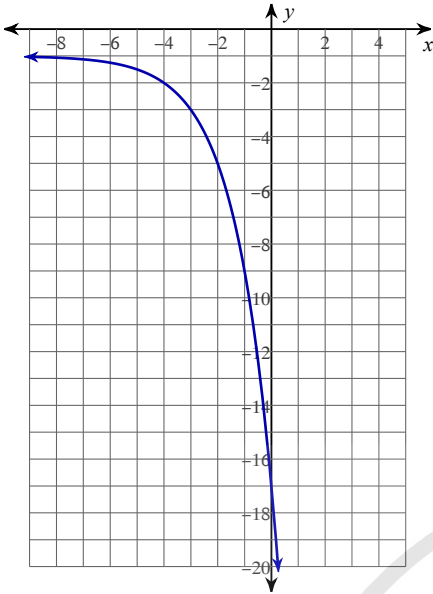
2) $f(x) = \log_6 (2x + 3) - 2$

3) $f(x) = \log_3 (4x + 18) - 3$
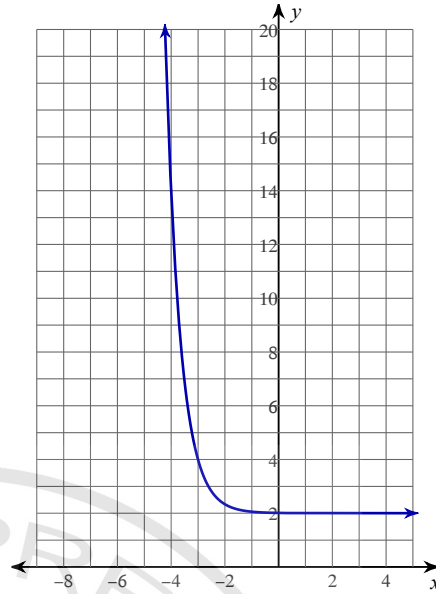
4) $f(x) = \log_4 (2x - 4) + 1$

For each graph, determine the domain, range, intercepts, asymptotes, end behavior, and where the function is increasing or decreasing. Then write the corresponding equation.
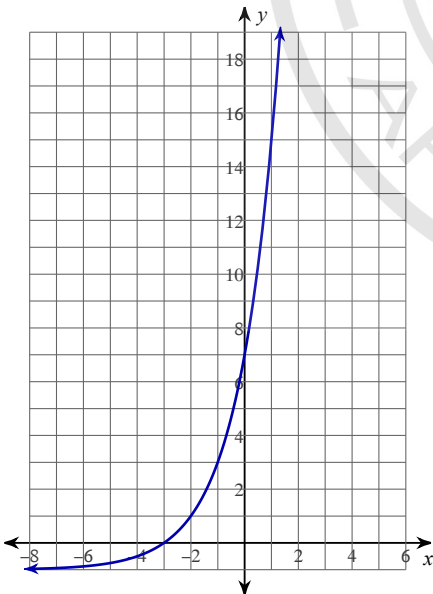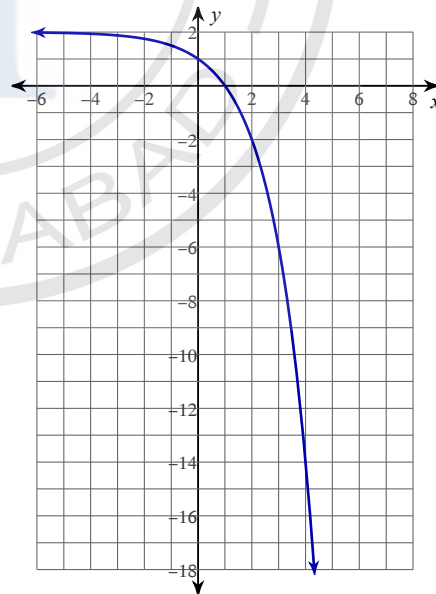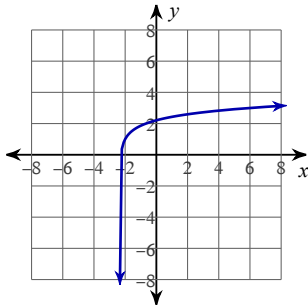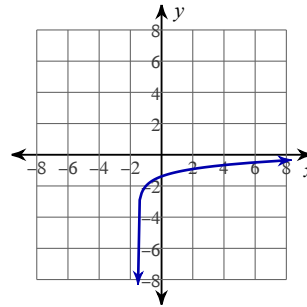
5)

6)

7)

8)

Answers to Assignment : Logarithmic and Exponential Function
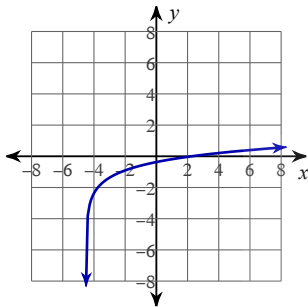
1)

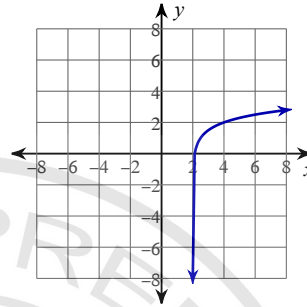Domain: $x > -\dfrac{7}{3}$

Range: All reals

2)

Domain: $x > -\dfrac{3}{2}$

Range: All reals

3)

Domain: $x > -\dfrac{9}{2}$

Range: All reals

4)

Domain: $x > 2$

Range: All reals

5) Domain: $(-\infty, \infty)$ Range: $(-\infty, -1)$

x-intercept: none y-intercept: -17

Asymptote: $y = -1$

$\lim\limits_{x \to \infty} y = -\infty$ $\lim\limits_{x \to -\infty} y = -1$

Decreasing on: $(-\infty, \infty)$

$y = -4 \cdot 2^{x+2} - 1$

6) Domain: $(-\infty, \infty)$ Range: $(2, \infty)$

x-intercept: none y-intercept: $\dfrac{217}{108}$

Asymptote: $y = 2$

$\lim\limits_{x \to \infty} y = 2$ $\lim\limits_{x \to -\infty} y = \infty$

Decreasing on: $(-\infty, \infty)$

$y = \dfrac{1}{3} \cdot \left(\dfrac{1}{6}\right)^{x+2} + 2$

7) Domain: $(-\infty, \infty)$ Range: $(-1, \infty)$

x-intercept: -3 y-intercept: 7

Asymptote: $y = -1$

$\lim\limits_{x \to \infty} y = \infty$ $\lim\limits_{x \to -\infty} y = -1$

Increasing on: $(-\infty, \infty)$

$y = 4 \cdot 2^{x+1} - 1$

8) Domain: $(-\infty, \infty)$ Range: $(-\infty, 2)$

x-intercept: 1 y-intercept: 1

Asymptote: $y = 2$

$\lim\limits_{x \to \infty} y = -\infty$ $\lim\limits_{x \to -\infty} y = 2$

Decreasing on: $(-\infty, \infty)$

$y = -2 \cdot 2^{x-1} + 2$