Chapter 6 Finals Warm Up

Solve for x.

1. $25^{x+5} = \left(\frac{1}{125}\right)^{2x}$

$(5^2)^{x+5} = (5^{-3})^{2x}$

$2(x+5) = -3(2x)$

$2x + 10 = -6x$

$8x = -10$

$\boxed{x = -\frac{5}{4}}$

2. $\log_9(3x+5) = 3$

$9^3 = 3x+5$

$729 = 3x+5$

$724 = 3x$

$\boxed{\frac{724}{3} = x}$

3. $\log_7(x^2 - 12) = \log_7(4x)$

$x^2 - 12 = 4x$

$x^2 - 4x - 12 = 0$

$(x-6)(x+2) = 0$

$\boxed{x = 6}$ $\cancel{x = -2}$

check

$\log_7(6^2 - 12) = \log_7(4(6))$

$\log_7(24) = \log_7(24)$ ✓

$\log_7((-2)^2 - 12) = \log_7(4(-2))$

$\log_7(-8) = \log_7(-8)$ ×

4. Find the exact & approx.: $7^{x+1} + 4 = 10$

$7^{x+1} = 6$

$\log 7^{x+1} = \log 6$

$(x+1)\log 7 = \log 6$

$x+1 = \frac{\log 6}{\log 7}$

$x = \frac{\log 6}{\log 7} - 1$

≈ -0.079

5. Evaluate $\log_4 64 = ?$

$4^? = 64$

3, since $4^3 = 64$

6. Given $y = 27(0.92)^x$ what would be the percent growth or decay?

$1 - .08$

8% decay

7. Use the sequence $26, 5.2, 1.04...$ to answer the following questions.

a. Find the recursive formula

$$a_n = \begin{cases} 26 & n = 1 \\ 0.2a_{n-1} & n > 1 \end{cases}$$

b. Find the explicit formula

$a_n = 26(0.2)^{n-1}$

c. Find the ~~10th~~ 6th term

$a_6 = 26(0.2)^{6-1}$

$= 0.001664$

d. Find the infinite sum

$S_\infty = \frac{a_1}{1-r}$

$S_\infty = \frac{26}{1-.2}$

$= 32.5$

Scanned by CamScanner

$$S_n = \frac{a_1(1-r^n)}{1-r}$$

8. Find the sum $\sum_{n=1}^{12} 3(1.9)^{n-1}$.

$$S_{12} = \frac{3(1-(1.9)^{12})}{1-1.9}$$

$$\approx 7374.383$$

9. You bought a baseball card for $35. It is a collector's card that increases by 1.2% quarterly. How much would the card be worth after 6 years?

$$A = 35\left(1+\frac{.012}{4}\right)^{4(t)}$$

$$= 35\left(1+\frac{.012}{4}\right)^{4(6)}$$

$$\approx \$36.61$$

10. When Jane was born her parents put $15,000 in an account that compounds continuously at 2.6%.

a. How much money would be in the account after 6 years?

$$A = 15000e^{.026t}$$

$$= 15000e^{.026(6)}$$

$$\approx \$17532.39$$

b. How long would it take you to double your money?

$$30{,}000 = 15000e^{.026t}$$

$$2 = e^{.026t}$$

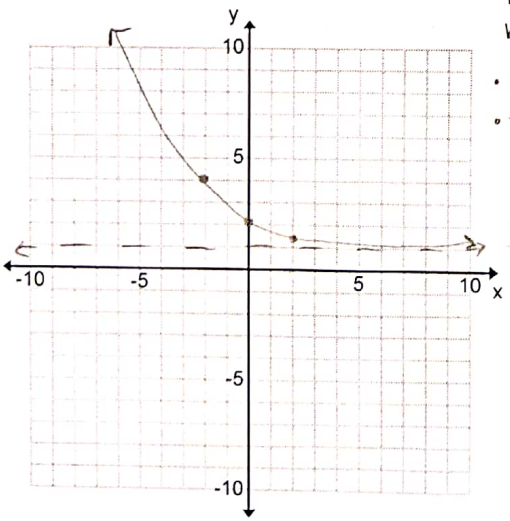
$$\ln 2 = .026t$$

$$\frac{\ln 2}{.026} = t$$

$$26.66 \approx t$$

It would take just over 26 years

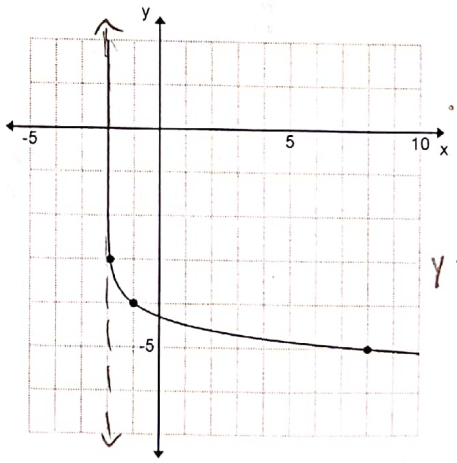
11. Graph $y = (3)^{\frac{-x}{2}} + 1$



- Horiz dilation by 2
- Reflect over y
- Translate up 1

$-2x$	x	y	$y+1$
2	-1	$\frac{1}{3}$	$\frac{4}{3} \approx 1.\overline{3}$
0	0	1	2
-2	1	3	4

12. Find the equation for the graph below. Base 10



- Translate left 2, down 4

$$y = \log(x+2) - 4$$

Scanned by CamScanner