Directions: Answer the following question(s).

1 **Which expression is equivalent to** $\left(3x^2+6x-5\right)+\left(-x^2+4\right)$?

A. $2x^2+6x-1$

B. $2x^2+6x-9$

C. $3x^4+6x-1$

D. $4x^2+6x-1$

2 **Which expression is the product of** $\left(3x-2\right)\left(x^2-2x+3\right)$?

A. $3x^3-2x^2-6$

B. $3x^3+2x^2+4x-6$

C. $3x^3-8x^2+13x-6$

D. $3x^3-8x^2+4x+3$

3 **Which expression is equivalent to** $\left(2x^2y\right)^3\left(3x^2y^3\right)$?

A. $24x^8y^6$

B. $24x^{12}y^9$

C. $18x^{12}y^9$

D. $18x^8y^6$

4 **Which polynomial expresses the difference of the two polynomials below?**

$$\left(7k^2+9k-8\right)-\left(-2k^2-12k+1\right)$$

A. $9k^2+21k-9$

B. $9k^2+21k-7$

C. $9k^2-3k-9$

D. $9k^2-3k-7$

5 **When** $(x+2)^6$ **is written as a polynomial, what is the coefficient of the term containing** x^4?

A. 6

B. 15

C. 60

D. 120

Directions: Answer the following question(s).

6

$$\frac{x^2 - 5x + 6}{x^2 + 2x - 15} =$$

A. $\frac{x+2}{x-5}$

B. $\frac{-5x+6}{2x-15}$

C. $\frac{x-2}{x+5}$

D. $\frac{x-1}{x-3}$

7 **Which expression is equivalent to $\frac{6x^2 - 3x}{3x}$?**

A. $2x - 1$

B. $2x$

C. $6x^2 - 1$

D. $6x^2$

8 **Jeremiah divided the two polynomials shown.**

$$\frac{4x^2 + 10x - 36}{x + 2}$$

What is the quotient?

A. $4x + 2 + \frac{-32}{x+2}$

B. $4x + 2 + \frac{-40}{x+2}$

C. $4x + 18$

D. $4x - 18$

Directions: Answer the following question(s).

9 **Employees of a local car dealership receive a choice of two incentives when buying a car. They can have a discount of 6% or receive $2,000 off the price of the car. All employees must then pay 6% sales tax. The following functions model the price of the car after each incentive as well as the price of the car after sales taxes.**

6% discount	$f(x) = 0.94x$
$2,000 off	$g(x) = x - 2000$
Sales tax	$h(x) = 1.06x$

Using the function composition of the sales tax function and one of the incentives, which composition will produce the lowest price on a car priced at $30,000?

A. $f(h(x))$
B. $h(f(x))$
C. $g(h(x))$
D. $h(g(x))$

10 **If** $f(x) = 3x - 2$ **and** $g(x) = x^2 - 5$, **what is** $g(f(2))$?

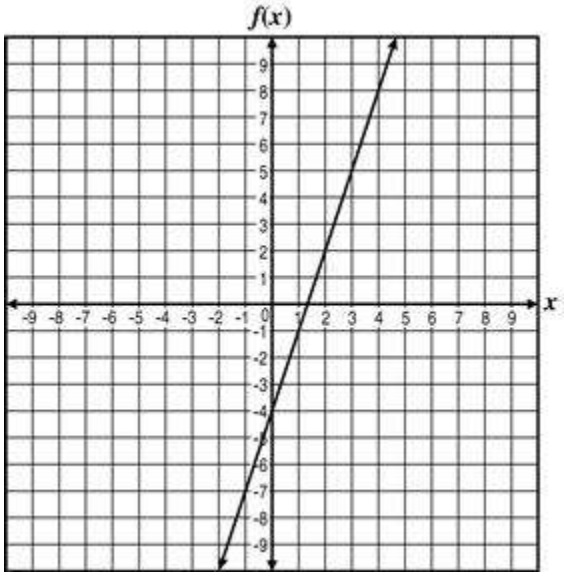
A. 11
B. 3
C. -4
D. -5

11 **In the two functions *f* and *g*,** $f \circ g$ **and** $g \circ f$ **are both equivalent to *x*. Which of the following statements must be TRUE?**

A. The two functions are inverses of each other.
B. The two functions are reflections of each other.
C. The two functions are reciprocals of each other.
D. The two functions are translations of each other.

Directions: Answer the following question(s).

12 **The graph of the function $f(x) = 3x - 4$ is shown on the grid below.**



Which value appears to represent $f^{-1}(x)$ when *x* = –1?

A. –7
B. –1
C. 1
D. 7

13 **The table below shows several values for the function *g*(*x*).**

x	*g*(*x*)
–3	–54
–2	–16
–1	–2
0	0
1	2
2	16
3	54

If *g*(*x*) is a one-to-one function, what is the value of $g^{-1}(-2)$?

A. –16
B. –1
C. 1
D. 16

Directions: Answer the following question(s).

14 **What is the inverse of** $f(x) = 5x + 6$?

A. $f^{-1}(x) = -5x - 6$

B. $f^{-1}(x) = \frac{x-6}{5}$

C. $f^{-1}(x) = \frac{x-5}{6}$

D. $f^{-1}(x) = 6x + 5$

15 **Jesse would like to determine if the following are inverse functions.**

$$f(x) = 3x - 4 \qquad g(x) = 4 - 3x$$

Which option proves that these two functions are NOT inverses of each other?

A. $\frac{f(x)}{g(x)} = \frac{3x-4}{4-3x} = -1$ $\qquad \frac{f(x)}{g(x)} = \frac{4-3x}{3x-4} = -1$

B. $f(x) - g(x) = 3x - 4 - (4 - 3x)$ $\qquad g(x) - f(x) = 4 - 3x - (3x - 4)$
$= 3x - 4 - 4 + 3x$ $\qquad = 4 - 3x - 3x + +4$
$= 6x - 8$ $\qquad = 8 - 6x$

C. $f(x) + g(x) = 3x - 4 + 4 - 3x$ $\qquad g(x) + f(x) = 4 - 3x + 3x - 4$
$= 0$ $\qquad = 0$

D. $f(g(x)) = 3(4 - 3x) - 4$ $\qquad g(f(x)) = 4 - 3(3x - 4)$
$= 12 - 9x - 4$ $\qquad = 4 - 9x + 12$
$= 8 - 9x$ $\qquad = 16 - 9x$

16 **The dimensions of a box are *x* units,** $x + 1$ **units, and** $2x$ **units.**

- **Write an expression that represents the volume of the box, in cubic units.**
- **Simplify the expression completely.**
- **Write an expression that represents the total surface area of the box, in square units.**
- **Simplify the expression completely.**

Directions: Answer the following question(s).

17 Evan deposits $\$ 500$ in a savings account that earns interest. Let $f(t) = 500$ and $g(t) = 1.05^t$, where t represents the time, in years, since the account was opened.

Which expression models the amount of interest, in dollars, earned on the account as a function of time?

A. $f(t) \cdot g(t)$

B. $g(t) - f(t)$

C. $f(t) + f(t) \cdot g(t)$

D. $f(t) \cdot g(t) - f(t)$