

1

The operation $x\#n$ for all positive integers greater than 1 is defined in the following manner: $x\#n = x$ to the power of $x\#(n-1)$

If $x\#1 = x$, which of the following expressions has the greatest value?

- A. $(3\#2)\#2$
- B. $3\#(1\#3)$
- C. $(2\#3)\#2$
- D. $2\#(2\#3)$
- E. $(2\#2)\#3$

2

For which of the following functions is $f(a+b)=f(a)+f(b)$ for all positive numbers a and b ?

- A. $f(x) = x^2$
- B. $f(x) = x+1$
- C. $f(x) = \sqrt{x}$
- D. $f(x) = \frac{2}{x}$
- E. $f(x) = -3x$

3

If the function Q is defined by the formula $Q = 5w/(4x(z^2))$, by what factor will Q be multiplied if w is quadrupled, x is doubled, and z is tripled?

- A. $1/9$
- B. $2/9$
- C. $4/9$
- D. $3/9$
- E. $2/27$

4

$Ax(y)$ is an operation that adds 1 to y and then multiplies the result by x . If $x = 2/3$, then $Ax(Ax(Ax(Ax(Ax(x)))))$ is between

- (A) 0 and $\frac{1}{2}$
- (B) $\frac{1}{2}$ and 1
- (C) 1 and $1\frac{1}{2}$
- (D) $1\frac{1}{2}$ and 2
- (E) 2 and $2\frac{1}{2}$