

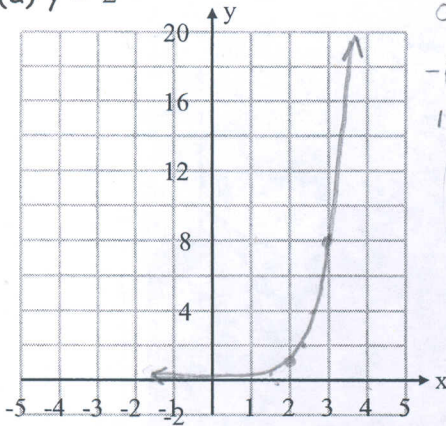
Exponential Graphs

Use calculators for checking only.

1. For the following functions:

- Graph the function.
- Identify the domain and range of the function. Domain \mathbb{R} , Range, $y > 0$
- Write the equation of any asymptotes. $y = 0$
- Determine the intercepts of the function.

(a) $y = 2^{3(x-2)}$

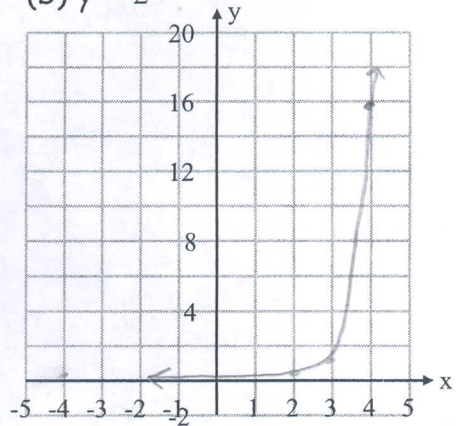


y-int.: $2^{-6} = \frac{1}{64}$

$y = 2^x$

| | |
|----|-----|
| x | y |
| 0 | 1 |
| -1 | 0.5 |
| 1 | 2 |
| 2 | 4 |
| 3 | 8 |
| 4 | 16 |

(b) $y = 2^{4(x-3)}$



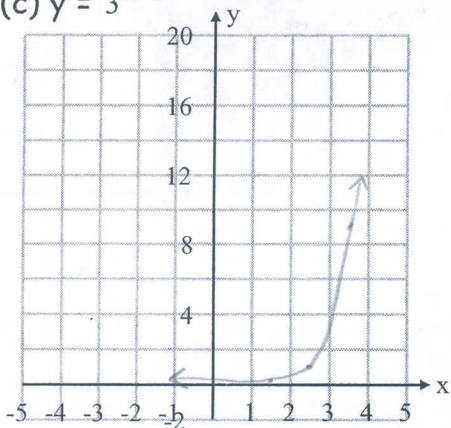
y-int.: $2^{-12} = \frac{1}{4096}$

$y = 2^x$

| | |
|----|------------|
| x | y |
| -4 | 1/16 = .06 |
| 0 | 1 |
| 4 | 16 |

| | |
|---|-----|
| x | y |
| 2 | .06 |
| 3 | 1 |
| 4 | 16 |

(c) $y = 3^{2(x-5/2)}$



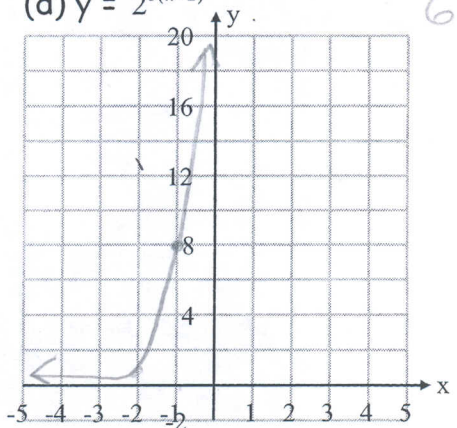
y-int.: $3^{-5} = \frac{1}{243}$

$y = 3^x$

| | |
|----|-----|
| x | y |
| -2 | 0.1 |
| 0 | 1 |
| 2 | 9 |

| | |
|-----|-----|
| x | y |
| 1.5 | 0.1 |
| 2.5 | 1 |
| 3.5 | 9 |

(d) $y = 2^{3(x+2)}$



y-int.: $2^6 = 64$

| | |
|---|----|
| x | y |
| 0 | 1 |
| 3 | 8 |
| 6 | 64 |

| | |
|----|----|
| x | y |
| -2 | 1 |
| -1 | 8 |
| 0 | 64 |

LOGARITHMIC GRAPHS

1. Write the equation of the inverse of each of the following exponential function.

$x = 7^y$
 (a) $f(x) = 7^x$ $\log_7 x = y$

$x = (3/2)^y$
 (b) $g(x) = (3/2)^x$ $\log_{3/2} x = y$

2. Write the equation of the inverse of the logarithmic function: $f(x) = \log_6 x$ $x = \log_6 y$

$6^x = y$

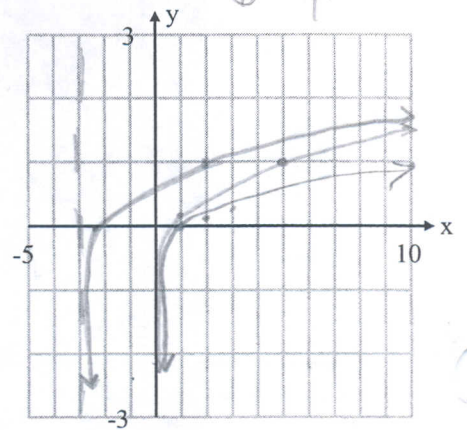
3. For the list, sketch the graphs on the same grid.

- $y = \log x$
- $y = \log_2 x$
- $y = \log_2(x+3)$

| | |
|------|-----|
| y | x |
| 1/10 | -1 |
| 1 | 0 |
| 10 | 1 |

| | |
|---------|-----|
| $1/2 x$ | y |
| 1/20 | -1 |
| 1/2 | 0 |
| 5 | 1 |

| | |
|-------------|-----|
| $1/2 x - 3$ | y |
| -2.95 | -1 |
| -2.5 | 0 |
| 2 | 1 |



4. Graph $y = 4 \log_3(x-2)$

(a) Identify the domain and range of the function.

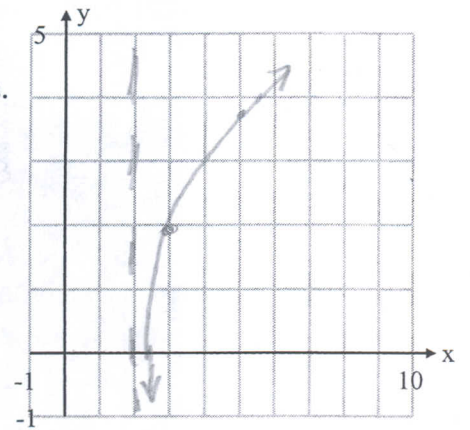
(b) Write the equations of any asymptotes.

(c) Determine the intercepts of the function.

| | |
|------|-----|
| x | y |
| 1/10 | -1 |
| 1 | 0 |
| 10 | 1 |

| | |
|------|-----|
| y | x |
| 2.03 | -4 |
| 2.3 | 0 |
| 5.3 | 4 |

$0 = 4 \log_3(x-2)$
 $0 = \log_3(x-2)$
 $10^0 = 3(x-2)$
 $1/3 + 2 = x$
 $x = 2.3$



5. Solve each equation for x , thus expressing x as a logarithmic function of y .

(a) $y = 8.2 \times 1.03^x$

$\log y = \log 8.2 + x \log 1.03$
 $x = \frac{\log y - \log 8.2}{\log 1.03}$

(b) $y = 64 \left(\frac{1}{2}\right)^x$

$\frac{y}{64} = \left(\frac{1}{2}\right)^x$
 $\log \left(\frac{y}{64}\right) = x \log \frac{1}{2}$
 $x = \frac{\log y - \log 64}{\log 1 - \log 2} = \frac{\log y - \log 64}{-\log 2}$