1. $-2 \ -4 \ +6 \ -5(-8+3)+12 = ?$

a. 25
b. 0
c. 67
d. 37
e. 45

2. a = 5 more than the product of 3 and b. What equation best describes this?

a. $a = 15 + b$
b. $a = 3b + 5$
c. $a = 5(3 + b)$
d. $a = 15b$
e. $a = b$

3. The length of a rectangle is 5 units longer than its width. Which of the following represents its area in square units?

a. 5x
b. $x(5 - x)$
c. $x(x - 5)$
d. $x(x + 5)$
e. $2x + 2(x + 5)$

4. The sum of two numbers is 14. If **x** represents one number, which expression represents the product of the numbers.

a. 14x
b. $x(14 - x)$
c. $x(14 + x)$
d. $(14 - x)(14 + x)$
e. $(x + 14)(x - 14)$

5. The sum of two angles is 90°. If the larger angle is twice the measure of the smaller, what is the larger?

a. 30°
b. 60°
c. 45°
d. 90°
e. 180°

6. What is the slope of the line containing the points (5,7) and (8,11)?

a. 4 / 3
b. – 4 / 3
c. 18 / 13
d. 0
e. 1

7. What is the slope of the line determined by the equation 3x – 2y = 12 ?

a. 3
b. – 2
c. 12
d. – 12
e. 3 / 2

8. What is the distance between points P(-4, -2) and Q(2,1)?

a. 12
b. 25
c. 45
d. $3\sqrt{5}$
e. 0

9. What is $\sqrt[3]{250x^3y^7}$

a. $5x\sqrt[3]{10y}$
b. $5xy^2\sqrt[3]{2y}$
c. $2\sqrt[3]{5xy}$
d. $5xy^3\sqrt{10xy}$
e. $5\sqrt{10xy}$

10. If for all x not equal to -1, $\frac{3x^2+kx+7}{x+1}$ = 3x + 7, then k = ?

a. 3
b. 7
c. 10
d. 1
e. 21

11. For all x, $(8x^2 + 5x - 9) - (3x^2 - 5x + 1) = ?$

a. $5x^2 - 8$
b. $5x^2 + 10x$
c. $5x^2 + 10x - 8$
d. $5(x^2 + 2x - 2)$
e. $11x^2 - 8$

12. For all k, m, n $\dfrac{m^5n^3}{k^2} \div \dfrac{m^4n^5}{k^3} = ?$

a. $\dfrac{m^9n^8}{k^5}$
b. kmn
c. $\dfrac{km}{n^2}$
d. kmn^2
e. kmrt

13. $\dfrac{(5x^2y^{-3})^2}{xy} = ?$

a. $5x^3y^5$
b. $\dfrac{25x^3}{y^7}$
c. $25x^3y^5$
d. $25x^3y^8$
e. $\dfrac{5x^3}{y^7}$

14. For all x not equal to 2, $(x-2)^2 (x-2)^{-2} = ?$

a. 0
b. 1
c. $x^2 - 4x + 4$
d. $x^4 - 4$
e. $x^4 - 8x^3 + 24x^2 - 32x + 16$

15. What are the solutions of $x^2 - 9x + 18 = 0$?

a. –6, -3
b. 6, -3
c. 6, 3
d. 2,5
e. 0

16. If x = 2, what is the value of the expression $(3\sqrt{x})^2$?

a. 36
b. 18
c. 12
d. 6
e. 24

17. If $f(x) = x^2 + 4$ and $g(x) = 3-x$, then $f(g(3)) = ?$

a. 0
b. 4
c. 13
d. –10
e. 3

18. If $f(x) = x^2 - 3x - 10$ and $g(x) = 2x - 1$, then $g(f(5)) = ?$

a. –1
b. 44
c. 5
d. 9
e. 0

19. If $\sqrt{-1} = i$, what is $(2 - 8i)(8 + 2i)$?

a. 16 – 16i
b. 32 – 60i
c. –60i
d. –60
e. 2

20. If f (x) = $(x-3)^2$ and g(x) = $3(x-1)^2$, what is $\frac{f(5)}{g(-2)}$?

a. 4/3
b. 0
c. 4/27
d. –4/27
e. –5/2

21. If f ($\begin{bmatrix} a & b \\ c & d \end{bmatrix}$) = ad - bc , then f ($\begin{bmatrix} -3 & -5 \\ 4 & 2 \end{bmatrix}$) = ?

a. 14
b. –14
c. –26
d. –2
e. 7

22. Professor Diamond just received a raise of 5%. If his **new** salary is $42,000, what was he making before the increase?

a. $44,000
b. $40,000
c. $39,900
d. $40,500
e. $41,800

23. Mr. Manilow makes a 10% profit on a $400 investment.
Mr. Floyd makes an 8% profit on a $500 investment?
Mr. Tull makes a 6% profit on a $700 investment.
Who made the most money?

a. Mr. Manilow
b. Mr. Floyd
c. Mr. Tull
d. Mr. Manilow and Mr. Floyd
e. Mr. Taxman

24. What is the arithmetic mean of the following numbers: 2,5, 7 , 9?

a. 11
b. 23
c. 6
d. 5.75
e. $\sqrt{23}$

25. .7 - .003 = ?

a. .4
b. .703
c. .021
d. .007
e. .697

Answer Key

1. d
2. b
3. d
4. b
5. b
6. a
7. e
8. d
9. b
10. c
11. d
12. c
13. b
14. b
15. c
16. b
17. b
18. a
19. b
20. c
21. a
22. b
23. c
24. d
25. e

FORMULAS

Slope of the line with points (X_1,Y_1) and (X_2, Y_2)

$$M = \frac{Y_2 - Y_1}{X_2 - X_1}$$

Equation of the line with slope M and a given point (X_1, Y_1)

$$Y - Y_1 = M(X - X_1)$$

Equation of line in slope-intercept form:
M = slope, B = Y intercept. (Value of Y when X is 0)

$$Y = MX + B$$

Quadratic Formula to solve $ax^2 + bx + c = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

FOIL Product for (a + b) (c + d)

ac + ad + bc + bd

So for (x + 5) (x + 7) = x^2 + 7x + 5x + 35 = x^2 + 12x + 35

To factor a FOIL product quantity, "UN" FOIL it.

x^2 + 12x + 35 = (x) (x)

Find two numbers whose <u>sum</u> is 12 and whose <u>product</u> is 35.

35 = 35 x 1 or 7 x 5 and 7 + 5 = 12 so use 7 and 5

x^2 + 12x + 35 = (x + 7) (x + 5) Factored form

FORMUL AS

Factoring example:

$x^2 + 14x + 48 = (x + 8)(x + 6)$

48 = 48 x 1
24 x 2
12 x 4
8 x 6 (Use 8 and 6 because 8 + 6 = 14)

Absolute Value:

$|x + 3| < 4$ means

$x + 3 < 4$ and $x + 3 > -4$

$x + 3 < 4$
$-3 \quad -3$
$x < 1$

and

$x + 3 > -4$
$-3 \quad -3$
$x > -7$

$-7 < x < 1$

Distance Formula

Distance between the two points (X_1, Y_1) and (X_2, Y_2)

$$D = \sqrt{(X_2 - X_1)^2 + (Y_2 - Y_1)^2}$$

Example: Find the distance between points (1,3) and (4,7)

$$D = \sqrt{(4 - 1)^2 + (7 - 3)^2} = 5$$

Composite Functions:
If $f(x) = x^2$ and $g(x) = 3x + 2$,

$f \circ g(x)$ or $f(g(x)) = f(3x + 2) = (3x+2)^2$
so $f(g(2)) = f(3(2) + 2) = f(8) = 8^2 = 64$

$g \circ f(x)$ or $g(f(x)) = g(x^2) = 3(x^2) + 2$
so $g(f(2)) = g(2^2) = g(4) = 3(4) + 2 = 14$

ADDING FRACTIONS

When fractions have a **common denominator**, it means they have the **same name**, and thus can be added (or subtracted) like other things that have the same name. Three (3) dimes plus four (4) dimes are seven (7) dimes. However, three (3) dimes plus four (4) quarters can not be added unless each is converted to equivalent values with a common name. Therefore, equivalent fractions with a common denominator are needed:

$$3\,\text{dim}\,es = \frac{3}{10} \qquad 4\,\text{dim}\,es = \frac{4}{10}$$

$$3\,\text{dim}\,es + 4\,\text{dim}\,es = 7\,\text{dim}\,es \qquad \frac{3}{10} + \frac{4}{10} = \frac{7}{10}$$

The numerators (numbers) are added and the denominators (name of the fractions) stay the same.

$$3\,\text{dim}\,es = \frac{3}{10} \qquad 4 quarters = \frac{4}{4}$$

Three (3) dimes plus four (4) quarters = ?

$$\frac{3}{10} + \frac{4}{4} = ?$$

A common denominator of dimes and quarters would be nickels since each can divide evenly into nickels.

1 Quarter = 5 nickels Therefore 4 quarters = 20 nickels 1 nickel = 1/20 (of a dollar) 4 Quarters = 20/20 (of a dollar)

$$1\,\text{dim}\,e = 2 nickels \qquad 1 nickel = \frac{1}{20} ofadollar$$

$$Therefor, 1\,\text{dim}\,e = \frac{1}{10} = 2 nickels = \frac{2}{20} ofadollar$$

$$\frac{3}{10} = 3\,\text{dim}\,es = 6 nickels = \frac{6}{20}, , , , , , , , , , , , , , \frac{4}{4} = 4 quarters = 20 nickels = \frac{20}{20}$$

Common denominator for dimes 1/10 and quarters ¼ is nickels 1/20

Adding Unlike Fractions	
1. Change Fractions to equivalent fractions with common denominator	1. $\frac{3}{10} + \frac{4}{4}$ 
2.Multipley numerator and denominator by the number necessary to get the common denominator which is a multiple of both original denominators Lowest common multiple of 4 and 10 is 20 because 20 divides exactly by 4 and 10 with no remainder.	2. $\frac{3}{10} \cdot \frac{2}{2} + \frac{4}{4} \cdot \frac{5}{5}$
3.. Now add the numerators of the new fractions, keeping the denominator the same.	3. $\frac{6}{20} + \frac{20}{20} = \frac{26}{20}$
4. Reduce – divide out the common factors.	4. $\frac{26}{20} = \frac{13 \cdot \cancel{2}}{10 \cdot \cancel{2}} = \frac{10}{13} = 1\frac{3}{10}$

As expected, 3 dimes, plus 4 quarters equal $1.30.

This is the equivalent of 26/20 or 26 nickels

Or 13/10 or 13 dimes or

One whole dollar and 3 dimes or 30 cents 1 3/10 = 1 30/100 = $ 1.30.