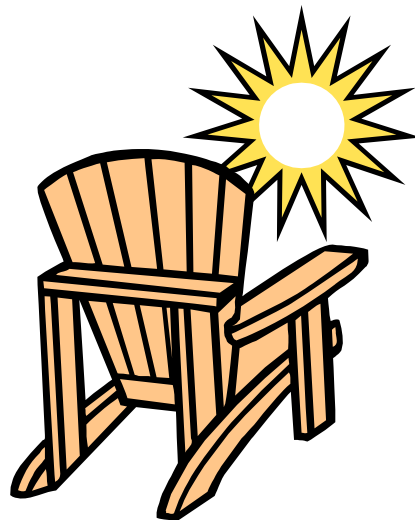




FOR ALL STUDENTS TAKING  
INTRO TO ALGEBRA  
SUMMER 2013



Dear Student and Parent/Guardian,

The math department at Central Dauphin School District wants you to be successful in Intro to Algebra. We also want you to be prepared for PSSA Exams. This summer packet is designed to help you reach these goals by reviewing necessary skills.

Be sure to follow the key information below when completing this packet:

- The packet is due when you return to school in August.
- **Every problem must be completed. None left blank.**
- The packet is worth 10 times a regular homework grade.
- Work must be shown to receive credit – no work, no points.  
**Show the work on the packet pages. Do NOT add additional pages.**
- Final answers must be shown on the answer pages at the back of the packet.
- A possible Quiz covering the material from the packet may be given at the end of the first week of school. These topics also tie in with the first few units of Intro to Algebra.
- All topics covered in the packet should be completed without the aid of a calculator. If it is decided to give a Quiz on the summer packet topics, no calculator will be allowed on the Quiz.
- When you return in August, you will have the opportunity to ask questions. Math Help will also be available during the first week.

***In addition, it is our expectation for every student to know their multiplication facts by memory up to and including 12.***

We hope that you have an enjoyable summer and return to school ready to be successful in Intro to Algebra!

**Helpful Websites**

[www.glencoe.com](http://www.glencoe.com) [www.regentsprep.org](http://www.regentsprep.org) [www.khanacademy.org](http://www.khanacademy.org) [www.purplemath.com/modules](http://www.purplemath.com/modules)  
[www.Aleks.com](http://www.Aleks.com) (a website where you can subscribe for individual math lessons)

## A. Apply the Order of Operations to Integer Computations

### Order of Operations Review

#### How Do I Remember PEMDAS?

|           |  |
|-----------|--|
| <b>P</b>  | Parentheses first                            |
| <b>E</b>  | Exponents (ie Powers and Square Roots, etc.) |
| <b>MD</b> | Multiplication and Division (left-to-right)  |
| <b>AS</b> | Addition and Subtraction (left-to-right)     |

Example: Evaluate  $7 + (6 \times 5^2 + 3)$

$$7 + (6 \times 5^2 + 3)$$

$$7 + (6 \times 25 + 3)$$

Start inside *Parentheses*, and then use *Exponents* first

$$7 + (150 + 3)$$

Then *Multiply*

$$7 + (153)$$

Then *Add*

$$7 + 153$$

*Parentheses* completed, last operation is an *Add*

$$160$$

DONE !

Now you try. Evaluate the following expressions using the order of operations. Make sure to show your work! Don't forget to put your final answers on the provided answer sheet.

1)  $3 + 2^2(1 + 8)$

2)  $2[13 - (1 + 6)]$

3)  $2(3 + 5) - 9$

4)  $3(6 + 4)(5 - 3)$

5)  $48/3 + 5$

6)  $100 - 4(7 - 4)^3$

7)  $45 \div 5 \cdot 3 + 2^3$

Let  $a = 4$   $b = 3$   $c = 5$   $d = 10$

8)  $a^2 + abc$

9)  $a(b + c)$

10)  $d \div c \cdot b + a$

11)  $d/c + a$

12)  $(ab)(c+a)$

13)  $b[a(b+c)]$

14)  $b^2 \div c \cdot b + a$

15)  $d^3/c^2$

16)  $abd$

17)  $c[ a + a(b+c)]$

## B. Add, Subtract, Multiply, and Divide Integers

### Operations on Integers Rule Review

#### • Adding Integers

- If the signs are the **SAME**, find the **SUM** (add the numbers without the signs)!
  - The sum of two positive numbers is positive.
  - The sum of two negative numbers is negative.
- If the signs are **DIFFERENT**, find the **DIFFERENCE** (subtract the numbers without the signs)! Make sure to **subtract the smaller number from the larger number!**
  - Take the sign of the number with the larger absolute value.

#### Examples:

1)  $-45 + 28$

The signs are different, so find the difference!

$$\begin{array}{r} 45 \\ -28 \\ \hline 17 \end{array}$$

45 is bigger, and it is negative, so the answer is -17.

$$-45 + 28 = -17$$

2)  $-65 + (-37)$

The signs are the same, so find the sum!

$$\begin{array}{r} 65 \\ +37 \\ \hline 102 \end{array}$$

The two numbers are negative, so the answer is -102.

$$-65 + (-37) = -102$$

3)  $-32 + 77$

The signs are different, so find the difference!

$$\begin{array}{r} 77 \\ -32 \\ \hline 45 \end{array}$$

77 is bigger, and it is positive, so the answer is 45.

$$-32 + 77 = 45$$

Now you try. Add the following integers. Make sure to show your work! Don't forget to put your final answers on the provided answer sheet.

18)  $-56 + (-82)$

19)  $-38 + 88$

20)  $83 + (-103)$

21)  $-105 + (-233)$

22)  $-73 + 22$

- **Subtracting Integers**

- Subtracting integers is the same as adding the additive inverse (opposite).
- Rewrite each problem as an addition problem where you add the opposite.
- Then, follow the rules for adding integers.

Examples:

1)  $-48 - 28$

Subtracting is the same as adding the opposite.

$$-48 + (-28)$$

$$48$$

$$\underline{+28}$$

$$76$$

The answer is  $-76$ .

$$-48 - 28 = -76$$

2)  $58 - 103$

Subtracting is the same as adding the opposite.

$$58 + (-103)$$

$$103$$

$$\underline{-58}$$

$$45$$

The answer is  $-45$ .

$$58 - 103 = -45$$

3)  $-31 - (-55)$

Subtracting is the same as adding the opposite.

$$-31 + 55$$

$$55$$

$$\underline{-31}$$

$$24$$

The answer is  $24$ .

$$-31 - (-55) = 24$$

Now you try. Subtract the following integers. Make sure to rewrite each subtraction problem as an addition problem and show your work! Don't forget to put your final answers on the provided answer sheet.

23)  $-58 - 66$

24)  $32 - 86$

25)  $-32 - (-78)$

26)  $83 - (-109)$

27)  $-148 - 238$

### Multiplying Integers

$$+ \cdot + = +$$

$$+ \cdot - = -$$

$$- \cdot + = -$$

$$- \cdot - = +$$

### Dividing Integers

$$+ \div + = +$$

$$+ \div - = -$$

$$- \div + = -$$

$$- \div - = +$$

### Examples:

1)  $-5 \cdot (-9) = 45$

A negative number times a negative number is positive.

3)  $15 \cdot (-3) = -45$

A positive number times a negative number is negative.

5)  $-63 \div (-7) = 9$

A negative number divided by a negative number is positive.

2)  $-12 \cdot 11 = -132$

A negative number times a positive number is negative.

4)  $25 \div (-5) = -5$

A positive number divided by a negative number is negative.

6)  $-54 \div 9 = -6$

A negative number divided by a positive number is negative.

Now you try. Multiply or divide the following integers. Don't forget to put your final answers on the provided answer sheet.

28)  $-12 \cdot (-12) = \underline{\hspace{2cm}}$

29)  $-81 \div 9 = \underline{\hspace{2cm}}$

30)  $35 \div (-7) = \underline{\hspace{2cm}}$

31)  $-8 \cdot 4 = \underline{\hspace{2cm}}$

32)  $-72 \div (-8) = \underline{\hspace{2cm}}$

33)  $13 \cdot (-3) = \underline{\hspace{2cm}}$

## D. Solve One- and Two-Step Equations

### Solving One-Step Equations Rule Review

- To solve one-step equations, use the inverse operation!

Examples:

1)  $x + 13 = -34$

The inverse of addition is subtraction!

$$\begin{array}{r} -13 \quad +(-13) \\ \hline x = -47 \end{array}$$

Remember that subtracting is the same as adding the opposite!

Side Work:

$$-34 + (-13)$$

$$34$$

$$\hline +13$$

$$47$$

$$-34 + (-13) = -47$$

2)  $x - 24 = -59$

The inverse of subtraction is addition!

$$\begin{array}{r} +24 \quad +24 \\ \hline x = -35 \end{array}$$

Side Work:

$$-59 + 24$$

$$59$$

$$\hline -24$$

$$35$$

$$-59 + 24 = -35$$

3)  $-18 + g = 46$

The inverse of addition is subtraction!

$$\begin{array}{r} -(-18) \quad +18 \\ \hline g = 64 \end{array}$$

Remember that subtracting is the same as adding the opposite!

Side Work:

$$46 + 18$$

$$46$$

$$\hline +18$$

$$64$$

$$46 + 18 = 64$$

4)  $r - (-28) = -32$

The inverse of subtraction is addition!

$$\begin{array}{r} +(-28) \quad +(-28) \\ \hline r = -60 \end{array}$$

Side Work:

$$-32 + (-28)$$

$$32$$

$$\hline +28$$

$$60$$

$$-32 + (-28) = -60$$

You can also do this...  $r - (-28) = -32$

$$r + 28 = -32$$

$$\hline -28 \quad +(-28)$$

$$r = -60$$



Now you try. Solve each of the following equations, showing all of your work as shown on the previous page! Don't forget to put your final answers on the provided answer sheet.

34)  $y - 82 = -77$

35)  $-45 + e = 35$

36)  $d - (-21) = -56$

37)  $p + 44 = -29$

Examples:

- REMEMBER: To solve one-step equations, use the **inverse operation!**

1)  $-5m = -55$  ← The inverse of multiplication is division!  
 $\div (-5) \div (-5)$   
 $m = 11$

2)  $7y = -35$  ← The inverse of multiplication is division!  
 $\div 7 \div 7$   
 $y = -5$

3)  $\frac{h}{-9} = -8$  ← The inverse of division is multiplication!  
 $\cdot (-9) \cdot (-9)$   
 $h = 72$

4)  $\frac{w}{-12} = 4$  ← The inverse of division is multiplication!  
 $\cdot (-12) \cdot (-12)$   
 $w = -48$

Now you try. Solve each of the following equations, showing all of your work as shown above! Don't forget to put your final answers on the provided answer sheet.

38)  $-8x = -64$

39)  $\frac{q}{-13} = 4$

$$40) \frac{f}{6} = -12$$

$$41) 3x = -27$$

## Solving Two-Step Equations Rule Review

- To solve two-step equations, use the reverse order of operations.
- You will still use inverse operations!

Examples:

$$\begin{array}{r}
 1) \quad 5x - 4 = 11 \\
 \quad \quad +4 \quad +4 \\
 \hline
 \quad \quad 5x = 15 \\
 \quad \quad \div 5 \quad \div 5 \\
 \hline
 \quad \quad x = 3
 \end{array}$$

$$\begin{array}{r}
 2) \quad -10 + \frac{k}{5} = 3 \\
 \quad \quad -(-10) \quad +10 \\
 \hline
 \quad \quad \frac{k}{5} = 13 \\
 \quad \quad \cdot 5 \quad \cdot 5 \\
 \hline
 \quad \quad k = 65
 \end{array}$$

$$\begin{array}{r}
 3) \quad \frac{w}{-8} - 4 = -7 \\
 \quad \quad +4 \quad +4 \\
 \hline
 \quad \quad \frac{w}{-8} = -3 \\
 \quad \quad \cdot(-8) \quad \cdot(-8) \\
 \hline
 \quad \quad w = 24
 \end{array}$$

$$\begin{array}{r}
 4) \quad 12 = -3j - 9 \\
 \quad \quad +9 \quad +9 \\
 \hline
 \quad \quad 21 = -3j \\
 \quad \quad \div(-3) \div(-3) \\
 \hline
 \quad \quad -7 = j
 \end{array}$$

Now you try. Solve each of the following equations, showing all of your work as shown above! Don't forget to put your final answers on the provided answer sheet.

$$42) -5x - 2 = 13$$

$$43) 25 = 6g + 1$$

44)  $-16 = 6a - 4$

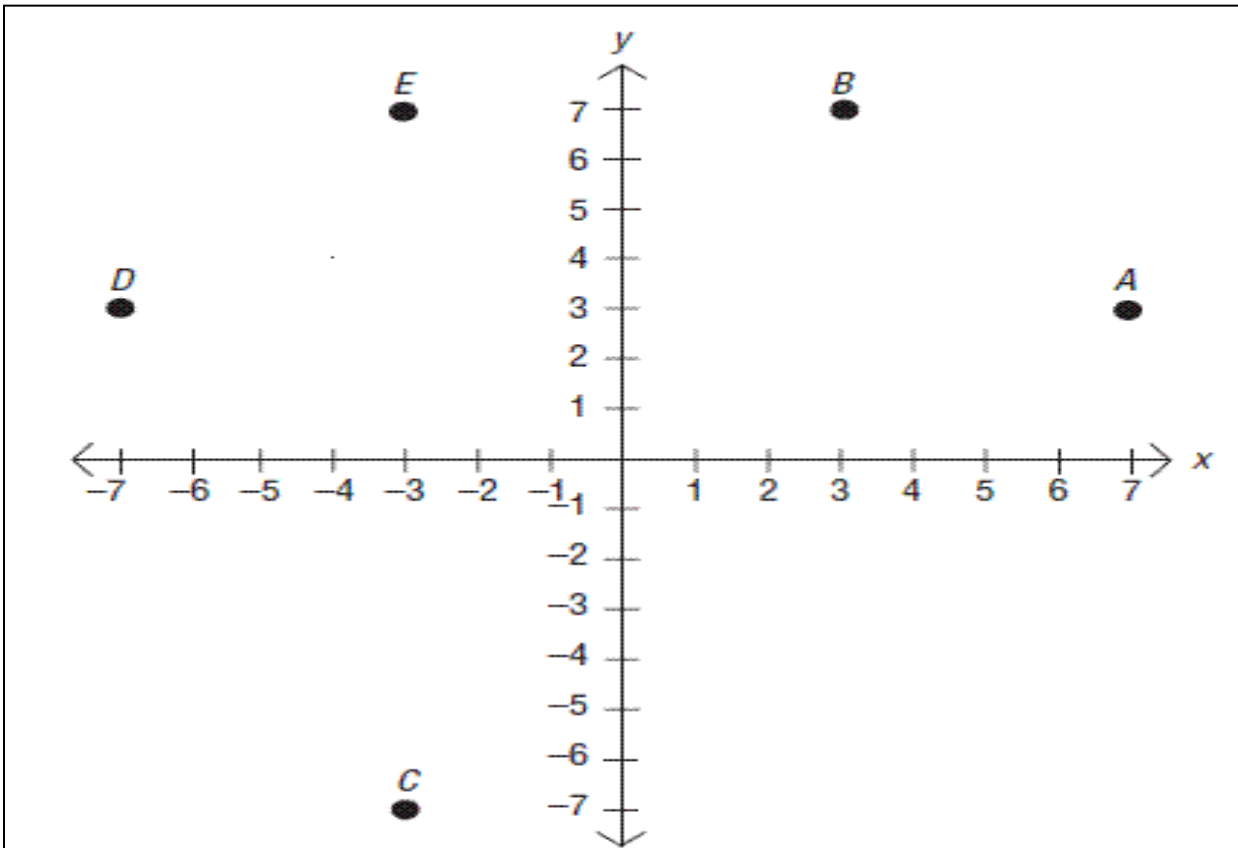
45)  $\frac{n}{-3} + 15 = 8$

46)  $4 = \frac{t}{6} - 11$

47)  $4 - x = 10$   
 $4 + (-1x) = 10$

This problem is started for you! The coefficient (number in front of)  $x$  is  $-1$ .

Coordinate Plane



Name the coordinates of the ordered pair and quadrant.

- 48) A
- 49) B
- 50) C
- 51) D
- 52) E

# Summer Packet for Students Taking Introduction to Algebra Answer Sheet

Put your answers to the problems from the summer packet on this sheet. Work should be shown on the previous pages underneath each question.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

11. \_\_\_\_\_

12. \_\_\_\_\_

13. \_\_\_\_\_

14. \_\_\_\_\_

15. \_\_\_\_\_

16. \_\_\_\_\_

17. \_\_\_\_\_

18. \_\_\_\_\_

19. \_\_\_\_\_

20. \_\_\_\_\_

21. \_\_\_\_\_

22. \_\_\_\_\_

23. \_\_\_\_\_

24. \_\_\_\_\_

25. \_\_\_\_\_

26. \_\_\_\_\_

27. \_\_\_\_\_

28. \_\_\_\_\_

29. \_\_\_\_\_

30. \_\_\_\_\_

31. \_\_\_\_\_

32. \_\_\_\_\_

33. \_\_\_\_\_

34. \_\_\_\_\_

35. \_\_\_\_\_

36. \_\_\_\_\_

37. \_\_\_\_\_

38. \_\_\_\_\_

39. \_\_\_\_\_

40. \_\_\_\_\_

41. \_\_\_\_\_

42. \_\_\_\_\_

43. \_\_\_\_\_

44. \_\_\_\_\_

45. \_\_\_\_\_

46. \_\_\_\_\_

47. \_\_\_\_\_

48. \_\_\_\_\_

49. \_\_\_\_\_

50. \_\_\_\_\_

51. \_\_\_\_\_

52. \_\_\_\_\_