**ASSET 1**

**Numerical Portion and Elementary Algebra**

1) \[ \frac{2}{5} + \frac{3}{10} \]
\[ = \left( \frac{2}{2} \right) \frac{2}{5} + \frac{3}{10} \]
\[ = \frac{4}{10} + \frac{3}{10} = \frac{7}{10} \]

B. \[ \frac{7}{10} \]

First find a common denominator.

After the denominators are the same, add the numerators.

2) \[ 7 - 2 \frac{5}{8} \]
\[ = \frac{7}{1} - \frac{21}{8} \]
\[ = \left( \frac{8}{8} \right) \frac{7}{1} - \frac{21}{8} \]
\[ = \frac{56}{8} - \frac{21}{8} = \frac{35}{8} \]

C. \[ \frac{43}{8} \]

Make the second term into an improper fraction by multiplying the 2 and the denominator (8) and adding the numerator (5).

Find a common denominator.

Convert the answer into a mixed number by dividing 35 by 8 and placing the remainder over 8.

3) \[ x = \frac{3 \times 5}{1 \times \frac{5}{2}} \]
\[ = \frac{5}{1 \times \frac{5}{2}} = \frac{5}{2} \]

A. \[ \frac{21}{2} \]

After cross reducing, multiply across the top and across the bottom.

Convert this answer into a mixed number.

4) \[ \frac{5}{6} \div \frac{2}{3} \]
\[ = \frac{5 \times 3}{6 \times 2} \]
\[ = \frac{15}{12} = 1.25 \]

D. \[ 1.25 \]

Flip the second fraction, cross reduce and multiply.

Cross reduce and multiply across the top and bottom. Divide the fraction to get a decimal answer.

5) \[ \frac{7}{8} - \frac{1}{3} \]
\[ = \left( \frac{3}{3} \right) \frac{7}{8} - \frac{1}{3} \]
\[ = \frac{21}{24} - \frac{8}{24} = \frac{13}{24} \]

A. \[ \frac{13}{24} \]

Find a common denominator.

Multiply and then subtract the fractions.
6) \( \frac{1}{3} \times 5400 = \frac{5400}{3} \)
   \[
   = \frac{1800}{3} = 600
   \]
   D. $1800

7) \( 13 - 8.765 \)
   \[
   = 13.000 - 8.765
   = 4.235
   \]
   B. 4.235

8) \( 0.2 \times 0.3 \times 0.4 \)
   \[
   = 0.2 \\
   = 0.3 \\
   = 0.4 \\
   = 0.024
   \]
   C. 0.024

9) \( 15.2 + 0.026 + 0.0083 \)
   Line up the decimals and add the numbers.
   \[
   = 15.2000 \\
   = 0.0260 \\
   = 0.0083 \\
   = 15.2343
   \]
   A. 15.2343

10) \( \frac{47.60}{8} \)
    To find the money each gave, divide the money by the number of persons.
    \[
    = 5.95
    \]
    D. $5.95

11) \( 2^5 \)
    The exponent represents the number of times the number is multiplied to itself.
    \[
    = 2 \times 2 \times 2 \times 2 \times 2 = 32
    \]
    B. 32

12) \( 5^3 \)
    The exponent represents the number of times the number is multiplied to itself.
    \[
    = 5 \times 5 \times 5 = 125
    \]
    C. 125

13) \( \left( \frac{3}{4} \right)^2 \)
    The exponent represents the number of times the number is multiplied to itself. Multiply across the tops and bottoms.
    \[
    = \left( \frac{3}{4} \right) \times \left( \frac{3}{4} \right) = \frac{9}{16}
    \]
    C. \( \frac{9}{16} \)

14) \( \sqrt{81} \)
    A square root asks the question, “What two numbers multiplied by itself two times gives the number 81. For every pair of numbers, take one of those numbers out from under the radical (square root).
    \[
    = \sqrt{9 \times 9}
    \]
    D. 9

15) \( \frac{5}{8} \) to a %
    Convert the fraction into a decimal by dividing 5 by 8.
    \[
    = 0.625
    \]
    B. 320 %

16) Write 3.2 as a percent.
    Multiply the decimal by 100.
    \[
    = 3.2 \times 100 = 320 \%
    \]
    B. 320 %

17) 35% of 80
    Convert the percent to a decimal and multiply by 80.
    \[
    = \frac{35}{100} = 0.35 \\
    = 0.35 \times 80 = 28
    \]
    A. 28
18) 13 is what percent of 20.

\[
\frac{.65}{20} = \frac{13.00}{100} = .65 \times 100 = 65 \%
\]

C. 65 %

23) \[
\frac{123}{35} \times \frac{x}{4}
\]

Solve for x

\[
\frac{13}{20} = x
\]

Divide the part (13) by the whole (20).

A. 25

19) \[
\frac{56}{800} = \frac{x}{1}
\]

Set up a ratio, and cross multiply and solve for x.

\[
56 = 800x
\]

Divide both sides by 800.

B. x = .07 or 7%

20) \[
20,400 \times .08 = $1632
\]

Multiply to find the percent increase, and then add the increase to the original value.

\[
20,400 + 1632 = 22032
\]

D. 22032

24) \[
\frac{6}{40} = \frac{9}{x}
\]

See problem 22 for explanation.

\[
6x = 360
\]

\[
x = \frac{360}{6}
\]

B. 60

25) \[
\frac{3}{13} = \frac{x}{520}
\]

See problem 22.

\[
13x = 1560
\]

\[
x = \frac{1560}{13}
\]

C. 120

26) \[
3 = 2x + 5 -3(x-1)
\]

Isolate x on one side of the equation.

D. 124

\[
3 = 2x + 5 -3x + 3
\]

Distribute the -3 throughout the (x-1).

\[
3 = -x + 8
\]

Combine like terms.

\[
-8 = -8
\]

Combine constants by subtracting 8 from both sides.

\[
x = -5
\]

Divide by -1 to make x positive.

C. 5
27) \( \frac{3x}{4} - 3 = \frac{1x}{2} + 2 \)
\[
= 8 \left( \frac{3x}{4} - 3 = \frac{1x}{2} + 2 \right)
\]
\[
= 6x - 24 = 4x + 16
\]
\[
= 6x - 24 = 4x + 16
\]
\[
-4x + 24 = -4x + 24
\]
\[
2x = 40
\]
\[
\frac{2x}{2} = \frac{40}{2}
\]
\[
x = 20
\]

28) \( 0.9y + 3 = 0.4y + 1.5 \)
\[
= 0.9y + 3 = 0.4y + 1.5
\]
\[
-0.4y - 3 -0.4y - 3.0
\]
\[
0.5y = -1.5
\]
\[
y = -3
\]

29) \( 0.8x + 0.18 - 0.4x = 0.3(x+0.2) \)
\[
0.4x + 0.18 = 0.3x + 0.06
\]
\[
-0.3x - 0.18 = -0.3x - 0.18
\]
\[
= 0.1x = -0.12
\]

30) \(|x - 2| \leq 6\)
\[
x - 2 \leq 6 \quad \text{or} \quad x - 2 \geq -6
\]
\[
+2 \quad +2 \quad +2
\]
\[
x \leq 8 \quad \text{or} \quad x \geq -4
\]
\[
-4 \leq x \leq 8
\]

31) \( 2 - 3x \leq -5 + 4x \)
\[
2 - \frac{3x}{3} \leq -5 + 4x
\]
\[
+5 + 4x +x + 3x
\]
\[
= \frac{7}{7} \leq \frac{7x}{7}
\]
\[
= 1 \leq x
\]

32) \( 5 - \frac{1x}{2} > 4 \)
\[
= 5 - \frac{1x}{2} > 4
\]
\[
-5 \quad -5
\]
\[
= -\frac{1x}{2} > -1
\]
\[
= -2 \left( -\frac{1x}{2} > -1 \right)
\]
\[
x < 2
\]

33) \( 4y \geq 2(12 - 2y)\)
\[
= 4y \geq 24 - 4y
\]
\[
+4y + 4y
\]
\[
8y \geq 24
\]
\[
= \frac{8y}{8} \geq \frac{24}{8}
\]
\[
y \geq 3
\]

34) \( (6,0) \)
\[
x + y = 6
\]
\[
= 6 + 0 = 6
\]
\[
-2x + y = -3
\]
\[
= -2(6) + 0 = -3
\]
\[
= -12 + 0 = -3
\]

A solution is the point at which the two lines intersect. Plug in the x and y values, and if both equations have the same answer the point is the solution.
35) \((6x + 3y)(2x - 4y)\)
\[
= (6x + 3y)(2x - 4y)
= 12x^2 - 24xy + 6xy - 12y^2
= 12x^2 - 18xy - 12y^2
\]
B. \(12x^2 - 18xy - 12y^2\)

36) \(y(y^2 + 4) - 6\)
\[
= y(y^2 + 4) - 6
= y^3 + 4y^2 - 6y
\]
E. \(y^3 + 4y^2 - 6y\)

37) \((-2x^2)(x^2 + 3xy - 4y^2)\)
\[
= -2x^4 - 6x^3y + 8x^2y^2
\]
B. \(-2x^4 - 6x^3y + 8x^2y^2\)

38) \(15x^3y - 9x^2y^2\)
\[
= 3x^2y(5x - 3y)
\]
E. \(3x^2y(5x - 3y)\)

39) \(3ax - 7a - 6x + 14\)
\[
= 3x - 6x - 7a + 14
= 3(x - 2) - 7(a - 2)
= (3x - 7)(a - 2)
\]
A. \((3x - 7)(a - 2)\)

40) \(x^2 - 10x + 24\)
\[
= (x - 6)(x - 4)
\]
D. \((x - 6)(x - 4)\)

41) \(4x^2 + 7x - 15\)
\[
= 4x^2 + 12x - 5x - 15
= 4x(x + 3) - 5(x + 3)
= (4x - 5)(x + 3)
\]
A. \((4x - 5)(x + 3)\)

42) \(2x^2 - 18\)
\[
= 2(x^2 - 9)
\]
C. \((x - 3)(x + 3)\)

43) \((\sqrt{2a^3})^{\sqrt{8b^2}}\)
\[
= \sqrt{2(2)(2)(2)aabb}
= 2*2*a*b\sqrt{a}
= 4ab\sqrt{a}
\]
E. \(4ab\sqrt{a}\)

To factor a trinomial, find the factors of 24 that add to -10.
\(-6 \cdot (-4) = -10\)
The sign of the last term (+24) tells whether the signs in the parenthesis are the same or different.
\(+ * + = + \quad - * + = - \quad - * - = + \quad + * - = -\)
The sign of the first term (-10x) shows the sign of the largest number in the parenthesis.

First multiply the coefficient of the first term and the last term. Which factors of this number (60) add or subtract to +7.
12 and -5 are the factors that add to seven.
Rewrite the problem and factor (see #39).

First, factor out the common factors.
\((x^2 - 9)\) is a difference of squares.

Because the roots are the same, multiply the two terms together.
Break each term down to its prime factors and group them by twos. For every group of two, take one out from under the radical (see #14).
44) \( (\sqrt[4]{11} + 2)\sqrt[2]{11} - 1 \)

Use the FOIL method described above (see #35).

Take the square root of 121 and combine common terms.

\[
2\sqrt{121} - \sqrt{11} + 4\sqrt{11} - 2 \\
= 2*11 + 3\sqrt{11} - 2 \\
= 22 + 3\sqrt{11} - 2 \\
= 20 + 3\sqrt{11} \\
\]

C. 20 + 3\sqrt{11}

45) \( \sqrt[3]{16x^4y^7} \)

Break the terms down into their prime factors and group them by 3 (this is a cube root).

\[
= \sqrt[3]{2}\sqrt[3]{2}\sqrt[3]{2}\sqrt[3]{x^3}\sqrt[3]{x^3}\sqrt[3]{x^3}\sqrt[3]{y^3}\sqrt[3]{y^3}\sqrt[3]{y^3} \\
= 2xy\sqrt[3]{2xy} \\
= 2xy^2\sqrt[3]{2xy} \\
\]

D. 2xy^2\sqrt[3]{2xy}