## College Algebra

1. What is the next term in the geometric sequence $16,-4,1,-\frac{1}{4}, \ldots$ ?
A. $\quad-\frac{1}{8}$
B. 0
C. $\quad \frac{1}{16}$
D. $\frac{1}{8}$
E. $\quad \frac{1}{2}$
2. A manufacturing company processes raw ore. The number of tons of refined material the company can produce during $t$ days using Process $A$ is $A(t)=t^{2}+2 t$ and using Process $B$ is $B(t)=10 t$. The company has only 7 days to process ore and must choose 1 of the processes. What is the maximum output of refined material, in tons, for this time period?
A. 8
B. $\quad 10$
C. 51
D. 63
E. $\quad 70$
3. For the 2 functions, $f(x)$ and $g(x)$, tables of values are shown below. What is the value of $g(f(3))$ ?

| $x$ | $f(x)$ | $x$ | $g(x)$ |
| :---: | :---: | :---: | :---: |
| -5 | 7 | -2 | 3 |
| -2 | -5 | 1 | -1 |
| 1 | 3 | 2 | -3 |
| 3 | 2 | 3 | -5 |

A. $\quad-5$
B. -3
C. -1
D. 2
E. 7
4. For positive real numbers $x, y$, and $z$, which of the following expressions is equivalent to $x^{\frac{1}{2}} y^{\frac{2}{3}} z^{\frac{5}{6}}$ ?
A. $\quad \sqrt[3]{x y^{2} z^{3}}$
B. $\sqrt[6]{x y^{2} z^{5}}$
C. $\quad \sqrt[6]{x^{3} y^{2} z^{5}}$
D. $\quad \sqrt[6]{x^{3} y^{4} z^{5}}$
E. $\sqrt[11]{x y^{2} z^{5}}$
5. If $A=\left[\begin{array}{rr}2 & -4 \\ 6 & 0\end{array}\right]$ and $B=\left[\begin{array}{ll}-2 & 4 \\ -6 & 0\end{array}\right]$, then $A-B=$ ?
A. $\quad\left[\begin{array}{ll}0 & 0 \\ 0 & 0\end{array}\right]$
B. $\quad\left[\begin{array}{ll}1 & 0 \\ 0 & 1\end{array}\right]$
C. $\quad\left[\begin{array}{cc}0 & -8 \\ 0 & 0\end{array}\right]$
D. $\quad\left[\begin{array}{rr}-4 & 0 \\ -12 & 0\end{array}\right]$
E. $\quad\left[\begin{array}{rr}4 & -8 \\ 12 & 0\end{array}\right]$
6. Listed below are 5 functions, each denoted $g(x)$ and each involving a real number constant $c>1$. If $f(x)=2^{x}$, which of these 5 functions yields the greatest value for $f(g(x))$, for all $x>1$ ?
A. $\quad g(x)=c x$
B. $\quad g(x)=\frac{c}{x}$
C. $\quad g(x)=\frac{x}{c}$
D. $\quad g(x)=x-c$
E. $\quad g(x)=\log _{c} x$
7. If the function $f$ satisfies the equation $f(x+y)=f(x)+f(y)$ for every pair of real numbers $x$ and $y$, what are the possible values of $f(0)$ ?
A. Any real number
B. Any positive real number
C. $\quad 0$ and 1 only
D. $\quad 1$ only
E. 0 only
8. The imaginary number $i$ is defined such that $i^{2}=-1$. What does $i+i^{2}+i^{3}+\cdots+i^{49}$ equal?
A. $\quad i$
B. $-i$
C. $\quad-1$
D. $\quad 0$
E.
1
9. In an arithmetic series, the terms of the series are equally spread out. For example, in $1+5+9+13+17$, consecutive terms are 4 apart. If the first term in an arithmetic series is 3 , the last term is 136 , and the sum is 1,390 , what are the first 3 terms?
A. $\quad 3,10,17$
B. $\quad 3,23,43$
C. $\quad 3,36 \frac{1}{3}, 70$
D. $\quad 3,69 \frac{1}{2}, 136$
E. $\quad 3,139,1,251$

## Correct Answers for Sample College Algebra Items

| Item \# | Correct Answer |
| :---: | :---: |
| 1 | C |
| 2 | E |
| 3 | B |
| 4 | D |
| 5 | E |
| 6 | A |
| 7 | E |
| 8 | A |
| 9 | A |

