

SUMMER MATH PACKET 1-B

The problems in this packet have been selected to help you to review concepts in preparation for your next math class. Please complete the **odd problems** in this packet.

- Show your work clearly - remember, only odd-numbered problems are required.
- Hand the packet to your teacher on the first day of class. It will count as a graded assignment
- No calculator for this problem set

Have a great summer and we look forward to meeting you

Randy Bernstein

Math Chair

Ma'ayanot Yeshiva High School for Girls

ORDER OF OPERATIONS

P.E.M.D.A.S.

PARENTHESES- this means operations inside the parentheses

EXPONENTS - raise number to exponents

MULTIPLICATION/DIVISION - all in order from left to right

ADDITION/SUBTRACTION - all in order from left from right

Example 1:

$$\begin{aligned}
 &24 - 16 \div 4 \times 2 + 3 = \\
 &24 - 4 \checkmark \times 2 + 3 = \\
 &24 - 8 \checkmark + 3 = \\
 &16 \checkmark + 3 = \\
 &19
 \end{aligned}$$

Example 2:

Evaluate the expression:

$$9/3 + 2(9+10) - 8 + 4 \bullet 3$$

$9/3 + 2(9+10) - 8 + 4 \bullet 3$	Parenthesis
$9/3 + 2(19) - 8 + 4 \bullet 3$	Division (comes 1 st)
$3 + 2(19) - 8 + 4 \bullet 3$	Multiplication (comes 2 nd)
$3 + 38 - 8 + 4 \bullet 3$	Multiplication (comes 3 rd)
$3 + 38 - 8 + 12$	Addition (comes 1 st)
$41 - 8 + 12$	Subtraction
$33 + 12$	Final Addition
45	45 is the final answer.

Using Order of Operations - (NO CALCULATOR)

1) $60 \div (6+2-4) - 8 - 1 - 6$

2) $4 - 8 + \{12 \div 2 \times 7 - 3 \times 8\}$

3) $[4 - 90 \div 3 + 8] \times 1 \times 2 \times 7$

4) $3 \times 4 \times (2 - 1 \times 45) \times 8 \times 1$

5) $1 - [6 \times 8 - 4 + 6 - 3] + 8$

6) $9 + [8 + 14 \div 2 + 7 - 6] \times 3$

7) $6 + [8 \times 61 \div 2 + 9] \times 7 \times 5$

8) $8 + 14 \div (5 + 1 - 1 \times 5) \times 3$

9) $[7 \times 5 \times 21 \div 1 + 7] - 2 - 1$

10) $[7 \times 30 \div 5 \times 9 \times 4 + 5] + 8$

Simplify by combining like terms.

11) $5(t+5) + 10(t+1)$	12) $-2k - 3v - 7k + 3 - 10k =$ $=(-2k-7k-10k)-3v-$ $=-19k-3v+3$
13) $5 + 5(-3y + 3)$	14) $-5(v-4) + 5(-7 - 5v)$
15) $8t - 2 - 10 - 5t$	16) $-3v + 3v$
17) $-2s - 5sx - 4 - 3sx$	18) $-6 - 6n - 2n^2 - 5n + 5 + 10n^2$
19) $-4(7k-6) - 3(6 + 3k)$	20) $-3(7k + 6 + k^2) - 4k$
21) $4 - 6w + 7w + 10w - 3(w-2)$	22) $-2 + -5(X-4) - 5X$

Solve for the variable

23) $3 \cdot (-4) = 2(c-1)$	24) $5 - 2p = 1$
25) $4 - p = -5 - 5$	26) $1n = -5 + (-1)$
27) $-2 = 2(w-4)$	28) $v - 5 = 1$
29) $5 = 5(n-2)$	30) $4(z+3) + 0 = -1$
31). $5(x-3) + 7 = 3(x-5)$	32). $5 = 3(4-s)$
33) $3(a+5) + 3 = 5$	34) $-(k+4) + 2k = 0$

Evaluate by substituting the given values of the variables:

35) $m + p \div 5$; use $m = 1$, and $p = -5$	36) $(p + q)^2 - (5 - 5)$; use $p = 1$, and $q = -2$
37) $z(x + y)$; use $x = 6$, $y = -8$, and $z = 6$	38) $12k - h^2$; use $h = 2$, and $k = -3$
39) $x^3 \div 3 - y$; use $x = 3$, and $y = -1$	40) $y \div 5 + 1 + x \div 6$; use $x = -6$, and $y = 5$
41) $\frac{2x - y + z}{x + 3z}$ for $x = -2$ and $y = 5$	42) $\frac{x + y - 5z}{x - 3z}$ for $x = -2$ and $y = -5$

RATIOS , RATES, AND PROPORTIONS- What's the difference?**Ratios**

A ratio is a comparison of two quantities that have the *same units*. You can express a ratio in any one of the following ways:

$$\frac{18}{5} \qquad 18:5 \qquad 18 \text{ to } 5 \qquad 5$$

Example: If there are 15 boys and 20 girls then

$$\frac{\text{boys}}{\text{girls}} = \frac{15}{20} \qquad \frac{\text{girls}}{\text{boys}} = \frac{20}{15} \qquad \frac{\text{boys}}{\text{total}} = \frac{15}{35} \qquad \frac{\text{girls}}{\text{total}} = \frac{20}{35}$$

Rates: A rate is a comparison of two quantities that have *different units*. Rates are usually expressed in the fractional form.

Example: Francine paid \$16 for her 12-month subscription to *Better Homes and Gardens* magazine. Express as a rate.

$$- \quad \frac{\$16.00}{12 \text{ magazines}} = \frac{\$4.00}{3 \text{ magazines}}$$

If Francine wants to know how much she pays for each (1) magazine, she can divide \$4 by 3 magazines. This will give her the price per magazine (also called the **unit rate**). $\frac{\$4.00}{3} = \$1.33/\text{magazine}$

RATIOS AND PROPORTIONS PRACTICE SHEET

A. Write each ratio as a fraction in lowest terms. (NO CALCULATOR)

43) 2 to 4

44) 3 to 12

47) 6:18

48) 22 : 330

B. Write each of the following rates as a unit rate. (Look at model problems above)

49) $\frac{3 \text{ Tbsp sugar}}{2 \text{ cups of milk}}$

50) $\frac{135 \text{ pitches}}{45 \text{ strikes}}$

51) $\frac{128 \text{ miles}}{4 \text{ hours}}$

60) $\frac{2250 \text{ pencils}}{18 \text{ boxes}}$

61) $\frac{\$450}{18 \text{ shares}}$

62) $\frac{2500 \text{ meters}}{15 \text{ seconds}}$

C. Solve each proportion and state the answer in simplest form.

63) $6 : 8 = n : 12$

64) $\frac{2}{7} = \frac{8}{n}$

65) $\frac{n}{6} = \frac{11}{3}$

66) $4 : n = 6 : 9$

67) $2 \frac{1}{2} : 3 \frac{1}{2} = n : 2$

68) $1 : 2 = n : 9$

69) $4 \text{ to } 8 = 15 \text{ to } n$

70) $18 : n = 3 : 11$

D. Solve by using a proportion. Round answers to the nearest hundredth if necessary.

(YOU MAY USE A CALCULATOR, BUT SHOW THE WAY YOU SET UP THE PROBLEM. CALCULATOR SHOULD ONLY BE USED AT THE END)

71) You jog 3.6 miles in 30 minutes. At that rate, how long will it take you to jog 4.8 miles?

72). An airplane flies 105 miles in $\frac{1}{2}$ hour. How far can it fly in $1\frac{1}{4}$ hours at the same rate of speed?

73) What is the cost of six filters if eight filters cost \$39.92?

74) If one gallon of paint covers 825 sq. ft., how much paint is needed to cover 2640 sq. ft.?

75) A map scale designates $1'' = 50$ miles. If the distance between two towns on the map is 2.75 inches, how many miles must you drive to go from the first town to the second?

76) Bob is taking his son to look at colleges. The first college they plan to visit is 150 miles from their home. In the first hour they drive at a rate of 60 mph. If they want to reach their destination in $2\frac{1}{2}$ hours, what speed must they average for the remainder of their trip?

77) Four employees can wash 20 service vehicles in 5 hours. How long would it take 5 employees to wash the same number of vehicles?

(Hint: As the number of employees increases, the amount of time to complete the same job decreases. This is **not a direct proportion.**)



Word Problems: Percent Increase and Decrease

Percent Increase

$$\frac{\text{Amount of Increase}}{\text{original price}} = \% \text{ increase (percent means per hundred!)}$$

Percent Decrease

$$\frac{\text{Amount of Decrease}}{\text{original price}} = \% \text{ decrease}$$

EXAMPLES

A jacket is on sale for 25% off the original price. If the original price is \$58, what is the sale price of the jacket?

Let x = amount of decrease

$$\frac{x}{\$58} = \frac{25}{100}$$

$$100x = 25 \cdot 58$$

$$100x = \$1450$$

$$x = \$14.50$$

$$\text{so Sale price} = \$58 - \$14.50 = \$43.50$$

For the following, you may use a calculator, but show all work and use the calculator for the final step. Make sure to declare your variable (Let $x =$)

78) Lane saved \$8 by buying her video game on sale. If the game was on sale for 25% off the original price, what the original price of the game?

Let x = original price

$$\frac{8}{x} = \frac{25}{100} \quad \text{complete the problem}$$

79) Jasmine took the hem out of her skirt. As a result, she increased the length of her skirt by 14%. The original length of her skirt was 16 inches. What was the final length of her skirt?

80) A survey two years ago showed that 120 students in the school were able to use computers at home. A new survey shows that the number of students with access to computers at home has increased by 15%. How many students now have access to computers?

81) In a survey taken two weeks ago, 146 students said they would vote for Megan for class president. Today 163 students said they would vote for her. What was the approximate percent increase in the number of students voting for Megan?

82) Mike weighed 160 pounds last year. This year he weighs 200 pounds. What is the percent increase in his weight?

83) Jeff weighs 144 pounds now, but last year he weighed 180 pounds. What is his percent decrease?

Graphing Linear Equations

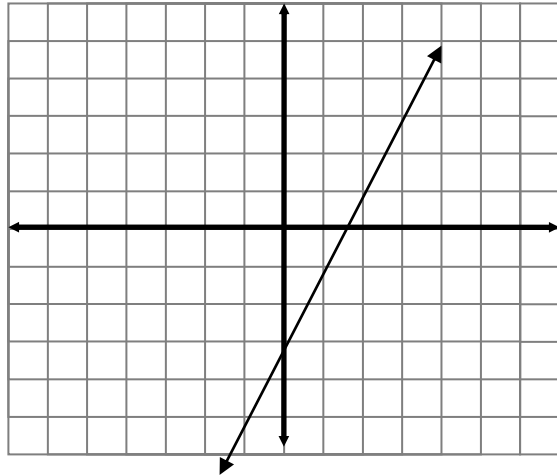
By using a table, graph each of the following. First fill in the table, then plot the three points, and draw the line.

Here is a model problem.

$$y = 2x - 3$$

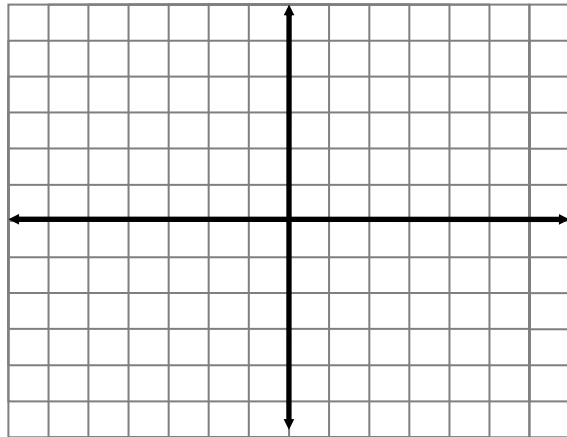
x	$y=2x-3$	y	(x,y)
-1	$2(-1)-3 = -5$	-5	(-1,-5)
0	$2(0)-3 = -3$	-3	(0,-3)
1	$2(1) - 3 = -1$	-1	(1,-1)

Plot the 3 points and connect to form a line



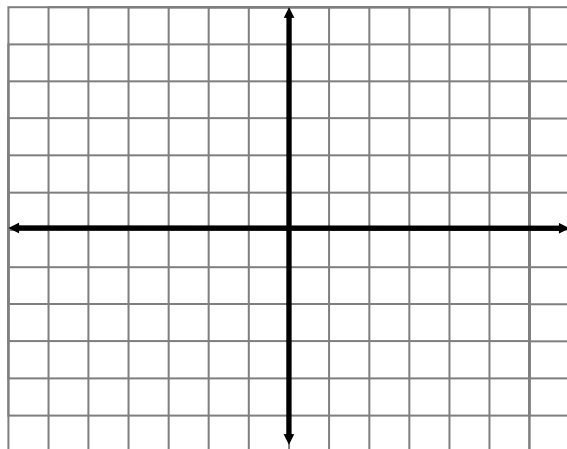
84) $y = -3x - 2$

x	$y = -3x-2$	y	(x,y)
-1	$Y = -3(-1)-2=1$	1	(-1,1)
0	$Y = -3(0) - 2$	-2	(0,-2)
1	$Y = -3(1) - 2$	-5	(1,-5)



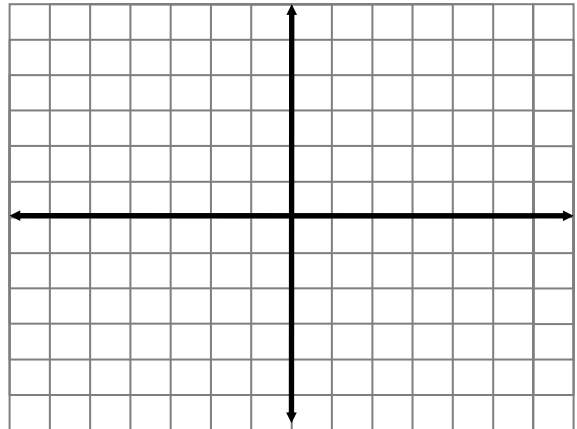
85) $y = \frac{1}{2}x + 1$

x	$y = \frac{1}{2}x + 1$	y	(x,y)
-2		0	
0		1	
2		2	



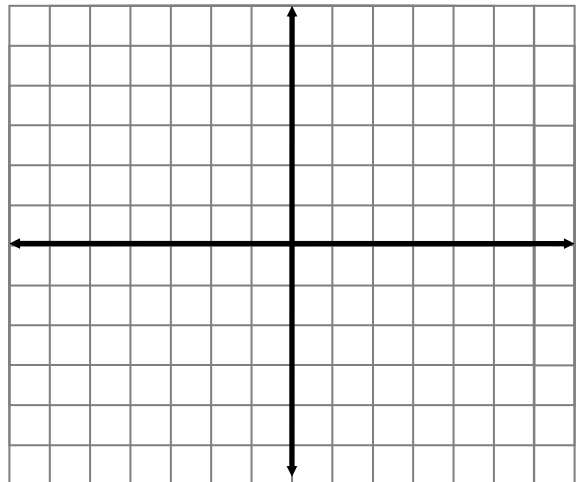
86) $y = 2x - 1$

x		y	



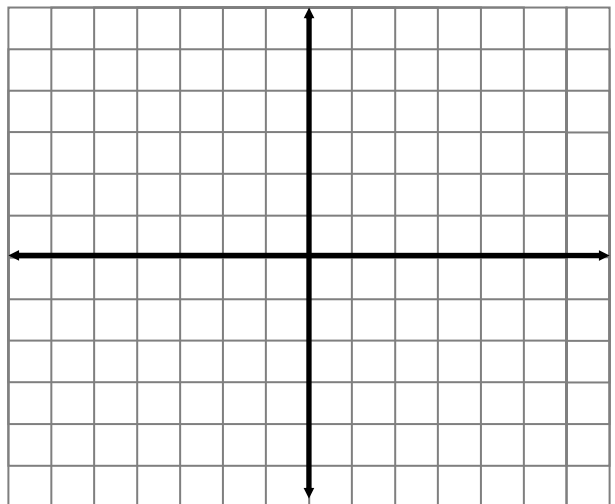
87) $y = -2x + 3$

x		y	



88) $y = (1/3)x + 2$

x		y	
-3			
0			
3			



Solve each of the following for the variable- Show work

89) $\frac{-2}{7}x = 6$

90) $-5 = \frac{-x}{6}$

91) $\frac{-m}{8} = -5$

92) $\frac{-m}{3} = 2$

93) $\frac{3}{4}t = \frac{2}{3}$

94) $\frac{2}{3} = -\frac{3}{5}t$

95) $\frac{-5}{6}x = \frac{3}{4}$

96) $\frac{3}{4}x = \frac{1}{2}$

$$97) 2y - \frac{3}{5} = \frac{1}{2}$$

$$98) y - \frac{2}{5} = -\frac{1}{3}$$

$$99) \frac{1}{4} + \frac{1}{2}t = 4$$

$$100) \frac{1}{4}x + x = -3 + \frac{1}{2}x$$

YOU'RE DONE!

HAND IT IN TO YOUR TEACHER ON THE FIRST DAY OF CLASS.