Benchmark Test: Algebra 1

1. Benchmark: MA.912.A.3.3

   If $a + ar = b + r$, what is the value of $a$ in terms of $b$ and $r$?

   A. $\frac{b + r}{1 + r}$
   
   B. $\frac{1 + b}{r + b}$
   
   C. $\frac{1 + b}{r}$
   
   D. $\frac{b}{r} + 1$

2. Benchmark: MA.912.A.3.1

   Simplify:

   $\frac{1}{4}g(5 + 3) - 4g + 13$

   F. $-\frac{11}{4}g + 16$
   
   G. $-2g + 21$
   
   H. $-\frac{15}{4}g + 21$
   
   I. $-2g + 13$
Benchmark Test: Algebra 1

3 Benchmark: MA.912.A.3.1

What is the value of $x$ in the equation $\frac{2x}{3} + \frac{x}{6} = 5$?

A 6  
B 10  
C 15  
D 30

4 Benchmark: MA.912.A.3.1

What is the value of $x$ in the equation $6(x - 2) = 36 - 10x$?

F -6  
G 1.5  
H 3  
I 6

5 Benchmark: MA.912.D.7.1

If $A = \{\text{red, blue}\}$ and $B = \{\text{shirt, pants, socks}\}$, how many elements will be in the cross product $A \times B$?

A 2  
B 3  
C 5  
D 6
6 Benchmark: MA.912.A.5.4

Solve the following proportion for $x$:

$$\frac{x}{9} = \frac{6}{27}$$

F 2
G 3
H 18
I 40.5

7 Benchmark: MA.912.A.5.4

Solve the following proportion for $x$:

$$\frac{3x + 5}{10} = \frac{x - 3}{15}$$

A -6.3
B -3
C -1.6
D 3

8 Benchmark: MA.912.D.7.1

Consider the set of integers greater than -2 and less than 6. A subset of this set is the positive factors of 5. What is the complement of this subset?

F \{-1, 0, 2, 3, 4\}
G \{0, 2, 3, 4\}
H \{-2, -1, 0, 2, 3, 4, 6\}
I \{-2, -1, 0, 1, 2, 3, 4, 5, 6\}
Benchmark Test: Algebra 1

9 Benchmark: MA.912.A.3.3

In terms of \( b \), what is the value of \( x \) in the equation below?

\[
2x + b = 3
\]

A \( \frac{3}{b} - 2 \)

B \( \frac{3}{2 + b} \)

C \( \frac{3 - b}{2} \)

D \( \frac{3}{2} - b \)

10 Benchmark: MA.912.A.3.3

If \( x = 2a - b^2 \), which expression represents \( a \)?

F \( x + b^2 \)

G \( \frac{x - b^2}{2} \)

H \( \frac{b^2 - x}{2} \)

I \( \frac{x + b^2}{2} \)
The Venn diagram below shows the results of a survey asking which sports the members of the Key Club watch on television.

Which of the following statements are true?
   I. The most watched sport is tennis.
   II. The least watched sport is baseball.
   III. More Key Club members watch tennis than football.

A  I, only
B  II, only
C  I and II, only
D  II and III, only

What is \((a + 3)(a - 4)\) expressed as a trinomial?

F  \(a^2 - 4a - 12\)
G  \(a^2 + 7a - 12\)
H  \(a^2 - a - 12\)
I  \(a^2 + 3a - 12\)
Benchmark Test: Algebra 1

13 Benchmark: MA.912.D.7.1

Given $A = \{0, 1, 2, 5, 7, 8\}$ and $B = \{3, 5, 7, 9\}$, what is the union of $A$ and $B$?

A $\{5, 7\}$
B $\{0, 1, 2, 5, 7, 8\}$
C $\{3, 5, 7, 9\}$
D $\{0, 1, 2, 3, 5, 7, 8, 9\}$

14 Benchmark: MA.912.A.3.1

Simplify:

$$8y^2 + 7y + 4 - 3(2y^2 - 5y - 8)$$

F $2y^2 + 22y + 28$
G $10y^2 + 2y - 4$
H $2y^2 - 8y - 20$
I $10y^2 + 2y - 7$

15 Benchmark: MA.912.A.3.3

In terms of $C$ and $p$, what is the value of $r$ in the equation below?

$$C = 2pr$$

A $\frac{C}{p} - 2$
B $\frac{2C}{p}$
C $C - 2p$
D $\frac{C}{2p}$
16 Benchmark: MA.912.A.3.3

In physics, the current \((I)\), potential difference \((V)\), and resistance \((R)\) of an electrical circuit are known to stand in the following relation.

\[
I = \frac{V}{R}
\]

Which of the following is the same equation solved for \(V\)?

- **F** \(V = IR\)
- **G** \(V = \frac{I}{R}\)
- **H** \(V = \frac{R}{I}\)
- **I** \(V = I(1 - R)\)

17 Benchmark: MA.912.A.3.1

Solve the following equation for \(x\):

\[
7x + 4(5 - x) = 24x - 3(x - 4)
\]

- **A** \(x = -7\)
- **B** \(x = \frac{4}{9}\)
- **C** \(x = \frac{8}{5}\)
- **D** \(x = 23\)
Benchmark Test: Algebra 1

18 Benchmark: MA.912.A.4.2

What is \((x + 2)(x - 5)\) expressed as a trinomial?

F \(x^2 - 3x - 10\)
G \(x^2 + 7x - 10\)
H \(x^2 - 5x - 10\)
I \(x^2 + 2x - 10\)

19 Benchmark: MA.912.D.7.2

A school newspaper took a survey of 100 students. The results of the survey showed that 43 students are fans of the Jacksonville Jaguars, 27 students are fans of the Miami Dolphins, and 48 students do not like either team. How many of the students surveyed are fans of both the Jacksonville Jaguars and the Miami Dolphins?

A 16
B 18
C 52
D 70

20 Benchmark: MA.912.A.5.4

Which equation represents the direct variation relationship of the equation \(\frac{x}{y} = \frac{1}{2}\)?

F \(y = 2x\)
G \(x = 2y\)
H \(y = 3x\)
I \(y = x + \frac{1}{2}\)
Benchmark Test : Algebra 1

21 Benchmark: MA.912.A.4.2

What is the sum of $3x^2 - 2x + 5$ and $x^2 + 2x - 8$, expressed in its simplest form?

A $4x^2 - 3$
B $4x^2 + 3$
C $3x^4 - 3$
D $4x^4 - 3$

Directions: Use the diagram below to answer the questions that follow.

Ben took a poll at a local ice cream shop to determine how many people like hot fudge, nuts, and caramel on their sundaes. He recorded his results in the Venn diagram below.

Ben’s Poll

Hot Fudge | Caramel
---|---
8 | 12 | 2
9 | 17 | 2

22 Benchmark: MA.912.D.7.2

How many people like hot fudge and caramel, but not nuts?

F 10
G 12
H 17
I 19
Benchmark Test: Algebra 1

23 Benchmark: MA.912.D.7.2

How many people like hot fudge and nuts, but not caramel?

A 9
B 10
C 17
D 26

24 Benchmark: MA.912.A.4.2

Simplify:

\[(4a^2 - 3a + 6) - (7a^2 + 2a - 5) =\]

F \(3a^2 - 5a + 11\)
G \(11a^2 - a + 1\)
H \(-3a^2 - 5a + 11\)
I \(-3a^2 - a + 1\)

25 Benchmark: MA.912.D.7.1

Given \(R = \{a, b, d, g, h, j\}\) and \(S = \{b, c, g, j, k, m\}\), what is the intersection of \(R\) and \(S\)?

A \{b, g, j\}
B \{b, c, g, j, k, m\}
C \{a, b, c, d, g, h, j, k, m\}
D \{a, b, d, g, h, j\}
26 Benchmark: MA.912.A.3.3

In terms of \( a, b, \) and \( c, \) what is the value of \( x \) in the equation below?

\[ ax - b = -c \]

\[ \text{F} \quad \frac{-c}{a - b} \]

\[ \text{G} \quad \frac{c}{b} - a \]

\[ \text{H} \quad \frac{-c}{a} + b \]

\[ \text{I} \quad \frac{b - c}{a} \]

27 Benchmark: MA.912.A.5.4

There are 357 seniors at Harris High School. The ratio of boys to girls is 7:10. How many boys are in the senior class?

\[ \text{A} \quad 107 \]
\[ \text{B} \quad 117 \]
\[ \text{C} \quad 147 \]
\[ \text{D} \quad 210 \]

28 Benchmark: MA.912.D.7.1

Given \( A = \{0, 1, 5, 7\} \) and \( B = \{1, 2, 4, 5\}, \) what is the union of \( A \) and \( B? \)

\[ \text{F} \quad \{1, 5\} \]
\[ \text{G} \quad \{1, 2, 4, 5\} \]
\[ \text{H} \quad \{0, 1, 5, 7\} \]
\[ \text{I} \quad \{0, 1, 2, 4, 5, 7\} \]
Benchmark Test : Algebra 1

29 Benchmark: MA.912.A.3.1

What is the value of \( x \) in the equation \( 0.03x = 1.5 \)?

A  0.045
B  1.47
C  5
D  50

30 Benchmark: MA.912.A.3.3

If \( bx - 2 = K \), which expression represents \( x \)?

F \( \frac{K + 2}{b} \)
G \( \frac{K - 2}{b} \)
H \( \frac{K + b}{2} \)
I \( \frac{2 - K}{b} \)

31 Benchmark: MA.912.A.4.2

What is \((5x^2 + 2x - 3) - (2x^2 - 3x + 7)\) expressed as a trinomial?

A  \( 3x^2 + 5x + 4 \)
B  \( 3x^2 + 5x - 10 \)
C  \( 3x^2 - x - 10 \)
D  \( 3x^2 - x + 4 \)
Benchmark: MA.912.A.5.4

If the ratio of the corresponding sides of two similar triangles is 3:5, what is the ratio of the areas of these triangles?

F 3:5
G 9:25
H 27:125
I $\sqrt{3}:\sqrt{5}$

Directions: Use the diagram below to answer the questions that follow.

The Venn diagram shows characteristics of Sarah and Rylan.

Benchmark: MA.912.D.7.2

Which of these is a characteristic of both Sarah and Rylan?

A Likes reading
B Blue eyes
C 15 years old
D 16 years old
Benchmark Test: Algebra 1

34. Benchmark: MA.912.D.7.2

Which of these is a characteristic of only Rylan?

F  Girl
G  Blue eyes
H  16 years old
I  Likes basketball

35. Benchmark: MA.912.A.5.4

When rice is prepared, the amount of rice varies directly as the amount of water required. If 2 cups of rice requires 4.5 cups of water, what is the total number of cups of water needed to prepare 5 cups of rice?

A  9
B  10
C  11.25
D  22.5

36. Benchmark: MA.912.A.3.1

If $3(x - 2) = 2x + 6$, what is the value of $x$?

F  0
G  5
H  12
I  20
Benchmark Test: Algebra 1

37 Benchmark: MA.912.A.4.2

What is the result when $3a^2 - 7a + 6$ is subtracted from $4a^2 - 3a + 4$?

A $a^2 - 10a - 2$
B $7a^2 - 10a + 10$
C $-a^2 - 4a + 2$
D $a^2 + 4a - 2$

38 Benchmark: MA.912.A.4.2

The lengths of the sides of a trapezoid are represented by $2x + 3, 4x - 5, 3x + 2,$ and $5x - 9$. What is the perimeter of the trapezoid expressed as a binomial in terms of $x$?

F $14x^4 - 9$
G $120x + 270$
H $14x - 9$
I $120x^4 + 270$

39 Benchmark: MA.912.D.7.1

Given that $A =$ {All even integers from 2 to 20, inclusive} and $B =$ {10, 12, 14, 16, 18}, what is the complement of set $B$ within the universe of set $A$?

A {4, 6, 8}
B {2, 4, 6, 8}
C {2, 4, 6, 8, 20}
D {4, 6, 8, 20}
Which graph illustrates the relationship where $x$ varies directly as $y$?

- **F**
- **H**
- **G**
- **I**
DIRECTIONS FOR MARKING ANSWER SHEET
Use a #2 pencil only.
Do NOT use ink or ballpoint pens.
Make heavy black marks that fill the ovals completely.
Erase clearly any answer you wish to change.
Make no stray marks on the answer sheet.