

Exponentials Test Review

Date _____

Period _____

Choose the correct answer.

- 1) Sharice is trying to restart her New Year's resolution so she investigates the costs of gyms near her. She determines LA Fitness to be the best option. The sign-up fee at LA Fitness is \$75, and costs \$30 ~~X~~ month after that. After six months, how much money has Sharice spent towards the gym?

A) \$405 B) \$330 C) \$480 D) \$362

$$y = 30x + 75$$

$$y = 30(6) + 75$$

$$y = 255$$

- 2) A new sports car sells for \$35,000. The value of the car depreciates 18% annually. Which of the following choices models the yearly value of the car since its purchase?

A) $y = 35000 \cdot 0.82^x$

B) $y = 35000 \cdot 1.18^x$

C) $y = 35000 \cdot 0.18^x$

D) $y = 35000 \cdot 1.018^x$

$$35000(1 - 18\%)^x$$

$$35000(0.82)^x$$

- 3) At the end of last year, the population of Alaina's hometown was approximately 75,000 people. The population is growing at the rate of 2.4% each year. Which function models the growth of this town?

A) $f(x) = 75000 \cdot 0.976^x$

B) $f(x) = 75000 \cdot 1.024^x$

C) $f(x) = 75000 \cdot 0.76^x$

D) $f(x) = 75000 \cdot 1.24^x$

$$75,000(1 + 2.4\%)^x$$

$$75,000(1.024)^x$$

Using the equation of the exponential function given, answer the following questions:

$$y = -\frac{3}{2} \cdot 4^{x-2} - 1$$

- 4) What is the asymptote of this function?

$$y = k \text{ so } y = -1$$

- 5) How does the function move horizontally?

(exponent)

right 2

- 6) Is this function a reflection? How do you know?

yes, a is negative

- 7) How does this function move vertically?

k = -1 down 1

- 8) Is this function stretched or compressed vertically?

$$\frac{3}{2} > 1$$

Using the equation of the exponential function given, answer the following questions:

$$y = 3 \cdot \left(\frac{1}{4}\right)^{x-1} + 3$$

- 9) What type of exponential function is given above? Growth or decay and why?

b value

$$\frac{1}{4} < 1$$

10) How does this function shift vertically?

$k=3$
up 3

11) Does this function stretch or compress, and by what factor?

$3 > 1$

12) How does this function move horizontally?

right 1

13) Is this function a reflection? Why or why not?

No a is +

14) Given the function $y = 2^x$, what transformation produces the new function $y = 2^{x+3}$?

~~A) vertical shift up 3~~

B) horizontal shift right 3

~~C) vertical stretch by a factor of 3~~

D) horizontal shift left 3

Geometric sequences are created by multiplying the prior term by a constant value, called the common ratio. This common multiplication occurring at each step can be viewed as a "growth factor," similar to what we see in exponential growth.

3, 9, 27, 81, ...

$$r = \frac{9}{3} = 3$$

15) Which function models this sequence?

A) $y = 3^x$

→ $a_1 = 3^1 = 3$

~~B) $y = 3(1 - 0.3)^x$~~

$a_2 = 3^2 = 9$

C) $y = 3(1 + 0.3)^x$

$a_3 = 3^3 = 27$

~~D) $y = x^3$~~

$a_4 = 3^4 = 81$

Given the equation $y = 20 \cdot 0.9^x$:

16) Does this equation represent exponential growth or decay?

- A) exponential decay
- B) exponential growth

17) What is the initial value?

initial value = 20

18) What is the rate?

10% (circled)

1 - 0.9 = 0.1 = 10% (circled)

OR

400 students are chosen for a game. 15% are randomly cut each day.

19) This is a situation of:

- A) exponential growth
 B) exponential decay

20) How can you write a function that models the game?

$$400(1-15\%)^x$$

$$400(0.85)^x$$

Freeze tag is being played in elementary school. The person who is "it" tags 35% more people each round. First, there are 2 people to start.

21) This is an example of:

- A) exponential growth
 B) exponential decay

22) How can you write a function that models this game?

$$2(1+35\%)^x$$

$$2(1.35)^x$$

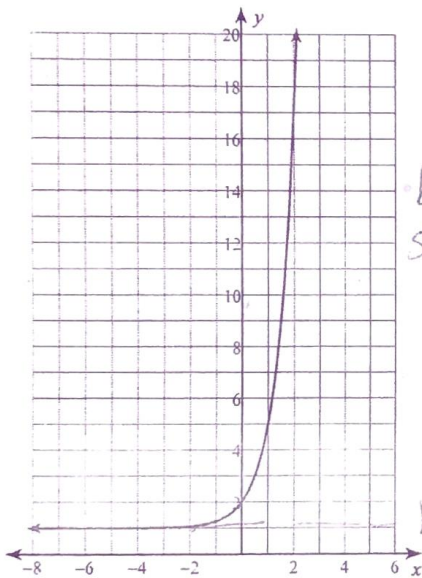
23) How many students will be frozen after 12 rounds?

$$2(1+35\%)^{12} = 73.29 \approx 73 \text{ students}$$

OR $2(1.35)^{12}$

Choose the correct equation AND IDENTIFY DOMAIN AND RANGE FOR EACH

24)



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

B) $y = \frac{1}{4} \cdot 4^{x+1} + 1$

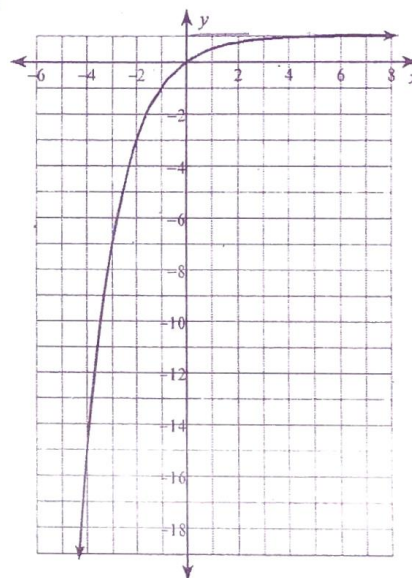
C) $y = -3 \cdot 2^{x-2} + 2$

D) $y = -4 \cdot 2^{x+1} + 2$

Domain: $-\infty < x < \infty$

Range: $y > 4$
 $y > 1 \rightarrow$ b/c a is pos

25)



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

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

C) $y = 5 \cdot \left(\frac{1}{2}\right)^{x+1} - 1$

D) $y = -\frac{1}{2} \cdot \left(\frac{1}{2}\right)^{x-1} + 1$

$K=1$
 r shaped so negative
 normal r so decay
 so b value < 1

D: $(-\infty, \infty)$

Range: $y < 1$
 b/c a is neg