

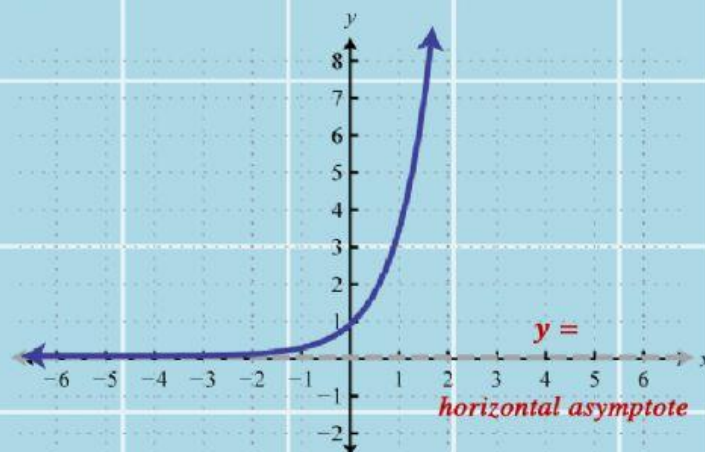
Name: \_\_\_\_\_

No. \_\_\_\_\_ M.4/ \_\_\_\_\_

**Exponential Functions**

1.  $y = 4^x$

| $x$ | $y = 4^x$                                    | <i>Solutions</i> |
|-----|----------------------------------------------|------------------|
| -3  | $4^{-3} = \frac{1}{4^3} = \frac{1}{\quad} =$ | (-3, $\quad$ )   |
| -2  | $4^{-2} = \frac{1}{4^2} = \frac{1}{\quad} =$ | (-2, $\quad$ )   |
| -1  | $4^{-1} = \frac{1}{4^1} = \frac{1}{\quad} =$ | (-1, $\quad$ )   |
| 0   | $4^0 =$                                      | (0, $\quad$ )    |
| 1   | $4^1 =$                                      | (1, $\quad$ )    |
| 2   | $4^2 =$                                      | (2, $\quad$ )    |
| 3   | $4^3 =$                                      | (3, $\quad$ )    |

 $(-\infty, \infty)$  $(0, \infty)$ *The horizontal asymptote is  $y =$* 

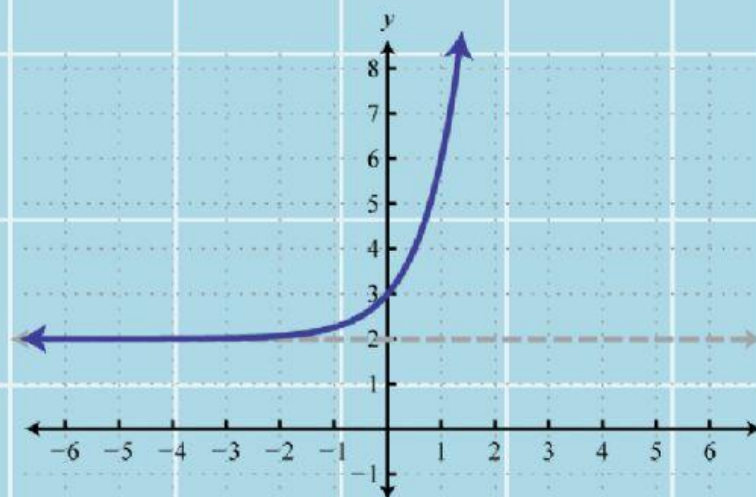
Domain:

Range:

2.  $f(x) = 4^x + 2$

| $x$ | $y = 4^x + 2$                                          | <i>Solutions</i> |
|-----|--------------------------------------------------------|------------------|
| -3  | $4^{-3} = \frac{1}{4^3} = \frac{1}{64} = 0.015625 + 2$ | (-3, 2.015625)   |
| -2  | $4^{-2} = \frac{1}{4^2} = \frac{1}{4} = \quad + 2$     | (       )        |
| -1  | $4^{-1} = \frac{1}{4^1} = \frac{1}{4} = \quad$         | (       )        |
| 0   | $4^0 = \quad + 2$                                      | (       )        |
| 1   | $4^1 = \quad$                                          | (       )        |
| 2   | $4^2 = \quad$                                          | (       )        |
| 3   | $4^3 = \quad$                                          | (       )        |

$(-\infty, \infty)$        $(2, \infty)$



*The horizontal asymptote is  $y =$*

Domain:

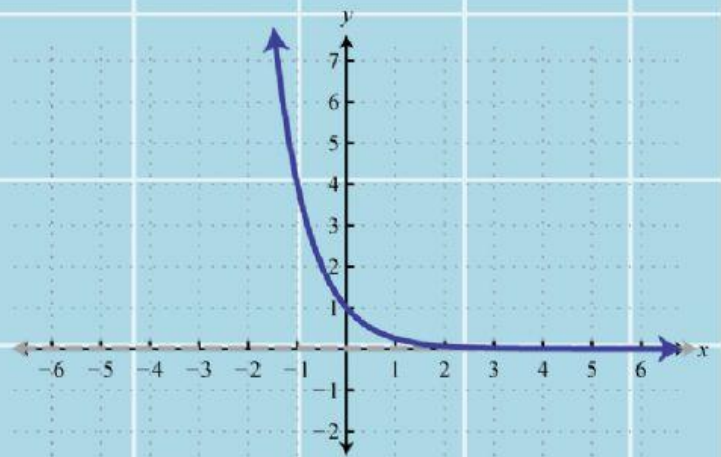
Range:

3.  $f(x) = \left(\frac{1}{4}\right)^x$

| $x$ | $y = \left(\frac{1}{4}\right)^x$                                                                                                       | <i>Solutions</i>     |
|-----|----------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| -3  | $\left(\frac{1}{4}\right)^{-3} = \frac{1}{\left(\frac{1}{4}\right)^3} = \frac{1}{\frac{1}{8}} = \frac{1}{1} \times \frac{8}{1} = 8$    | <b>(-3, 8)</b>       |
| -2  | $\left(\frac{1}{4}\right)^{-2} = \frac{1}{\left(\frac{1}{4}\right)^2} = \frac{1}{\frac{1}{16}} = \frac{1}{1} \times \frac{16}{1} = 16$ | <b>(-2, 16)</b>      |
| -1  | $\left(\frac{1}{4}\right)^{-1} = \frac{1}{\left(\frac{1}{4}\right)^1} = \frac{1}{\frac{1}{4}} = \frac{1}{1} \times \frac{4}{1} = 4$    | <b>(-1, 4)</b>       |
| 0   | $\left(\frac{1}{4}\right)^0 = 1$                                                                                                       | <b>(0, 1)</b>        |
| 1   | $\left(\frac{1}{4}\right)^1 = \frac{1}{4} = 0.25$                                                                                      | <b>(1, 0.25)</b>     |
| 2   | $\left(\frac{1}{4}\right)^2 = \frac{1}{16}$                                                                                            | <b>(2, 0.0625)</b>   |
| 3   | $\left(\frac{1}{4}\right)^3 = \frac{1}{64}$                                                                                            | <b>(3, 0.015625)</b> |

$(-\infty, \infty)$

$(0, \infty)$



*The horizontal asymptote is  $y = 0$*

Domain:

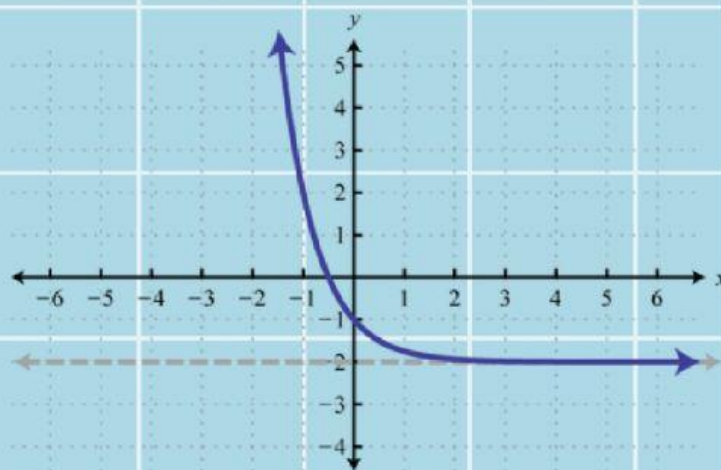
Range:

$$4. f(x) = \left(\frac{1}{4}\right)^x - 2$$

| $x$ | $y = \left(\frac{1}{4}\right)^x - 2$                                                                                                                    | <i>Solutions</i> |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| -3  | $\left(\frac{1}{4}\right)^{-3} = \frac{1}{\left(\frac{1}{4}\right)^3} = \frac{1}{\frac{1}{8}} = \frac{1}{1} \times \frac{8}{1} = 8$<br>$8 - 2 = 6$      | $(-3, 6)$        |
| -2  | $\left(\frac{1}{4}\right)^{-2} = \frac{1}{\left(\frac{1}{4}\right)^2} = \frac{1}{\frac{1}{16}} = \frac{1}{1} \times \frac{16}{1} = 16$<br>$16 - 2 = 14$ | $(-2, 14)$       |
| -1  | $\left(\frac{1}{4}\right)^{-1} = \frac{1}{\left(\frac{1}{4}\right)^1} = \frac{1}{\frac{1}{4}} = \frac{1}{1} \times \frac{4}{1} = 4$<br>$4 - 2 = 2$      | $(-1, 2)$        |
| 0   | $\left(\frac{1}{4}\right)^0 = \frac{1}{\left(\frac{1}{4}\right)^0} = \frac{1}{1} = 1$<br>$1 - 2 = -1$                                                   | $(0, -1)$        |
| 1   | $\left(\frac{1}{4}\right)^1 = \frac{1}{4} = 0.25$<br>$0.25 - 2 = -1.75$                                                                                 | $(1, -1.75)$     |
| 2   | $\left(\frac{1}{4}\right)^2 = \frac{1}{16} = 0.0625$<br>$0.0625 - 2 = -1.9375$                                                                          | $(2, -1.9375)$   |
| 3   | $\left(\frac{1}{4}\right)^3 = \frac{1}{64} = 0.015625$<br>$0.015625 - 2 = -1.984375$                                                                    | $(3, -1.984375)$ |

$(-\infty, \infty)$

$(-2, \infty)$



*The horizontal asymptote is  $y = -2$*

Domain:

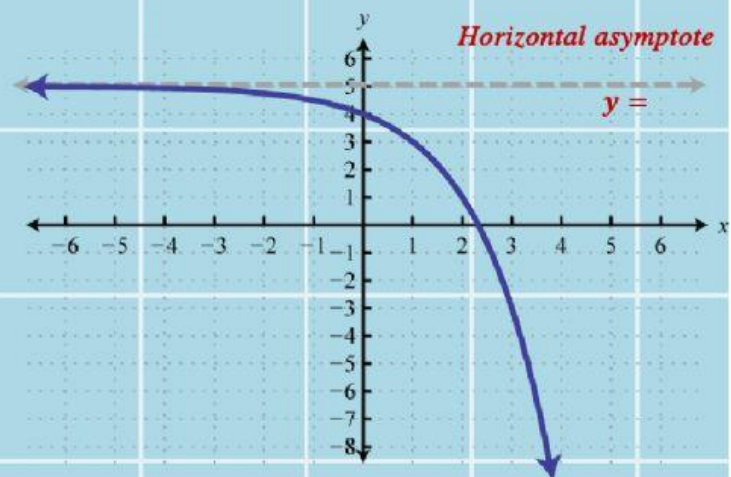
Range:

5.  $y = 5 - 2^x$

| $x$ | $y = 5 - 2^x$                                                               | Solutions          |
|-----|-----------------------------------------------------------------------------|--------------------|
| -3  | $5 - 2^{-3} = 5 - \frac{1}{2^3} = 5 - \frac{1}{8}$<br>$= 5 - 0.125 = 4.875$ | <b>(-3, 4.875)</b> |
| -2  | $5 - 2^{-2} = 5 - \frac{1}{2^2} = 5 - \frac{1}{4}$<br>$= 5 - \quad =$       | <b>(-2,    )</b>   |
| -1  | $5 - 2^{-1} = 5 - \frac{1}{2^1} = 5 - \frac{1}{2}$<br>$= 5 - \quad =$       | <b>(-1,    )</b>   |
| 0   | $5 - 2^0 = 5 - \quad =$                                                     | <b>(0,    )</b>    |
| 1   | $5 - 2^1 = 5 - \quad =$                                                     | <b>(1,    )</b>    |
| 2   | $5 - 2^2 = 5 - \quad =$                                                     | <b>(2,    )</b>    |
| 3   | $5 - 2^3 = 5 - \quad =$                                                     | <b>(3,    )</b>    |

$(-\infty, 5)$

$(-\infty, \infty)$



The horizontal asymptote is  $y =$

Domain:

Range: