

# *Solving and Evaluating Linear Equations:*

**Name:** \_\_\_\_\_

**Target A:** I can simplify expressions and evaluate when given values.

**Target B:** I can solve 1 and 2 step equations

**Target C:** I can solve multi-step equations

**Target D:** I can manipulate equations and solve for different variables.

## **Resources:**

<http://mrnohner.com/chapter15.html>

N D S U E X P R E S S I O N P E T S O W T Q M W D  
 G X Y C I D F V R S E Y G V D B D X F J W X U Z F  
 K Y Y G A G A Z P R M X B S C U L P M S R L V O A  
 D W G T S L D Y P A O R S E V B G R H D A S O W B  
 B Q R W U E S D O D V C C M I E H X F I R F E C K  
 H N R A J S M P M T G H B S T Y W H I E G R R V Z  
 D Q T G J E W U Q F O G I H M P H N T E M O U D S  
 Z E H J W D F Y L L Y P M Z X G J A B Q R C Q C K  
 S I L D G A D H H T L I S M S H L T W U L T P U I  
 F B B W T H E K V B I W K S C U C Y R A S Z M X S  
 D W J N I R A P G Q G S B Q P J Q P O T N T N Y Z  
 Q I O J Y D Z U X T X Y T I C S U F S I S Q L A E  
 D K C I W A T A B Q Q N N E G I X U L O Y S P L X  
 I P J P D S O U J S Q A N P P G V Z R N W K W D N  
 W W L Z O L T B L V M Z M G I U J S T H X K G N E

EQUATION  
 MANIPULATE

EVALUATE  
 MULTISTEP

EXPRESSION  
 TWOSTEP

Guide notes

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| Title:   | Date: |
| Goal:    |       |
| Notes:   |       |
| Summary: |       |

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## Order Of Operations

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**Evaluate each expression.**

1)  $10 \div 2 - 2$

2)  $(9 \cdot 2) \div 3$

3)  $4 \cdot 3 - 3 - (2 + 4)$

4)  $6 - (6 \cdot 2) \div (3 + 1)$

5)  $(18 \div 6 - 1)(6 - (5 - 1) + 4)$

6)  $(1 + 1^2 + 6 - 5) \cdot 2 - 2$

**Evaluate each using the values given.**

7)  $j(h - h \div 3)$ ; use  $h = 3$ , and  $j = 2$

8)  $j^2 - (j + h)$ ; use  $h = 5$ , and  $j = 3$

9)  $p(5 - (n(n - n) + p))$ ; use  $n = 6$ , and  $p = 2$

10)  $(x(z - z + 4) - 3) \div 3$ ; use  $x = 6$ , and  $z = 1$

11)  $(z^3 - (y - x)) \div 6 + 4 + x - 1$ ; use  $x = 3$ ,  $y = 6$ , and  $z = 3$

12)  $(p(3p(1 + n) + 6 - n)) \div 4$ ; use  $n = 4$ , and  $p = 2$

## Order Of Operations, Evaluating Expressions, Simplifying Expressions

**Evaluate each expression.**

1)  $10(3 - 3 \times (-1))$

2)  $(-3) - 5 + (-6)^2$

3)  $\frac{14 - 4}{(-6) - (-1)}$

4)  $\frac{9 \times 3}{3} - 3$

**Evaluate each using the values given.**

5)  $y - (x^2 - (z - 7))$ ; use  $x = -9$ ,  $y = -7$ , and  $z = -5$

6)  $k(h - k - j) - k$ ; use  $h = 10$ ,  $j = -1$ , and  $k = 5$

7)  $xy + \frac{4}{4} - y$ ; use  $x = 2$ , and  $y = 6$

8)  $(-2)^2(p + m) + q$ ; use  $m = -3$ ,  $p = 9$ , and  $q = 6$

**Simplify each expression.**

9)  $-5x - 8x$

10)  $3m + 9 + 7$

11)  $-8(9v + 10)$

12)  $-7(8n + 10)$

13)  $7p - 8(p + 2)$

14)  $-n - 7(10n + 5)$

15)  $-7(5x - 2) - 8(8 + 6x)$

16)  $-3(1 - 7x) + 8(1 - 3x)$

## Simplifying Expressions & 1 and 2 Step Equations

**Simplify each expression.**

1)  $-3x - 3 + 1 - 10x$

2)  $4x - x$

3)  $-10 + 9(9 + 10n)$

4)  $3 - 5(3 - 3b)$

5)  $4(x + 6) + 8(x + 1)$

6)  $-3(8n - 4) + 2(1 - 4n)$

**Solve each equation.**

7)  $n + 14 = 19$

8)  $a - 7 = 3$

9)  $-105 = 15x$

10)  $10 = \frac{n}{20}$

$$11) -9n = -36$$

$$12) x - 17 = -9$$

$$13) 4 = v + 14$$

$$14) -14 = \frac{x}{2}$$

$$15) 4 = 5 + \frac{r}{9}$$

$$16) 7 + 9x = 52$$

$$17) 2 + 8b = -46$$

$$18) \frac{b}{20} - 5 = -6$$

$$19) \frac{p}{6} + 6 = 4$$

$$20) 11 = \frac{x}{15} + 10$$

$$21) \frac{-2 + n}{6} = -3$$

$$22) 9b - 8 = -98$$



## Multi-Step Equations

**Solve each equation.**

1)  $24 = 5m + 7m$

2)  $-1 + 3x - 8x = -6$

3)  $-3k + 6 - 4k = 20$

4)  $-5r + 4 + 3r = 10$

5)  $1 - 5n + 2n - 2 = 3 - 2n$

6)  $7x + 4 = 6x - 1 + 3 - 4$

7)  $-6 + r = 3r + 4$

8)  $-3x + 6x = -4x + 5x$

$$9) \ 133 = -7(1 - 5k)$$

$$10) \ 7(4r + 5) = 259$$

$$11) \ 149 = -1 + 6(1 + 3a)$$

$$12) \ 4(5 + 7m) = 132$$

$$13) \ 40 + 7r = 8(1 + 3r) - 2$$

$$14) \ -2n - 34 = 7(2n + 4) + 2$$

$$15) \ -40 + 8x = -2(-7x + 5)$$

$$16) \ 26 + 4b = 6(b + 2)$$

$$17) \ -4(1 - 3v) + 2(v - 6) = -30$$

$$18) \ 50 = 8(7k - 7) + 6(k - 3)$$

## Solving Equations For Variables

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**Solve each equation for the indicated variable.**

1)  $4a - 1 = v + 2w$ , for  $a$

A)  $a = \frac{-1 - v - 2w}{4}$

B)  $a = 3 - v + 2w$

C)  $a = \frac{1 + v + 2w}{4}$

D)  $a = 5 - v + 2w$

2)  $2a + 3 = 2r - 4d$ , for  $a$

A)  $a = \frac{-2r + 4d + 3}{2}$

B)  $a = r - 2d - \frac{3}{2}$

C)  $a = r - 2d + \frac{3}{2}$

D)  $a = \frac{-2r - 4d - 3}{2}$

3)  $z = 15a$ , for  $a$

4)  $u = 4 - 2a$ , for  $a$

5)  $u = 4 + 8a + 4b$ , for  $a$

6)  $4x + 3 = -3pn$ , for  $x$

7)  $10x = v - 3w$ , for  $x$

8)  $2a^2 - 4 = 3v - w$ , for  $a$

## Practice Quiz Algebra 1-2

Target A: I can simplify expressions and evaluate when given values.

Evaluate:

1)  $p - (9 - (m + n))$  ; Use  $m = 4$ ,  $p = 5$ ,  $n = 3$

2)  $(b - 1)^2 + a^2$  ; Use  $a = 6$ ,  $b = 1$

3)  $20 \div (4 - (10 - 8))$

Simplify the following expressions

4)  $6(x+4) - 9x + 7$

5)  $3x - 4 - 5x + 9$

**Target B: I can solve 1 and 2 step equations**

Solve and check solutions for the following equations:

6)  $-22 = x - 9$

7)  $-3(4y - 8) = -36$

8)  $\frac{m}{9} - 1 = -5$

9) You are hoping to buy yourself a nice, warm jacket for the winter. The one you like costs \$233.50. Your relative gives you \$49.00 for your summer birthday. If you save \$15 per week, how long will it take you to buy that jacket?

a) Write an equation that models this situation

b) Solve the equation:

**Target C: I can solve multi-step equations**

Solve and check solutions for the following equations:

10)  $-5x + 6 = 17 - 7x$

11)  $3(x+9) = -2(4x+2) + 75$

12)  $\frac{4x-3}{11} = 3$

**Target D: I can manipulate equations and solve for different variables.**

13) Solve the following equation for h:  $4h - 3 = p$

14) Solve the following equation for x:  $\frac{9x-4}{y} = 15$

### **Intro Into Algebra Extensions:**

1) Solve the following equation for c,  $E=mc^2$

2) What would the question mark box have to be to make the following equation true?

$$5(3x + \text{?}) - 10x = 20$$

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3) Complete the following game

Goal:

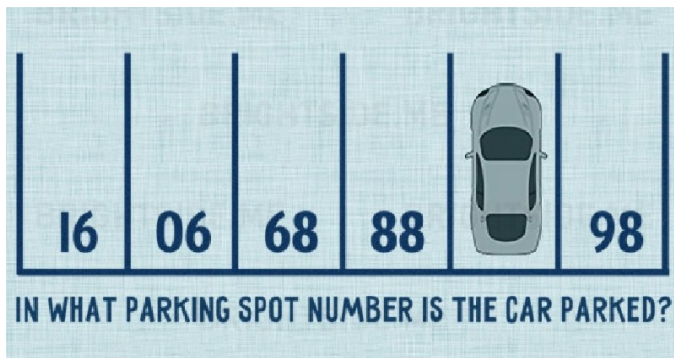
- Get from square 1 to 100

Rules:

- You can move horizontally, vertically, or diagonal, but only one square at a time
- To move you must add, subtract, multiply or divide the value of the square you are in by 2 or 5 to get the value in the square you are moving to.

|    |    |    |    |     |
|----|----|----|----|-----|
| 1  | 5  | 10 | 20 | 30  |
| 2  | 3  | 22 | 6  | 28  |
| 4  | 27 | 8  | 14 | 19  |
| 20 | 17 | 11 | 55 | 95  |
| 18 | 9  | 50 | 57 | 100 |

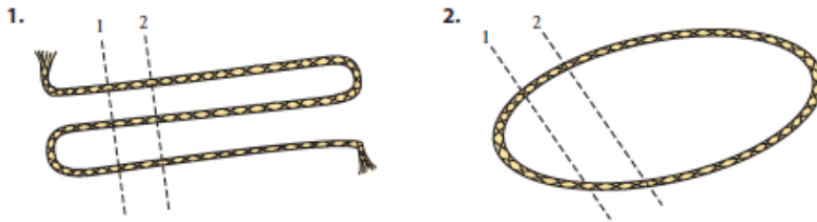
4) This one is tricky...



5) Patterns make life easier huh?

### *Rope Tricks*

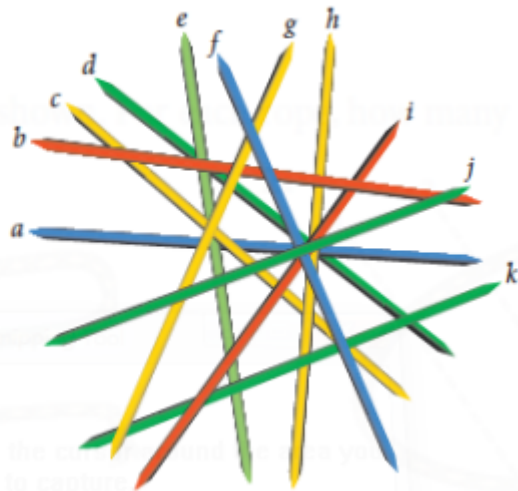
Each rope will be cut 50 times as shown. For each rope, how many pieces will result?



6) A different kind of order of operations....

### *Pickup Sticks*

Pickup sticks is a good game for developing motor skills, but you can turn it into a challenging visual puzzle. In what order should you pick up the sticks so that you are always removing the top stick?





## INTRO INTO ALGEBRA SOLUTIONS

### Assignment 1: Order of Operations

- |       |       |        |        |
|-------|-------|--------|--------|
| 1) 3  | 2) 6  | 3) 3   | 4) 3   |
| 5) 12 | 6) 4  | 7) 4   | 8) 1   |
| 9) 6  | 10) 7 | 11) 10 | 12) 16 |

### Assignment 2: Order of Operations, Evaluating Expression, Simplifying Expressions

- |               |                 |                 |                 |
|---------------|-----------------|-----------------|-----------------|
| 1) 60         | 2) 28           | 3) -2           | 4) 6            |
| 5) -100       | 6) 25           | 7) 7            | 8) 30           |
| 9) $-13x$     | 10) $3m + 16$   | 11) $-72v - 80$ | 12) $-56n - 70$ |
| 13) $-p - 16$ | 14) $-71n - 35$ | 15) $-83x - 50$ | 16) $5 - 3x$    |

### Assignment 3: Simplifying Expressions and 1 & 2 Step Equations

- |               |                |               |                |
|---------------|----------------|---------------|----------------|
| 1) $-13x - 2$ | 2) $3x$        | 3) $71 + 90n$ | 4) $-12 + 15b$ |
| 5) $12x + 32$ | 6) $-32n + 14$ | 7) $\{5\}$    | 8) $\{10\}$    |
| 9) $\{-7\}$   | 10) $\{200\}$  | 11) $\{4\}$   | 12) $\{8\}$    |
| 13) $\{-10\}$ | 14) $\{-28\}$  | 15) $\{-9\}$  | 16) $\{5\}$    |
| 17) $\{-6\}$  | 18) $\{-20\}$  | 19) $\{-12\}$ | 20) $\{15\}$   |
| 21) $\{-16\}$ | 22) $\{-10\}$  |               |                |

### Assignment 4: Multi-Step Equations

- |              |              |              |             |
|--------------|--------------|--------------|-------------|
| 1) $\{2\}$   | 2) $\{1\}$   | 3) $\{-2\}$  | 4) $\{-3\}$ |
| 5) $\{-4\}$  | 6) $\{-6\}$  | 7) $\{-5\}$  | 8) $\{0\}$  |
| 9) $\{4\}$   | 10) $\{8\}$  | 11) $\{8\}$  | 12) $\{4\}$ |
| 13) $\{2\}$  | 14) $\{-4\}$ | 15) $\{-5\}$ | 16) $\{7\}$ |
| 17) $\{-1\}$ | 18) $\{2\}$  |              |             |

### Assignment 5: Solving For Variables

- |                           |                           |                          |                                  |
|---------------------------|---------------------------|--------------------------|----------------------------------|
| 1) C                      | 2) B                      | 3) $a = \frac{z}{15}$    | 4) $a = \frac{u-4}{-2}$          |
| 5) $a = \frac{u-4-4b}{8}$ | 6) $x = \frac{-3-3pn}{4}$ | 7) $x = \frac{v-3w}{10}$ | 8) $a = \sqrt{\frac{4+3v-w}{2}}$ |

### Assignment 6: Practice Quiz

- |                     |                       |              |                |            |        |       |
|---------------------|-----------------------|--------------|----------------|------------|--------|-------|
| 1) 3                | 2) 36                 | 3) 10        | 4) $-3x+31$    | 5) $-2x+5$ | 6) -13 | 7) 5  |
| 8) -36              | 9a) 233.50            | $= 49 + 15x$ | 9b) 12.3 weeks | 10) 5.5    | 11) 4  | 12) 9 |
| 13) $\frac{p+3}{4}$ | 14) $\frac{15y+4}{9}$ |              |                |            |        |       |

## John Wooden:

*"If you spend too much time learning the tricks of the trade, you may not learn the trade. There are no shortcuts. If you're working on finding a short cut, the easy way, you're not working hard enough on the fundamentals. You may get away with it for a spell, but there is no substitute for the basics. And the first basic is good, old-fashioned hard work."*

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*"Early on I came to believe that you should learn as if you were going to live forever, and live as if you were going to die tomorrow. What does this mean? In the simplest way, I would explain it like this.*

*Always be learning, acquiring knowledge, and seeking wisdom with a sense that you are immortal and that you will need much knowledge and wisdom for that long journey ahead. Know that when you are through learning, you are through.*

*But I want to live that life as if I were going to die tomorrow: with relish, immediacy, and the right priorities. I also will not waste even a minute."*

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*"When I was teaching basketball, I urged my players to try their hardest to improve on that very day, to make that practice a masterpiece.*

*Too often we get distracted by what is outside our control. You can't do anything about yesterday. The door to the past has been shut and the key thrown away. You can do nothing about tomorrow. It is yet to come. However, tomorrow is in large part determined by what you do today. So make today a masterpiece. You have control over that."*

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*"It begins by trying to make each day count and knowing you can never make up for a lost day. If a player appeared to be taking it easy in practice, I told him, 'Don't think you can make up for it by working twice as hard tomorrow. If you have it within your power to work twice as hard, why aren't you doing it now?'"*

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*"The real contest, of course, is striving to reach your personal best, and that is totally under your control. When you achieve that, you have achieved success. Period! You are a winner and only you fully know if you won."*