

Dear Parent and Student,

This review is an introduction to the concepts you will need to know and perfect in order to be successful in this course and others. Be ready to turn in your work on the first day of class to illustrate how adept you are at solving these math problems. The solution key is included but I am more concerned with how you arrive at the solution than what the answer is.

Thank you and have a great summer,

Math Dept.

| | |
|---|--------------------------|
| Rules: ** If a number has no sign it means it is a positive number. ** | |
| <u>Addition</u> | |
| SAME SIGNS | |
| 1) Add their absolute values. | |
| 2) Attach the common signs. | |
| $-4 + (-5) = -(4 + 5) = -9$ $4 + 5 = 9$ | |
| OPPOSITE SIGNS | |
| 1) Subtract the smaller absolute value from the larger absolute value. | |
| 2) Attach the sign of the number with the larger absolute value. | |
| $3 + (-9) = -(9 - 3) = -6$ $-3 + 9 = +(9 - 3) = 6$ | |
| <u>Subtraction</u> | |
| 1) Adding the opposite of a number is equivalent to subtracting the number. | |
| 2) Change all problems to addition and follow the addition rules. | |
| $3 - 12 = 3 + (-12) = -(12 - 3) = -9$ | |
| $-7 - 1 = -7 + (-1) = -(7 + 1) = -8$ | |
| $-4 - (-10) = -4 + 10 = +(10 - 4) = 6$ | |
| $12 - (-8) = 12 + 8 = 20$ | |
| NO CALCULATOR! | |
| 1. $7 + (-9) =$ | 2. $-12 + 15 =$ |
| 3. $2 - 4 =$ | 4. $12 - 19 =$ |
| 5. $-7 - (-5) =$ | 6. $7 + 27 =$ |
| 7. $-12 - (-4) =$ | 8. $0 - 8 =$ |
| 9. $0 - (-6) =$ | 10. $-8 - 2 =$ |
| 11. $-3 + 1 =$ | 12. $-7 + (-5) =$ |
| 13. $-9 - (-13) + (-4) =$ | 14. $-6 - 4 - (-8) =$ |
| 15. $25 - 21 + (-20) =$ | 16. $-39 - (-32) - 14 =$ |

Integers – Multiplying and Dividing

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| | |
|--|--|
| Rules: 1) If two numbers have the same sign, their product or quotient is positive. $(-7)(-5) = 35$ $6 \bullet 8 = 48$ 2) If two numbers have opposite signs, their product or quotient is negative $9(-2) = -18$ $(-3)(4) = -12$ | |
|--|--|

NO CALCULATOR!

| | |
|--------------------------|-------------------------|
| 1. $(-8)(3) =$ | 2. $(4)(-4) =$ |
| 3. $(20)(-65) =$ | 4. $-7 \bullet -5 =$ |
| 5. $-45 \div 9 =$ | 6. $\frac{-24}{-4} =$ |
| 7. $49 \div (-7) =$ | 8. $\frac{-99}{9} =$ |
| 9. $(5)(-2)(7) =$ | 10. $(-3)(-1)(4)(-6) =$ |
| 11. $-3740 \div (-10) =$ | 12. $\frac{56}{-7} =$ |
| 13. $(11)(-1)(-7)(-3) =$ | 14. $\frac{39}{13} =$ |
| 15. $(-72) \div (-12) =$ | 16. $(-9)(8)(-2)(5) =$ |

Decimals – Adding and Subtracting

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Rules:

- 1) Line up decimal points, if a number does not have a decimal point it is a whole number with the decimal point at the end.
- 2) Annex zeros to hold place.
- 3) Add or subtract vertically.
- 4) Bring down the decimal point.

$$4.1 + 3 + 5.61 + 21$$

$$16 - 7.498$$

$$4.10$$

$$16.000$$

$$3.00$$

$$- 7.498$$

$$5.61$$

$$8.502$$

NO CALCULATOR!

1. $5.1 + 2.23 + 8$

2. $9 + 3.3 + 0.781$

3. $6.7 - 3.987$

4. $5.21 + 6.5 + 8.123$

5. $9.8 - 2.0871$

6. $7.3 + 4.3 + 12 + 0.543$

7. $9.1 + 7.89 - 2.6$

8. $16 - 7.5 + 3.12$

9. $2.8 + 15 - 9.12$

10. $7.8 - 2.3 + 15$

11. $8 + 4.1 - 0.123$

12. $6.3 - 0.45 + 2.45$

Rules:

Multiplying

- 1) Line up digits, starting on the right.
- 2) Multiply
- 3) Place the decimal point in the answer by starting at the right and moving a number of places equal to the sum of the decimal places in both numbers multiplied.

$$\begin{array}{r}
 (6.432)(4.15) \\
 6.432 \text{ (3 decimal places)} \\
 \times 4.15 \text{ (2 decimal places)} \\
 \hline
 32160 \\
 64320 \\
 \hline
 2572800 \\
 26.69280 \text{ (5 decimal places)}
 \end{array}$$

Dividing

- 1) If the divisor is not a whole number, move the decimal point To the right to make it a whole number and move the decimal Point in the dividend the same number of places.
- 2) Divide.
- 3) Bring the decimal point up.

$$\begin{array}{r}
 27.216 \div 4.8 \\
 \hline
 5.67 \\
 48.)272.16 \\
 \underline{-240} \\
 321 \\
 \underline{-288} \\
 336 \\
 \underline{-336}
 \end{array}$$

NO CALCULATOR!

| | | | |
|-----------------------|-----------------------|--------------------------|---------------------------|
| 1. $5.4(0.5)$ | 2. $5.9(0.07)$ | 3. $0.68 \cdot 0.14$ | 4. $4.29 \cdot 0.4$ |
| 5. $69.3(0.7)$ | 6. $9.01(0.15)$ | 7. $36 \cdot 3.3$ | 8. $36.8 \cdot 0.55$ |
| 9. $0.24 \div 0.8$ | 10. $84.48 \div 0.88$ | 11. $\frac{8.3638}{1.9}$ | 12. $\frac{487.2}{0.56}$ |
| 13. $34.06 \div 0.13$ | 14. $147 \div 0.49$ | 15. $\frac{9.447}{6.7}$ | 16. $\frac{167.4}{0.093}$ |

Fractions – Adding and Subtracting

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Rules:

1) Find LCD.

$$3\frac{1}{9} = 3\frac{2}{18} = 2\frac{20}{18}$$

$$4\frac{3}{4} = 4\frac{9}{12}$$

2) Change to equivalent fractions.

$$-1\frac{5}{6} = -1\frac{15}{18} = -1\frac{15}{18}$$

$$+ 5\frac{5}{6} = +5\frac{10}{12}$$

3) Rename, if needed.

4) Add or Subtract.

$$1\frac{5}{18}$$

$$9\frac{19}{12} = 10\frac{7}{12}$$

5) Simplify

NO CALCULATOR!

| | | | |
|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|
| 1. $2\frac{3}{4} + 5\frac{5}{6}$ | 2. $9 - 4\frac{2}{5}$ | 3. $6\frac{1}{3} + 4\frac{3}{5}$ | 4. $8\frac{1}{9} - 2\frac{5}{6}$ |
| 5. $9 + 1\frac{1}{7}$ | 6. $6\frac{1}{2} + 2\frac{2}{3}$ | 7. $5\frac{1}{2} + 1\frac{3}{5}$ | 8. $1\frac{3}{4} - \frac{1}{2}$ |
| 9. $\frac{1}{5} + 1\frac{3}{4}$ | 10. $\frac{4}{5} - \frac{2}{3}$ | 11. $\frac{5}{7} + 1\frac{4}{5}$ | 12. $3\frac{5}{8} - 2\frac{1}{6}$ |

Rules:

- 1) Change all mixed numbers to improper fractions.
- 2) Multiplying across.
- 3) Simplify

$$2\frac{2}{3} \cdot 4\frac{1}{10} = \frac{8}{3} \cdot \frac{41}{10} = \frac{4}{3} \cdot \frac{41}{5} = \frac{164}{15} = 10\frac{14}{15}$$

- 1) Change all mixed numbers to improper fractions.
- 2) Take the reciprocal.
- 3) Multiply across.
- 4) Simplify

$$2\frac{3}{4} \div 3\frac{1}{2} = \frac{11}{4} \div \frac{7}{2} = \frac{11}{4} \cdot \frac{2}{7} = \frac{11}{2} \cdot \frac{1}{7} = \frac{11}{14}$$

NO CALCULATOR!

| | | | |
|---------------------------------------|---------------------------------------|--------------------------------------|--------------------------------------|
| 1. $2\frac{3}{4} \cdot 1\frac{5}{11}$ | 2. $9 \cdot 4\frac{2}{3}$ | 3. $1\frac{1}{3} \cdot 4\frac{1}{6}$ | 4. $1\frac{1}{9} \cdot 2\frac{2}{5}$ |
| 5. $9 \cdot 1\frac{1}{3}$ | 6. $6\frac{1}{2} \cdot 2\frac{1}{13}$ | 7. $5\frac{1}{2} \div 1\frac{3}{4}$ | 8. $1\frac{3}{4} \div \frac{1}{2}$ |
| 9. $\frac{1}{5} \div 1\frac{3}{4}$ | 10. $\frac{4}{5} \div \frac{2}{3}$ | 11. $\frac{9}{20} \div 1\frac{4}{5}$ | 12. $3\frac{2}{8} \div 2\frac{1}{6}$ |

Real Numbers – Adding and Subtracting

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Use rules of integers, decimals and fractions.

Examples:

$$-4.1 - (-2.51) = -4.1 + 2.51$$

opposite -4.10
signs +2.51
subtract -1.59

$$-1\frac{3}{4} + (-2\frac{5}{6}) = -\frac{7}{4} + (-\frac{17}{6}) = -\frac{21}{12} + (-\frac{34}{12}) = -\frac{45}{12} = -\frac{15}{4} = -3\frac{3}{4}$$

NO CALCULATOR!

| | | | |
|----------------------------------|---------------------------------|-------------------------------------|-------------------------------------|
| 1. $3.98 - 6$ | 2. $5.8 + (-2.5)$ | 3. $1.8 - (-3.7)$ | 4. $7 + (-2.8)$ |
| 5. $(-0.8) + (-7.2) - 5.4$ | 6. $1.7 - (-0.8) + 4.013$ | 7. $-1\frac{1}{2} + 1\frac{3}{5}$ | 8. $-1\frac{3}{4} - (-\frac{1}{2})$ |
| 9. $-\frac{1}{5} + 1\frac{3}{4}$ | 10. $\frac{2}{5} - \frac{4}{5}$ | 11. $\frac{5}{7} + (-1\frac{4}{5})$ | 12. $-1\frac{5}{8} - 2\frac{1}{6}$ |

Use rules of integers, decimals and fractions.

| | | |
|--|---|--|
| Examples: | | |
| $-4.12(-5.3)$ | $51 \div (-0.25)$ | $-2\frac{2}{3} \cdot 4\frac{1}{10} = -\frac{8}{3} \cdot \frac{41}{10} = -\frac{4}{3} \cdot \frac{41}{5} = -\frac{164}{15} = -10\frac{14}{15}$ |
| $\begin{array}{r} -4.12 \\ \times -5.3 \\ \hline 1236 \\ 20600 \\ \hline +21836 \end{array}$ | $\begin{array}{r} -205 \\ 025 \overline{)5100.} \\ \underline{50} \\ 100 \\ \underline{100} \\ 0 \end{array}$ | $-2\frac{3}{4} \div -3\frac{1}{2} = -\frac{11}{4} \div -\frac{7}{2} = -\frac{11}{4} \cdot -\frac{2}{7} = \frac{11}{2} \cdot \frac{1}{7} = \frac{11}{14}$ |

NO CALCULATOR!

| | | | |
|---------------------------------------|--------------------------------------|---|--|
| 1. -5.5×-4.87 | 2. $1.5(-7.1)$ | 3. $1.7(-3.1)$ | 4. -7.8×-5.1 |
| 5. $4.2 \div (-2.1)$ | 6. $-2 \div (-0.5)$ | 7. $\frac{-6.4}{0.04}$ | 8. $\frac{6.6}{-1.1}$ |
| 9. $-\frac{1}{5} \cdot 1\frac{3}{4}$ | 10. $\frac{2}{5} \cdot 1\frac{1}{4}$ | 11. $\frac{5}{7} \cdot (-1\frac{4}{5})$ | 12. $(-1\frac{5}{8})(-3\frac{1}{5})$ |
| 13. $-\frac{3}{2} \div -\frac{10}{7}$ | 14. $-2 \div -3\frac{4}{5}$ | 15. $\frac{1}{9} \div -1\frac{1}{3}$ | 16. $-3\frac{7}{10} \div 2\frac{1}{4}$ |

Order of Operations

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| | | |
|--|------------------------|----------------------------|
| Parentheses (Grouping Symbols) | $[(7 - 4)^2 + 3] + 15$ | $\frac{(9-7)^2 + 6}{11-6}$ |
| Exponents | $= [3^2 + 3] + 15$ | $= \frac{2^2 + 6}{5}$ |
| Multiply or Divide, from left to right | $= [9 + 3] + 15$ | $= \frac{4+6}{5}$ |
| Add or Subtract, from left to right | $= 12 + 15$ | $= \frac{10}{2}$ |
| | | $= 5$ |

NO CALCULATOR!

| | | | |
|-------------------------------------|-----------------------------------|---------------------------------------|-------------------------------------|
| 1. $6 \div 3 + 2 \cdot 7$ | 2. $5 + 8 \cdot 2 - 4$ | 3. $16 \div 8 \cdot 2^2$ | 4. $10 \div (3 + 2) + 9$ |
| 5. $7[(18 - 6) - 6]$ | 6. $3(2.7 \div 0.9) - 5$ | 7. $6(5 - 3)^2 + 3$ | 8. $[10 + (5^2 \cdot 2)] \div 6$ |
| 9. $\frac{1}{3}(9 \cdot 3) + 18$ | 10. $\frac{1}{2} \cdot 26 - 3^2$ | 11. $2.5 \cdot 0.5^2 \div 5$ | 12. $\frac{16}{8} + 2^3 - 10$ |
| 13. $\frac{9 \cdot 2}{4 + 3^2 - 1}$ | 14. $\frac{13 - 4}{18 - 4^2 + 1}$ | 15. $\frac{5^3 \cdot 2}{1 + 6^2 - 8}$ | 16. $\frac{7 \cdot 4}{8 + 7^2 - 1}$ |

| | |
|---|---|
| Write the verbal phrase as an algebraic expression. | |
| Eleven less than the quantity four times a number x | $4(x - 11)$ |
| Evaluate the expression | |
| $x^2 + 4 - x$, when $x = 6$ | $6^2 + 4 - 6$ $= 36 + 4 - 6$ $= 40 - 6$ $= 34$ |

Write the verbal phrase as an algebraic expression.

| | |
|---|---|
| 1. four times a number x decreased by twelve | 2. six less than double a number x |
| 3. five squared minus a number x | 4. three more than the product of five and number x |
| 5. twenty-nine decreased by triple a number x | 6. two cubed divided by a number x |
| 7. the quotient of a number x and two-tenths | 8. the difference of ten and a number x |

NO CALCULATOR!

Evaluate the expression

| | |
|--|--|
| 9. $y \div 3 + 2$, when $y = 30$ | 10. $\frac{r}{s} \cdot 7$, when $r = 30$ and $s = 5$ |
| 11. $5x^2 - y$, when $x = 4$ and $y = 26$ | 12. $3r^2 - 17$, when $r = 6$ |
| 13. $\frac{4}{5} \div n + 13$, when $n = \frac{1}{5}$ | 14. $\frac{9}{10} \cdot y - \frac{3}{10}$, when $y = \frac{1}{2}$ |

Absolute Value

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The absolute value of a real number is the distance between the origin and point representing the number.

If a is a positive number, then $|a| = a$

$$|12| = 12$$

If a is 0, then $|a| = 0$

$$|0| = 0$$

If a is a negative number, then $|-a| = a$

$$|-12| = 12$$

$$|x| = 7, \text{ then } x = 7 \text{ and } -7$$

$$|x| = -5, \text{ then there is no solution}$$

| | | | |
|--------------------------------|--------------------|------------------|---------------------------------|
| 1. $ 17 $ | 2. $ -4 $ | 3. $ -4.5 $ | 4. $\left \frac{2}{3}\right $ |
| 5. $\left -\frac{4}{5}\right $ | 6. $ 0 + 2$ | 7. $ 6.3 - 3.1$ | 8. $-\left -\frac{8}{9}\right $ |
| 9. $ -6.1 - 6.01$ | 10. $ -6.4 - 3.1$ | 11. $x = -9 $ | 12. $ x = -11$ |
| 13. $ x = 4$ | 14. $ x = 5$ | 15. $x = -3.8 $ | 16. $ -x = 1$ |

Distributive Property

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Distributive Property

$$\begin{aligned}a(c) &= ab + bc \\(b + c)a &= ba + ca \\a(b - c) &= ab - ac \\(b - c)a &= ba - ca\end{aligned}$$

$$\begin{aligned}3(2x + 1) &= 6x + 3 \\(4x + 5)x &= 4x^2 + 5x \\-9(x - 8) &= -9x + 72 \\(x^2 - 3)x &= x^3 - 3x\end{aligned}$$

Distribute

| | | | |
|------------------|------------------|----------------------|--------------------|
| 1. $3(x + 4)$ | 2. $(w + 6)4$ | 3. $5(y - 2)$ | 4. $(7 - m)8$ |
| 5. $-(y - 9)$ | 6. $(-2)(x + 6)$ | 7. $(2x - 4)(-3)$ | 8. $x(x + 1)$ |
| 9. $-9(a + 6)$ | 10. $4x(x + 8)$ | 11. $-2t(12 - t)$ | 12. $(3y - 2)5y$ |
| 13. $-2x(x - 8)$ | 14. $-9(-t - 3)$ | 15. $(6 - 3w)(-w^2)$ | 16. $-y(-y^2 + y)$ |

ANSWER KEY

Page 2

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|-------|---------|---------|---------|
| 1. -2 | 2. 3 | 3. -2 | 4. -7 |
| 5. -2 | 6. 34 | 7. -8 | 8. -8 |
| 9. 6 | 10. -10 | 11. -2 | 12. -12 |
| 13. 0 | 14. -2 | 15. -16 | 16. -21 |

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|----------|---------|----------|---------|
| 1. -24 | 2. -16 | 3. -1300 | 4. 35 |
| 5. -5 | 6. 6 | 7. -7 | 8. -11 |
| 9. -70 | 10. -72 | 11. 374 | 12. -8 |
| 13. -231 | 14. 3 | 15. 6 | 16. 720 |

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|-----------|-----------|------------|-----------|
| 1. 15.33 | 2. 13.081 | 3. 2.713 | 4. 19.833 |
| 5. 7.7129 | 6. 24.143 | 7. 14.39 | 8. 11.62 |
| 9. 8.68 | 10. 20.5 | 11. 11.977 | 12. 8.3 |

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|----------|-----------|-----------|----------|
| 1. 2.7 | 2. 0.413 | 3. 0.0952 | 4. 1.716 |
| 5. 48.51 | 6. 1.3515 | 7. 118.8 | 8. 20.24 |
| 9. 0.3 | 10. 96 | 11. 4.4 | 12. 870 |
| 13. 262 | 14. 300 | 15. 1.41 | 16. 1800 |

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|---------------------|--------------------|----------------------|----------------------|
| 1. $8\frac{7}{12}$ | 2. $4\frac{3}{5}$ | 3. $10\frac{14}{15}$ | 4. $5\frac{5}{18}$ |
| 5. $10\frac{1}{7}$ | 6. $9\frac{1}{6}$ | 7. $7\frac{1}{10}$ | 8. $1\frac{1}{4}$ |
| 9. $1\frac{19}{20}$ | 10. $\frac{2}{15}$ | 11. $2\frac{18}{35}$ | 12. $1\frac{11}{24}$ |

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|-------------------|--------------------|-------------------|--------------------|
| 1. 4 | 2. 42 | 3. $5\frac{5}{9}$ | 4. $2\frac{2}{3}$ |
| 5. 12 | 6. $13\frac{1}{2}$ | 7. $3\frac{1}{7}$ | 8. $3\frac{1}{2}$ |
| 9. $\frac{4}{35}$ | 10. $1\frac{1}{5}$ | 11. $\frac{1}{4}$ | 12. $1\frac{1}{2}$ |

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|-------------------------------------|--------------------|---------------------------------------|--|
| 1. -2.02 | 2. 3.3 | 3. 5.5 | 4. 4.2 |
| 5. -13.4 | 6. 6.513 | 7. $\frac{1}{10}$ | 8. $-\frac{5}{4} = -1\frac{1}{4}$ |
| 9. $\frac{31}{20} = 1\frac{11}{20}$ | 10. $-\frac{2}{5}$ | 11. $-\frac{38}{35} = -1\frac{3}{35}$ | 12. $-\frac{91}{24} = -3\frac{19}{24}$ |

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|-------------------------------------|---------------------|------------------------------------|--|
| 1. 26.785 | 2. -10.65 | 3. -5.27 | 4. 39.78 |
| 5. -2 | 6. 4 | 7. -160 | 8. -6 |
| 9. $-\frac{7}{20}$ | 10. $\frac{1}{2}$ | 11. $-\frac{9}{7} = -1\frac{2}{7}$ | 12. $\frac{26}{5} = 5\frac{1}{5}$ |
| 13. $\frac{21}{20} = 1\frac{1}{20}$ | 14. $\frac{10}{19}$ | 15. $-\frac{1}{12}$ | 16. $-\frac{74}{45} = -1\frac{29}{45}$ |

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|-------------------|-------|----------------------|-------------------|
| 1. 16 | 2. 17 | 3. 8 | 4. 11 |
| 5. 42 | 6. 4 | 7. 27 | 8. 10 |
| 9. 27 | 10. 4 | 11. 0.125 | 12. 0 |
| 13. $\frac{3}{2}$ | 14. 3 | 15. $\frac{250}{29}$ | 16. $\frac{1}{2}$ |

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|--------------|--------------------|--------------------|-------------|
| 1. $4x - 12$ | 2. $2x - 6$ | 3. $5^2 - x$ | 4. $5x + 3$ |
| 5. $29 - 3x$ | 6. $\frac{2^3}{x}$ | 7. $\frac{x}{0.2}$ | 8. $10 - x$ |
| 9. 12 | 10. 42 | 11. 54 | 12. 91 |
| 13. 17 | 14. $\frac{3}{20}$ | | |

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|----------------------|----------------------|---------------|----------------------|
| 1. 17 | 2. 4 | 3. 4.5 | 4. $\frac{2}{3}$ |
| 5. $\frac{4}{5}$ | 6. 2 | 7. 3.2 | 8. $\frac{8}{9}$ |
| 9. 0.09 | 10. 3.3 | 11. $x = 9$ | 12. No solution |
| 13. $x = 4$ and -4 | 14. $x = 5$ and -5 | 15. $X = 3.8$ | 16. $x = 1$ and -1 |

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|-------------------|------------------|--------------------|-------------------|
| 1. $3x + 12$ | 2. $4w + 24$ | 3. $5y - 10$ | 4. $56 - 8m$ |
| 5. $-y + 9$ | 6. $-2x - 12$ | 7. $-6x + 12$ | 8. $x^2 + x$ |
| 9. $-9a - 54$ | 10. $4x^2 + 32x$ | 11. $-24t + 2t^2$ | 12. $15y^2 - 10y$ |
| 13. $-2x^2 + 16x$ | 14. $9t + 27$ | 15. $-6w^2 + 3w^3$ | 16. $y^3 - y^2$ |

