

3.4 Properties of Exponential Functions - Worksheet

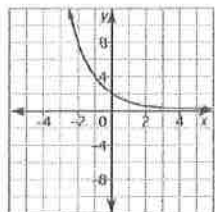
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SOLUTIONS

1) Match each graph with its corresponding equation.

a) B



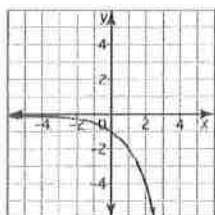
A $y = 2(2)^x$

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

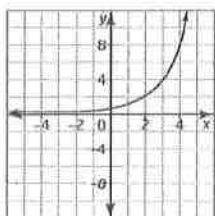
C $y = \frac{1}{2}(2)^x$

D $y = -2^x$

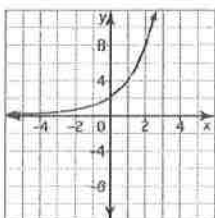
b) D



c) C



d) A



2) Given the following exponential equations, state whether they are increasing or decreasing.

a) $y = 3\left(\frac{1}{2}\right)^x$

D

b) $y = -3\left(\frac{1}{2}\right)^x$

I

c) $y = 3(2)^x$

I

d) $y = -3(2)^x$

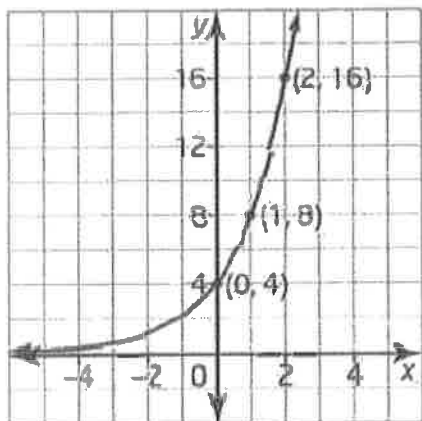
D

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

$y = 3\left(\frac{1}{2}\right)^x$

D

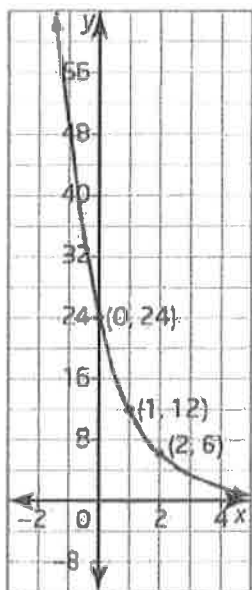
3) Write an exponential equation to match the graph shown



$$a = 4$$
$$b = 2$$

$$y = 4(2^x)$$

4) Write an exponential equation to match the graph shown



$$a = 24$$
$$b = \frac{1}{2}$$

$$y = 24\left(\frac{1}{2}\right)^x$$

5) A radioactive sample with an initial mass of 25 mg has a half-life of 2 days.

a) Write an equation to model this exponential decay where t is the time, in days, and A is the amount of the substance that remains.

$$A = 25\left(\frac{1}{2}\right)^{t/2}$$

b) What is the amount of radioactive material remaining after 7 days?

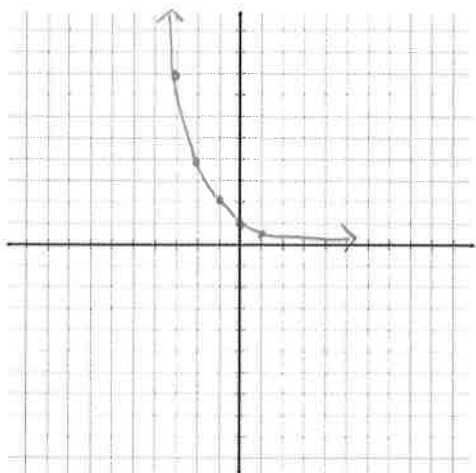
$$A = 25\left(\frac{1}{2}\right)^{7/2}$$

$$A = 2.2 \text{ mg}$$

6) Graph each function and identify the...

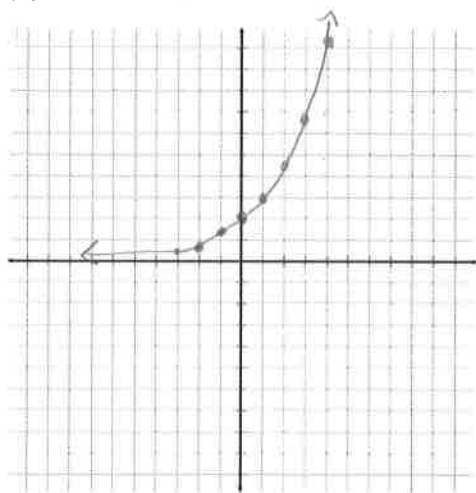
- i) domain
- ii) range
- iii) x- and y-intercepts, if they exist
- iv) increasing or decreasing
- v) asymptote

a) $f(x) = \left(\frac{1}{2}\right)^x$



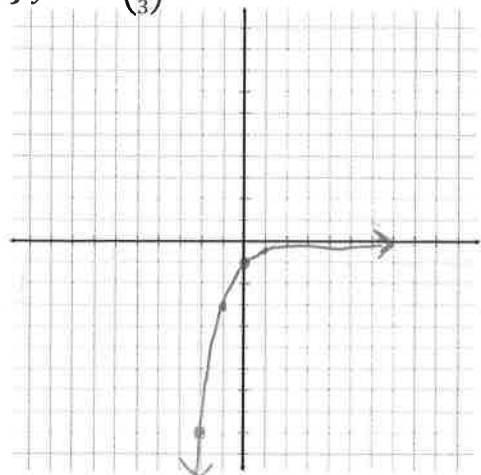
- i) $D: \{x \in \mathbb{R}\}$
- ii) $R: \{y \in \mathbb{R} \mid y > 0\}$
- iii) y-intercept at $(0, 1)$, no x-intercept.
- iv) decreasing
- v) $y = 0$ is a horizontal asymptote.

b) $y = 2(1.5^x)$



- i) $D: \{x \in \mathbb{R}\}$
- ii) $R: \{y \in \mathbb{R} \mid y > 0\}$
- iii) y-int at $(0, 2)$, no x-int.
- iv) increasing
- v) $y = 0$ is a horizontal asymptote.

c) $y = -\left(\frac{1}{3}\right)^x$



- i) $D: \{x \in \mathbb{R}\}$
- ii) $R: \{y \in \mathbb{R} \mid y < 0\}$
- iii) y-int at $(0, -1)$
- iv) increasing
- v) $y = 0$ is a horizontal asymptote.

Answers

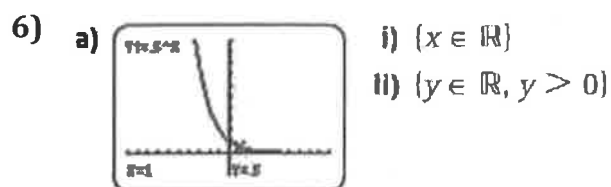
1) a) B b) D c) C d) A

2) a) decreasing b) increasing c) increasing d) decreasing e) decreasing

3) $y = 4(2^x)$

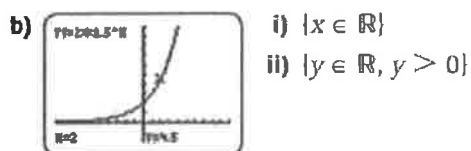
4) $y = 24\left(\frac{1}{2}\right)^x$

5) a) $A = 25\left(\frac{1}{2}\right)^{\frac{t}{2}}$ b) 2.2 mg



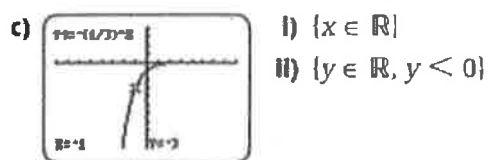
iii) no x-intercept; y-intercept 1

iv) always decreasing v) $y = 0$



iii) no x-intercept; y-intercept 2

iv) always increasing v) $y = 0$



iii) no x-intercept; y-intercept -1

iv) always increasing v) $y = 0$