

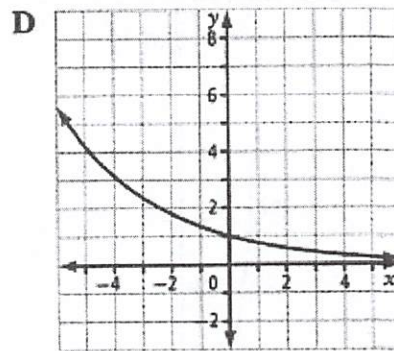
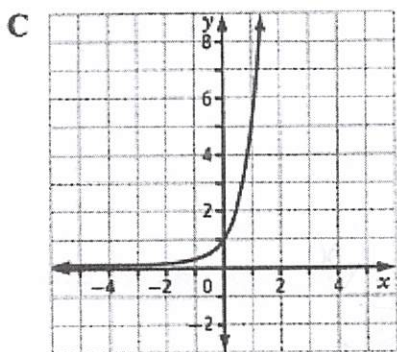
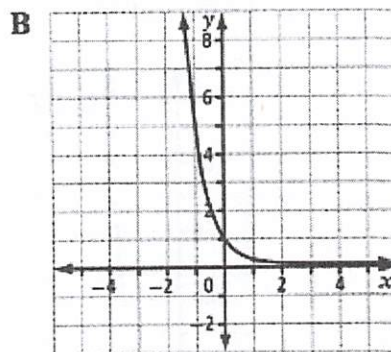
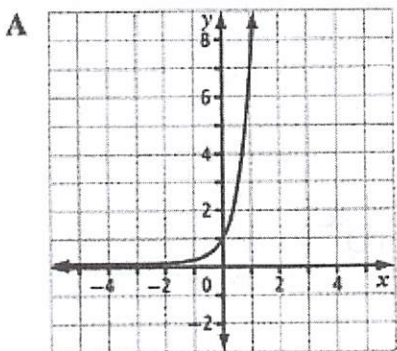
QUIZ 7&8

1. Determine if the following functions are exponential functions.

$y = x^5$		No		$y = 0.1^x$		YES		$y = \sqrt[3]{x}$		No		$y = x^{0.5}$		No
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2. Match each exponential function with its graph:

C a) $y = 5^x$ A b) $y = 7^x$ D c) $y = \left(\frac{3}{4}\right)^x$ B d) $y = 0.2^x$



3. State which basic exponential functions were transformed and name the transformations applied.

a) $y = 4^{2(x-5)} - 6$

basic function: $y = 4^x$

* horiz. stretch factor $1/2$

* horiz. translation $5 \rightarrow$

* vertic. translation $6 \downarrow$

b) $y = 2^{-x+1} - 5 = 2^{-(x-1)} - 5$

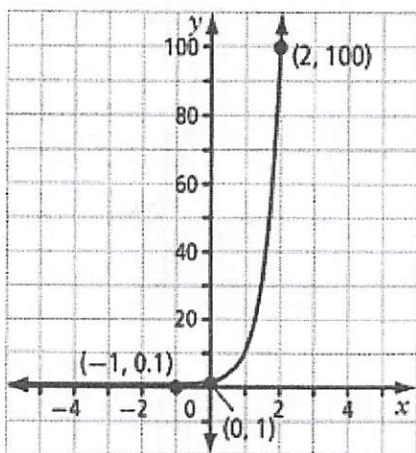
basic function: $y = 2^x$

* horiz. reflection

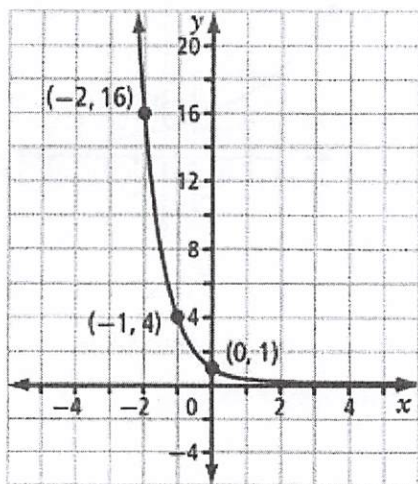
* horiz. translation $1 \rightarrow$

* vertic. translation $5 \downarrow$

4. Determine the equations of the following exponential functions :

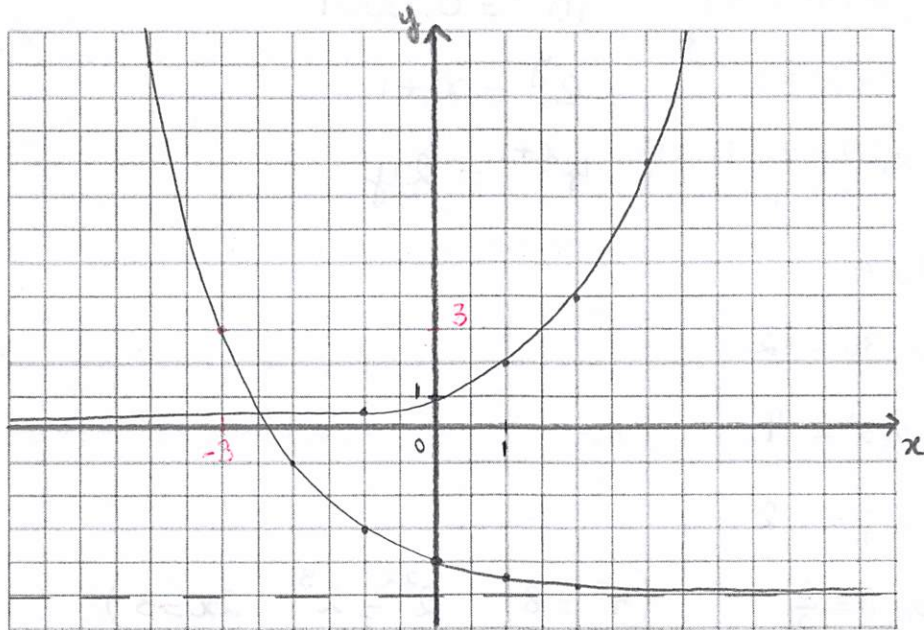


$y = 10^x$



$y = \left(\frac{1}{4}\right)^x$

5. Represent graphically $f(x) = 2^x$ and $g(x) = 2^{-x} - 5$. Determine their domain and range, y-intercept, if they are increasing or decreasing, and the equation of their asymptotes.



$$f(x) = 2^x$$

$$D = \mathbb{R}$$

$$R = (0, +\infty)$$

y-int: 1
increasing.

horiz. asympt: $y = 0$

$$g(x) = 2^{-x} - 5$$

$$D = \mathbb{R}$$

$$R = (-5, +\infty)$$

y-int: -4
decreasing

horiz. asympt: $y = -5$

6. Express the following in logarithmic form:

a) $3^5 = 243$

$$\log_3 243 = 5$$

b) $16^{\frac{1}{2}} = 4$

$$\log_{16} 4 = \frac{1}{2}$$

c) $e^{2x-5} = y - 1$

$$\ln(y-1) = 2x-5$$

7. Express the following in exponential form:

a) $\log_2 32 = 5$ $2^5 = 32$

b) $\log 0.0001 = -4$ $10^{-4} = 0.0001$

c) $\ln(x+1) = y$ $e^y = x+1$

d) $\log_4 2y = x+1$ $4^{x+1} = 2y$

8. Evaluate:

a) $\log_6 36 = 2$

b) $\log_5 5^4 = 4$

c) $\log_3 \frac{1}{9} = -2$

d) $\log_4 8 = \frac{3}{2}$ $(4^x = 8 \quad 2^{2x} = 2^3 \quad 2x = 3)$

e) $10^{\log 216} = 216$

9. Determine the value of x for each of the following equations:

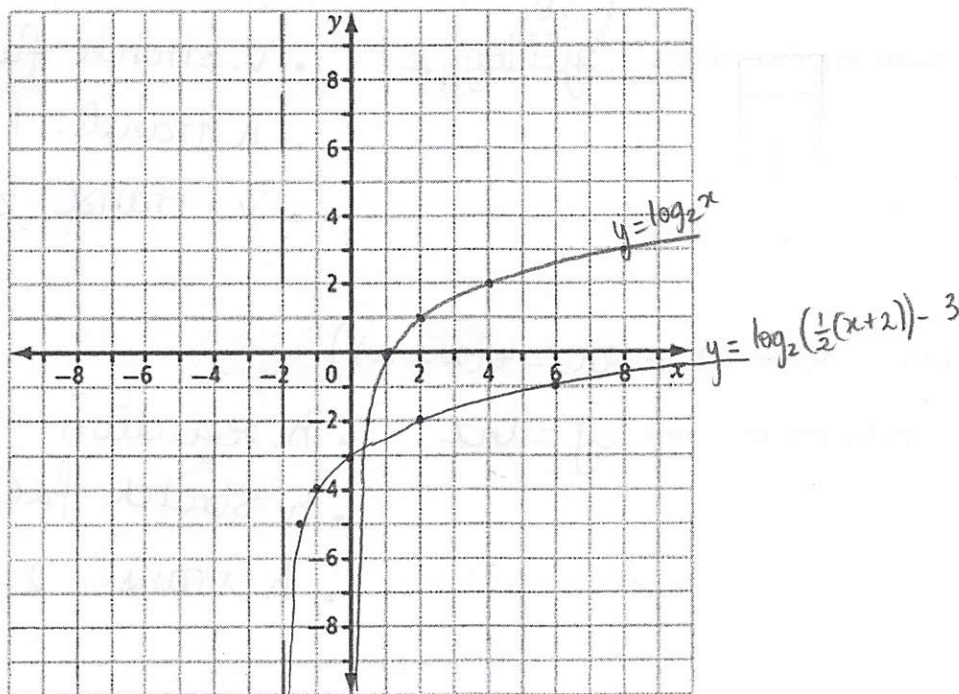
a) $4^x = 64$ $x = 3$

b) $\log_5 x = -2$ $5^{-2} = x$ $x = \frac{1}{25}$

c) $\log_x 81 = 4$ $x^4 = 81$ $x = 3$ because $x > 0$
 $x \neq 1$

d) $\log_x \frac{1}{25} = -2$ $x^{-2} = \frac{1}{25}$ $\frac{1}{x^2} = \frac{1}{25}$ $x^2 = 25$
 $x = 5$ because $x > 0$
 $x \neq 1$

10. a) Graph $y = \log_2 x$ and $y = \log_2 \left(\frac{1}{2}(x+2) \right) - 3$ on the same graph:



b) Determine the domain, range, x and y-intercepts (if they exist), and the asymptotes of the function : $y = \log_2 \left(\frac{1}{2}(x+2) \right) - 3$

$$D = \{x \in \mathbb{R} \mid x > -2\}$$

$$R = \mathbb{R}$$

$$v. \text{ asymptote: } x = -2$$

$$y\text{-int: } -3$$

3

$$x\text{-int: } 0 = \log_2 \left(\frac{1}{2}(x+2) \right) - 3$$

$$\log_2 \left(\frac{1}{2}(x+2) \right) = 3$$

$$2^3 = \frac{1}{2}(x+2)$$

$$16 = x+2$$

$$\boxed{x = 14}$$

11. Determine the transformations, in order that are applied, to transform a basic logarithmic function $y = \log_c x$ in each of the following functions:

a) $y = 2\log_4(x + 1) - 8$

Transformed function: $y = \log_4 x$

- v. stretch factor 2
- h. transl. 1 ←
- v. transl 8 ↓

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b) $y = \ln(8 - 4x) = \ln(-4(x - 2))$

transformed function: $y = \ln x$

- h. reflection
- h stretch factor $1/4$
- h transl. 2 →

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