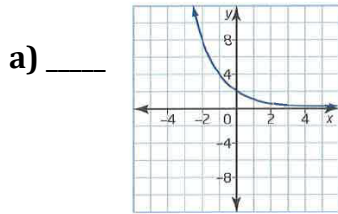# 3.4 Properties of Exponential Functions – Worksheet
MCR3U
Jensen

1) Match each graph with its corresponding equation.
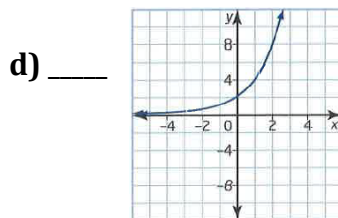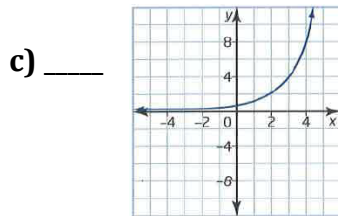
a) ____

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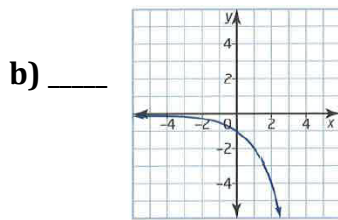
B $y = 2\left(\frac{1}{2}\right)^x$

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

D $y = -2^x$

b) ____

c) ____

d) ____

2) Given the following exponential equations, state whether they are increasing or decreasing.
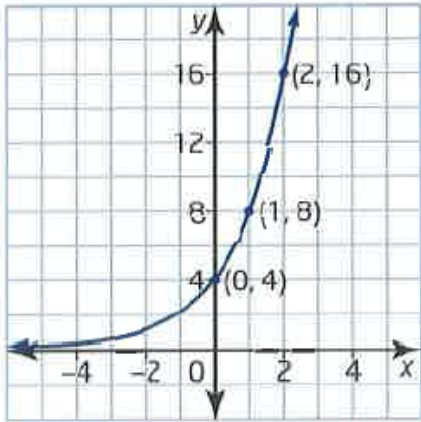
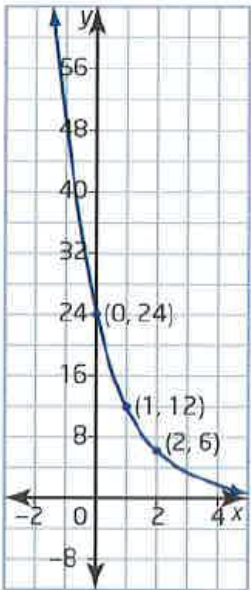**a)** $y = 3\left(\frac{1}{2}\right)^x$ **b)** $y = -3\left(\frac{1}{2}\right)^x$ **c)** $y = 3(2)^x$ **d)** $y = -3(2)^x$ **e)** $y = 3(2)^{-x}$

3) Write an exponential equation to match the graph shown

4) Write an exponential equation to match the graph shown

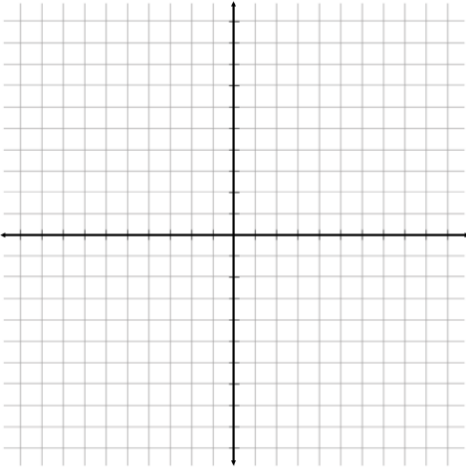**5)** A radioactive sample with an initial mass of 25 mg has a half-life of 2 days.

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.

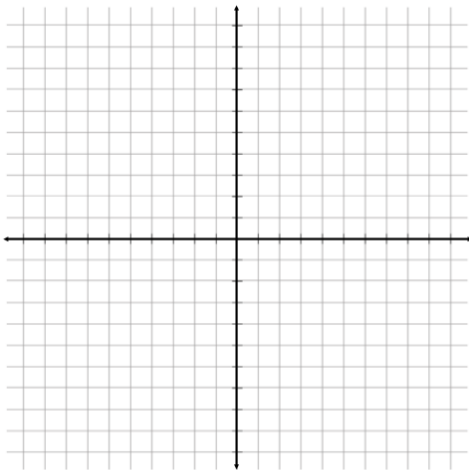**b)** What is the amount of radioactive material remaining after 7 days?

6) Graph each function and identify the...

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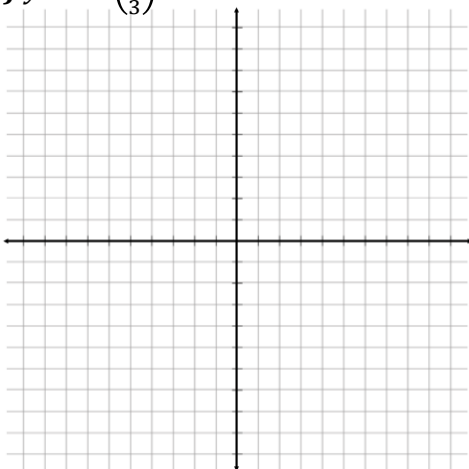- **iii)** x- and y-intercepts, if they exist
- **iv)** increasing or decreasing
- **v)** asymptote

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

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

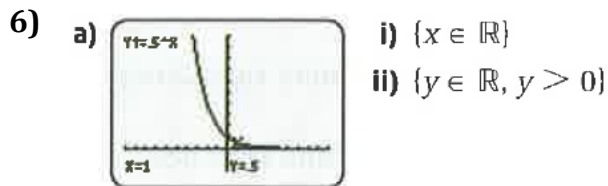**c)** $y = -\left(\frac{1}{3}\right)^x$

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

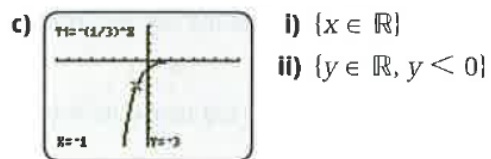**5) a)** $A = 25 \left(\frac{1}{2}\right)^{\frac{t}{2}}$ **b)** 2.2 mg

6)

a)

i) $\{x \in \mathbb{R}\}$
ii) $\{y \in \mathbb{R}, y > 0\}$

iii) no x-intercept; y-intercept 1
iv) always decreasing   **v)** $y = 0$

b)

i) $\{x \in \mathbb{R}\}$
ii) $\{y \in \mathbb{R}, y > 0\}$

iii) no x-intercept; y-intercept 2
iv) always increasing   **v)** $y = 0$

c)

i) $\{x \in \mathbb{R}\}$
ii) $\{y \in \mathbb{R}, y < 0\}$

iii) no x-intercept; y-intercept -1
iv) always increasing   **v)** $y = 0$