Q1. The function  $f(x) = 1 + 1.6 \ln (x+1)$  models the average number of free-throws a basketball player can make consecutively during practice as a function of time, where x is the number of consecutive days the basketball player has practiced for two hours. After how many days of practice can the basketball player make an average of 6 consecutive free throws?

- a. 24 days
- b. 80 days
- c. 22 days
- 0 ......
- d. 78 days

Q2.  $pH = -log_{10}[H^+]$  Find the  $[H^+]$  if the pH = 8.4.

 $\begin{array}{c} \bullet & \text{a. } 3.98 \times 10^{-8} \\ \bullet & \text{b. } 2.51 \times 10^{-8} \\ \bullet & \text{c. } 3.98 \times 10^{-9} \\ \bullet & \text{d. } 2.51 \times 10^{-9} \end{array}$ 

Q3. A local bank advertises that it pays interest on savings accounts at the rate of 3% compounded monthly. Find the effective rate. Round answer to two decimal places.

a. 3.44%
 b. 3.40%
 c. 36%
 d. 3.04%

Q4. Change the exponential expression to an equivalent expression involving a logarithm.

```
e^{x} = 25

a. \log_{25} x = e

b. \log_{x} e = 25

c. \ln x = 25

d. \ln 25 = x
```

Q5. The half-life of silicon-32 is 710 years. If 100 grams is present now, how much will be present in 600 years? (Round your answer to three decimal places.)

a. 0
 b. 0.286
 c. 94.311
 d. 55.668

### **Q6.** Express y as a function of x. The constant C is a positive number.

 $\begin{array}{c}
\text{In } \mathbf{y} = \mathbf{In} \ \mathbf{4x} + \mathbf{In} \ \mathbf{C} \\
\text{O} \\
\text{a. } \mathbf{y} = 4\mathbf{Cx}
\end{array}$ 

- b. y = 4x + C
- c.  $y = (4x)^{c}$
- <sup>C</sup> d. y = x + 4C

Q7. What annual rate of interest is required to triple an investment in 12 years?

- a. 4.794%
   b. 9.587%
   c. 455%
- c. 9.155%
- d. 5.946%

Q8. Change the exponential expression to an equivalent expression involving a logarithm.

**5<sup>x</sup> = 125 a**.  $\log_{125} x = 5$  **b**.  $\log_5 125 = x$  **c**.  $\log_{125} 5 = x$ **d**.  $\log_x 125 = 5$ 

**Q9.** Find the amount that results from the investment.

\$480 invested at 16% compounded quarterly after a period of 4 years

- a. \$864.45
   b. \$419.03
   c. \$200.11
- c. \$869.11 d. \$899.03

Q10. Change the logarithmic expression to an equivalent expression involving an exponent.

$$\ln \frac{1}{e^{6}} = -6$$

$$a. e^{-6} = \frac{1}{e^{6}}$$

$$b. \left(\frac{1}{e^{6}}\right)_{-6} = e$$

$$c. -6^{e} = \frac{1}{e^{6}}$$

$$d. \left(\frac{1}{e^{6}}\right)_{e} = -6$$
Q11. If 7<sup>-x</sup> =  $\frac{1}{4}$ , what does 49<sup>x</sup> equal?

a. 4
 b. 16
 c. -16
 d. -4

# Q12. Solve for pH: pH = $-\log_{10}[H^+]$ Find the pH if the $[H^+] = 9.6 \times 10^{-6}$ .

- a. 6.02
   b. 5.02
   c. 6.98
- d. 5.98

Q13. Solve the equation.

log₃2	7 = x
0	a. {81}
0	b. {9}
0	c. {3}
C	d. {30}

Q14. The function  $A = A_0 e^{-0.0099x}$  models the amount in pounds of a particular radioactive material stored in a concrete vault, where x is the number of years since the material was put into the vault. If 400 pounds of the material are initially put into the vault, how many pounds will be left after 40 years?

- a. 350 pounds
- b. 269 pounds
- C c. 114 pounds
- d. 119 pounds

#### **Q15.** Find the amount that results from the investment.

#### \$1,000 invested at 9% compounded annually after a period of 8 years

C	a. \$1828.04
0	b. \$1992.56
0	c. \$2171.89
0	d. \$992.56

Q16. The half-life of a radioactive element is 130 days, but your sample will not be useful to you after 80% of the radioactive nuclei originally present have disintegrated. About how many days can you use the sample?

° a. 302

b. 287
 c. 312
 d. 297

### Q17. Solve the equation.

# $\log_3 x + \log_3 (x - 24) = 4$

a. {-3, 27}
b. {27}
c. No real solutions
d. {53}

# Q18. Express as a single logarithm.

40	log₅ <sup>5</sup> √x + log₅(40x <sup>6</sup> ) - log₅ 40
0	a. $\log_5 x^{14/5}$
0	b. log <sub>5</sub> x <sup>14</sup>
0	c. log <sub>5</sub> x <sup>13/6</sup>
C	d. log <sub>5</sub> x <sup>11/8</sup>

### Q19. If the following defines a one-to-one function, find the inverse.

# $\{(6, 6), (12, 7), (10, 8), (8, 9)\}$

- a. {(7, 6), (9, 10), (6, 10), (7, 8)}
- b. {(7, 6), (6, 10), (6, 12), (7, 8)}
- C. Not a one-to-one function
- d. {(6, 6), (7, 12), (8, 10), (9, 8)}

# **Q20.** Find the effective rate of interest.

### 50.11% compounded daily

- ° a. 50.233%
- С b. 51.015%
- С с. 50.315%
- C d. 64.997%