1

Which of the following is equivalent to 0.03 % of 4?

A) 0.12

B) 0.012

C) 0.0012

D) 0.00012

2

$\frac{1}{400} =$

A) 0.25%

B) 0.025%

C) 0.0025%

D) 0.00025%

3

The quantities x and y are positive. If x is decreased by 20 percent and y is increased by 20 percent, then the product of x and y is

A) unchanged

B) decreased by 4%

C) increased by 5%

D) decreased by 6%

4

By what percent is 4.5×10^5 greater than 9×10^4?

A) 200%

B) 400%

C) 500%

D) 600%

5

The temperature increased from 60°F to 72°F. What is the percent increase in temperature?

A) 15%

B) $\frac{50}{3}\%$

C) 20%

D) $\frac{70}{3}\%$

6

What percent of 12 is 8?

A) 60%

B) $66\frac{2}{3}\%$

C) 75%

D) $130\frac{1}{3}\%$

7

54 is 120% of k.

Which of the following proportions could be used to solve the above expression?

A) $\frac{100}{120} = \frac{54}{k}$

B) $\frac{54}{100} = \frac{120}{k}$

C) $\frac{100}{54} = \frac{120}{k}$

D) $\frac{120}{100} = \frac{54}{k}$

8

If Kevin's monthly salary of \$4,500 is 72 percent of Paul's monthly salary, what is Paul's monthly salary?

A) \$3,240

B) \$5,150

C) \$5,870

D) \$6,250

9 A chemist mixes a 40% acid solution and a 30% acid solution. How many liters of the 40% solution must be added to produce 50 liters of a solution that is 36% acid?

A) 24

B) 26

C) 30

D) 32

10 A chemist mixes x mL of a 34% acid solution with a 10% acid solution. If the resulting solution is 40 mL with 25% acidity, what is the value of x?

A) 18.5

B) 20

C) 22.5

D) 25

11 The numbers a, b, and c are positive and a equals $3.2bc$. If b is increased by 150% and c is decreased by 60%, then a is

A) increased by 90%

B) increased by 10%

C) unchanged

D) decreased by 10%

12 A tablet with a list price of x dollars is discounted by 15% and then discounted an additional 12%. What is the final sale price of the tablet, in terms of x?

A) $0.73x$

B) $0.748x$

C) $0.75x$

D) $0.765x$

13 Number n is 25 less than 120 percent of itself. What is the value of n?

A) 125

B) 120

C) 105

D) 90

14 If $f(x)=\dfrac{1-5x}{2}$ and $g(x)=2-x$, what is the value of $f(g(3))$?

A) -7

B) -2

C) 2

D) 3

15 If $f(x)=x^2-3x-1$ and $g(x)=1-x$, what is the value of $f\circ g(-2)$?

A) -3

B) -1

C) 1

D) 3

16 A function f satisfies $f(-1)=8$ and $f(1)=-2$.
A function g satisfies $g(2)=5$ and $g(-1)=1$.
What is the value of $f(g(-1))$?

A) -2

B) 1

C) 5

D) 8

17 If $f(x)=\sqrt{2x^2-1}$, what is the value of $f\circ f\circ f(2)$?

A) $\sqrt{10}$

B) $\sqrt{15}$

C) $\sqrt{21}$

D) 5

18 If $f(x)=\sqrt{2x}$ and $g(x)=2x^2$, what is the value of $f(g(1))-g(f(1))$?

A) -4

B) -2

C) 2

D) 4

19 If $f(x)=\sqrt{625-x^2}$ and $g(x)=\sqrt{225-x^2}$, what is the value of $f(f(5))-g((g5))$?

A) 0

B) 5

C) 10

D) 20

20

x	$f(x)$
1	a
2	a^5
3	a^9

For the exponential function f, the table above shows several values of x and their corresponding values of $f(x)$, where a is a constant greater than 1. If k is a constant and $f(k) = a^{29}$, what is the value of k ?

A) 6
B) 8
C) 4
D) 9

21

f(x) = (x - 14)(x + 19)

The function f is defined by the given equation. For what value of x does f(x) reach its minimum?

A. -266

B. -19

C. $-\frac{33}{2}$

D. $-\frac{5}{2}$

22 For any positive integer n, let $n^{\heartsuit}$ be defined by $n^{\heartsuit} = 2n(n+1)$. What is the value of $\dfrac{8^{\heartsuit}}{2^{\heartsuit}}$?

(A) $2^{\heartsuit}$
(B) $4^{\heartsuit}$
(C) $6^{\heartsuit}$
(D) $8^{\heartsuit}$
(E) $10^{\heartsuit}$

23

$$f(x) = (x - 10)(x + 13)$$

The function f is defined by the given equation. For what value of x does $f(x)$ reach its minimum?

A) -130

B) -13

C) $-\dfrac{23}{2}$

D) $-\dfrac{3}{2}$