Algebra 1
Summer Packet

(For students entering Algebra 1)

Students entering Algebra 1 should complete the problems in this packet before returning to school from Summer Break. All the material in this packet will be used at some point this year. These topics should have been covered in previous years (not necessarily last year). necessarily last year). The entirety of this packet should be completed without the use of a calculator unless noted.

Students will be held responsible for understanding these concepts and teachers will check for completion and assess understanding.

Answers to all problems are included on the last page of this packet. Make note of any questions you have on these topics; your teacher will address any questions within the first few classes and then there will be an assessment on the material.

Need help on some of the topics? For each section a link to an instructional video has been provided!

Have a great summer and see you in the fall! ☺

Topics: Simplify expressions.

Order of Operations: https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-arithmetic-operations/cc-6th-order-of-operations/v/order-of-operations-1

Simplifying with Rational Numbers: https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-negative-numbers-multiply-and-divide/cc-7th-mult-div-neg-fractions/v/multiplying-negative-and-positive-fractions

https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-negative-numbers-multiply-and-divide/cc-7th-mult-div-neg-fractions/v/dividing-mixed-numbers

Simplify.

1. $4 - 2(3 - 2^2) + 2(3)^2$
2. $\left(3\frac{2}{3}\right) \cdot \left(-\frac{1}{5}\right)$
3. $4 + \left(2\frac{1}{3} \div 3\frac{1}{2}\right)$
4. $3\left(\frac{1}{2} + \frac{4}{3}\right)$

Topics: Solve linear equations in one variable and solve linear equations with rational number coefficients where there is one solution, infinitely many solutions, or no solutions

Solving simple equations: https://www.khanacademy.org/math/algebra/solving-linear-equations-and-inequalities/equations_beginner/v/simple-equations

Solving equations: https://www.khanacademy.org/math/algebra/solving-linear-equations-and-inequalities/basic-equation-practice/v/equations-3

Number of solutions: https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-solving-equations/cc-8th-equation-solutions/v/number-of-solutions-to-linear-equations

Linear equations word problems: https://www.khanacademy.org/math/algebra-basics/core-algebra-linear-equations-inequalities/core-algebra-linear-equation-word-problems/v/linear-equation-word-problem-example

Solve for the given variable.

5. $x + 1 = 2\frac{1}{5}$
6. $9.4 - 0.25c = 8.6$
7. $8x - 2 = -9 + 7x$
8. $1 + 2n = 8 + 4n$

9. $p - 4 = -9 + p$ 10. $9x - 7 = -7$ 11. $\frac{1}{2}x + 3 = 1\frac{1}{4}x + 3 - \frac{3}{4}x$

12. **CALCULATOR:** Ann buys donuts and bagels for a morning at the park with friends. A donut costs $1.17 and a bagel costs $0.99, If Ann bought 8 donuts and the total cost was $15.30, how many bagels did Ann buy? Write and solve the equation to show your work.

13. **CALCULATOR:** One cell phone plan charges $15 per month plus $0.30 per minute used. A second cell phone plan charges $25 per month plus $0.10 per minute used. Write and solve an equation to find the number of minutes you must talk to have the same cost for both calling plans.

Topic: Use the distributive property and collect like-terms when solving linear equations

Distributive Property: https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-solving-equations/cc-8th-equations-distribution/v/equation-special-cases

Solve for the given variable.

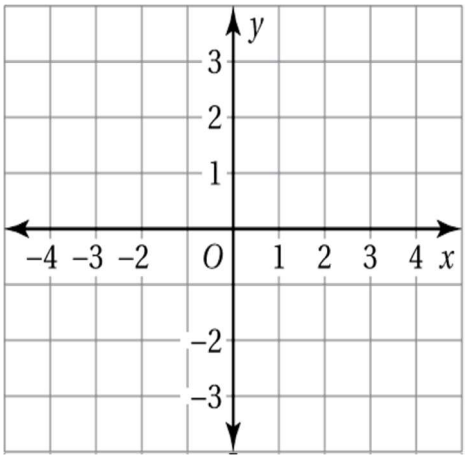
14. $12 = -4(-6x - 3)$ 15. $-8 = -(x + 4)$ 16. $5n + 34 = -2(1 - 7n)$ 17. $2(4x - 3) - 8 = 4 + 2x$

Topics: Determine the rate of change (slope) and initial value of a function from a description of a relationship or from two (*x*, *y*) values and Interpret slope as the unit rate of the graph

Slope: https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-linear-equations-functions/8th-slope/v/slope-intuition-example

18. Find the slope of the line containing the points (0, –1) and (5, 6)

19. Determine the slope and y-intercept and graph $y = 3x - 2$



Slope: _____

y-intercept: _____

Topic: Derive the equation $y = mx + b$ for a line given two distinct non-vertical points

Slope-Intercept Form: https://www.khanacademy.org/math/algebra/two-var-linear-equations-and-intro-to-functions/slope-intercept-form/v/graphing-a-line-in-slope-intercept-form

Write an equation in slope-intercept form $(y = mx + b)$ of the line passing through the given points.

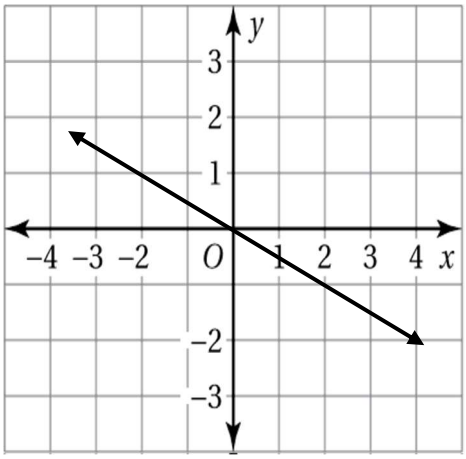
20. $(3, 5)\ and\ (0, 4)$

21. $(2, -6)\ and\ (-4, -2)$

22. $(\frac{1}{2}, -1)\ and\ (3\frac{1}{2}, 14)$

23. When Phil started his new job, he owed the company $65 for his uniforms. He is earning $13 per hour. The cost of his uniforms is withheld from his earnings. Write an equation that models the total money he has *m* after *h* hours of work.

24. What is the slope of the line? What is the y-intercept?

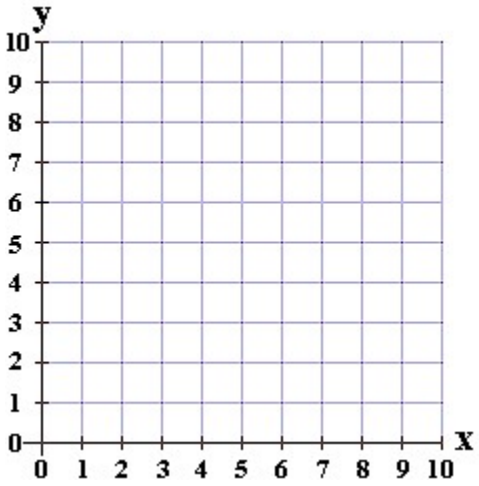


Slope: _____

y-intercept: _____

25. The table shows the cost *y* (in dollars) of *x* cold drinks.

a. Graph the data. Label the axes.



Drinks, *x*	0	2	4	6
Cost, *y*	0	3	6	9

b. What is the slope of the linear function? Interpret the slope in words in context of the situation.

c. What is the y-intercept of the linear function? Interpret the y-intercept in context of the situation.

Topic: Apply properties of integer exponents to generate equivalent numerical expressions

Exponent properties: https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-numbers-operations/cc-8th-exponent-properties/v/exponent-properties-involving-products

Negative Exponents: https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-numbers-operations/cc-8th-pos-neg-exponents/v/negative-exponents

Simplify each expression by using the properties of exponents.

26. $(x^3)^4$ 27. $x^2 \cdot x^3$ 28. $\frac{x^7}{x^3}$ 29. $3x^{-2}$ 30. $4x\left(\frac{2}{x^2}\right)^3$

Topic: Simplify square roots and use square and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$

Exponent properties: https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:rational-exponents-radicals/x2f8bb11595b61c86:simplifying-square-roots/v/simplifying-square-roots-1

Solving using roots: https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations/x2f8bb11595b61c86:untitled-1082/v/simple-quadratic-equation

Simplify each expression.

31. $\sqrt{144}$ 32. $\sqrt{162} - 2\sqrt{2}$ 33. $6 - 5\sqrt{\frac{4}{25}}$ 34. $\sqrt{4^2 + 36}$ 35. $\sqrt[3]{16}$

Solve each equation

36. $x^2 - 5 = 20$ 37. $3x^3 = 24$ 38. $2(x-1)^2 = 32$

Topic: One-Variable Statistics. Describe and compare data sets using summary statistics and create and analyze graphical displays of data sets.

Measures of Center: https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-data-statistics/mean-and-median/v/mean-median-and-mode

IQR: https://www.khanacademy.org/math/ap-statistics/summarizing-quantitative-data-ap/measuring-spread-quantitative/v/calculating-interquartile-range-iqr?modal=1

Graphical Displays: Box and Whisker: https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-data-statistics/cc-6th-box-whisker-plots/v/constructing-a-box-and-whisker-plot

Histogram: https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-data-statistics/cc-6th-box-whisker-plots/v/constructing-a-box-and-whisker-plot

Mean Absolute Deviation (MAD): https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-data-statistics/cc-6-mad/v/mean-absolute-deviation

CALCULATOR ALLOWED:

39. Determine the mean, median, mode(s), IQR and range for the data.

4, 5, 7, 7, 7, 8, 10, 11, 11, 13, 13, 14

40. Determine the mean absolute deviation for the price of sandwiches at a local deli.

$6.00, $8.95, $7.95, $6.50, $7.50, $5.75, $6.25

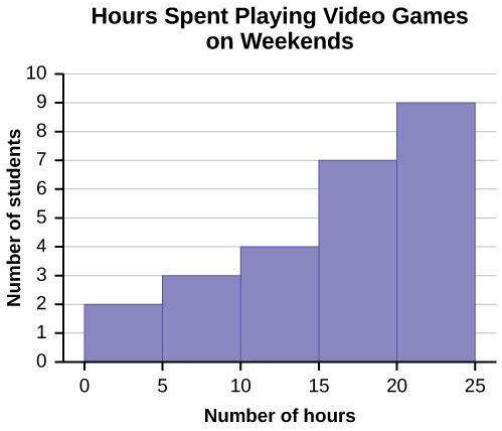
41. The ages of people at a concert are 48, 18, 51, 26, 33, 37, 35, 24, 39, 29, 32. Make a stem and leaf and box-and-whisker plot of the data.

42. Determine whether the questions below are statistical questions. Explain.

a. What is the capital of Connecticut?

b. How many students attend your school?

43 – 45 Use the histogram that shows the number of hours spent playing video games on the weekend.

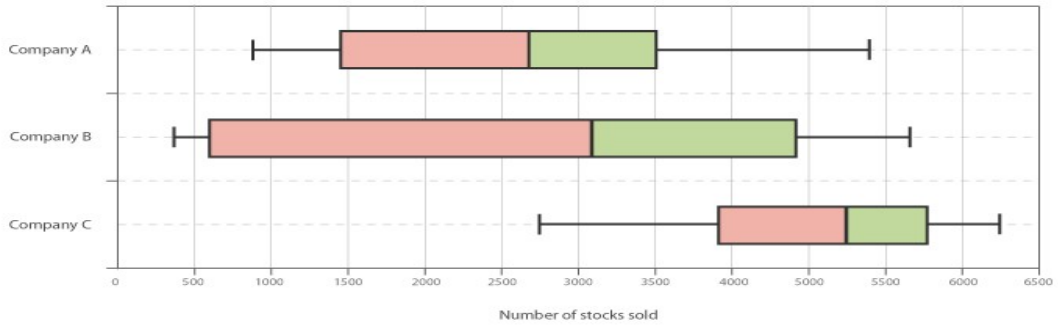


43. Which interval contains the most data?

44. How many students were asked?

45. Determine the percent of students that spend less than 15 hours playing video games on the weekend.

46 – 48 Use the box-and-whisker plot to answer the questions.



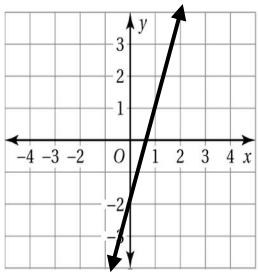
46. Identify the shape of each distribution.

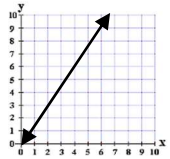
47. What percent for Company A falls at 3500 Stocks sold or more?

48. What company has the largest range of number of stocks sold?

ANSWERS:

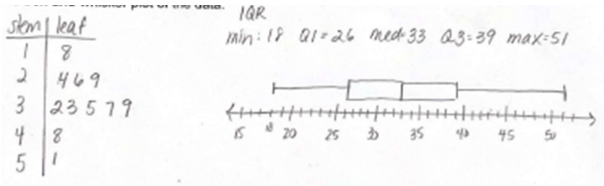
1. 34
2. $-\frac{11}{5}$
3. $2\frac{2}{3}\ or \frac{8}{3}$
4. $\frac{11}{2} or\ 5\frac{1}{2}$
5. $x = 1\frac{1}{5} or \frac{6}{5}$
6. $c = 3.2\ or\ 3\frac{1}{5}\ or \frac{16}{5}$
7. $x = -7$
8. $n = -\frac{7}{2}\ or -3\frac{1}{2}$
9. no solution
10. $x = 0$
11. infinitely many solutions.
12. 6 bagels
13. 50 minutes
14. $x = 0$
15. $x = 4$
16. $n = 4$
17. $x = 3$
18. $m = \frac{7}{5}$
19. $m = 3,\ y - int = -2$



20. $y = \frac{1}{3}x + 4$
21. $y = -\frac{2}{3}x - \frac{14}{3}$
22. $y = 5x - \frac{7}{2}$
23. $m = 13h - 65$
24. slope = $-\frac{1}{2}$ y – intercept = 0
25. a. 

b. $m = \frac{3}{2}$ The cost increases \$3 per 2 drinks (or \$1.50 per drink)

c. y-int = 0 The cost of 0 drinks is \$0.

26. x^{12}
27. x^5
28. x^4
29. $\frac{3}{x^2}$
30. $\frac{32}{x^5}$
31. 12
32. $7\sqrt{2}$
33. 4
34. $2\sqrt{13}$
35. $2\sqrt[3]{2}$
36. $x = \pm 5$
37. $x = 2$
38. $x = -3\ or\ 5$
39. mean = 9.16, median = 9, mode = 7
IQR: min = 4, Quartile 1 = 7, median = 9, Quartile 3 = 12, max = 14
40. \$0.98
41. 

42. a. Not statistical (only one answer)
    b. Statistical (many different answers)
43. 20-25
44. 25 students
45. 36%
46. Company A: skewed right
    Company B: skewed right
    Company C: skewed left
47. 25%
48. Company B