# Incoming Geometry Honors Math Summer Assignment

## *Sebastian Middle School*

### *Summer 2016*

2955 Lewis Speedway, St Augustine, FL 32084

Congratulations on making it through 7th grade. We are so excited to have you as a Sebastian Eagle for one more year. At Sebastian, we believe it is important to practice our math skills over the summer so that we are ready for the next school year. Student mastery of the basic math skills is as important to success in future mathematical procedures and reasoning as learning the alphabet is to reading and writing. The packet (with work must be completed and ready to turn in the first week of school). This work will be graded. All skills and concepts included were taught in the middle school and/or in Algebra 1. The skills and concepts you will be reviewing and applying to problems are as follows:

- **PART 1:** SOLVE MULTI-STEP EQUATIONS WITH ONE VARIABLE

- **PART 2**: LINEAR EQUATIONS
  - Write equations of lines o Graph linear functions
  - Solve a system of linear equations by graphing, elimination, substitution

- **PART 3:** QUADRATIC EQUATIONS
  - Solve quadratic equations by factoring and quadratic formula
  - Graph quadratic functions

- **PART 4:** RADICALS
  - Simplify radicals
  - Solve quadratic equations by finding square roots
  - Use the Pythagorean Theorem

- **PART 5:** PERIMETER, AREA, VOLUME
  - Apply perimeter and area of rectangles, triangles, trapezoids, circles
  - Find surface area and volume of rectangular prisms

- **PART 6:** ANGLE RELATIONSHIPS
  - Supplementary angles
  - Complementary angles

If there is a topic or concept that you find confusing, please research the topic on the internet. See suggested websites below:

- www.purplemath.com
- www.khanacademy.org
- www.helpingwithmath.com

You can practice any math skill on your IXL account this summer; your account information will expire in August 2016. We challenge you to try to complete as many skills as you can with a 75% smart score or higher!

If you need another copy of the math assignment you can go on Sebastian's website at http://www-sms.stjohns.k12.fl.us/curriculum/sebastian-summer-learning/ and print another copy.

Thank you,

Sebastian Math Department

Name: _____

# PART 1

## MULTI-STEP EQUATIONS WITH ONE VARIABLE

**Solve the equation. Show your work.**

| | |
|---|---|
| 1) $17 = 2\,(3x + 1) - x$ | 2) $-12 = \frac{1}{2}x + x$ |
| 3) $5m - (4m - 1) = -12$ | 4) $\frac{2}{3}x + \frac{3}{4}x = -34$ |
| 5) In any triangle, the sum of the measures of the angles is $180°$. In triangle ABC, $\measuredangle A$ is four times as large as $\measuredangle B$. $\measuredangle C$ measures $30°$ less than $\measuredangle B$. Write an equation that can be used to find the measure of each angle and solve it. Find the measure of angles A, B and C. | |

6) A rock climbing gym charges nonmembers $16.00 per day to use the gym and $8.00 per day for equipment. Members pay a yearly fee of $450.00 for unlimited climbing and $6.00 per day for the equipment.

- A nonmember used the rock climbing gym and equipment 20 times. What did the nonmember pay for the 20 days?

- Had she joined the gym as a member and used the equipment for 20 days, how much would she have paid?

- When do non members' fees become the same as the members' fees? Show all work!

- How would you decide whether or not to become a member? Write a paragraph supporting your decision by the math you used in the problem.

# PART 2
# LINEAR EQUATIONS

- **Slope formula:** $m = \frac{y_2 - y_1}{x_2 - x_1}$
- **Slope intercept form:** $y = mx + b$
- **Point slope form** $(y - y_1) = m(x - x_1)$
- **Standard form:** $AX + BY = C$

7) Write the equation of a line with a slope of $\frac{2}{3}$ and y-intercept of 8.

8) Find the equation of a line through the point $(-2, 3)$ and parallel to $y = 6x + 2$.

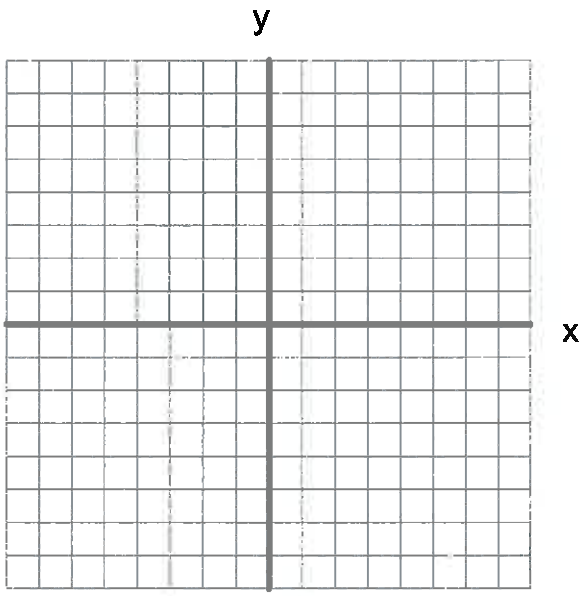
Write the equation in standard form:

9) Write the equation of the line through point $(-1, 1)$ that is perpendicular to $y = -\frac{1}{3}x + 2$.

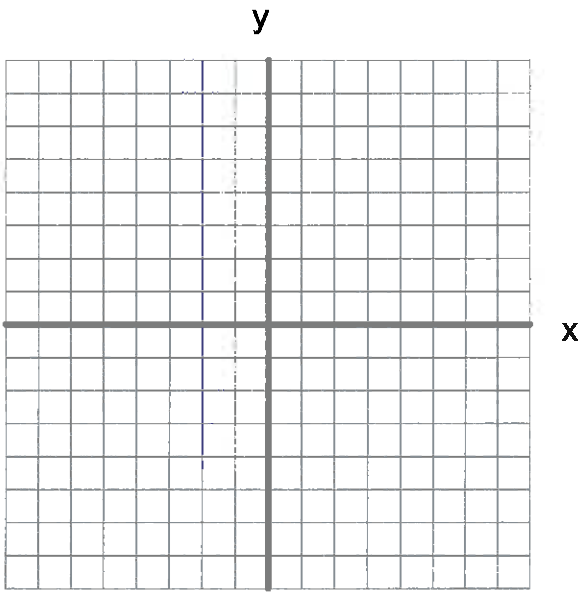
10) Write the equation of the line that passes through the points (5, 8) and (5, 3).

**Problems 11 and 12, graph the equations.**

11) $y = \frac{-1}{4}x + 4$

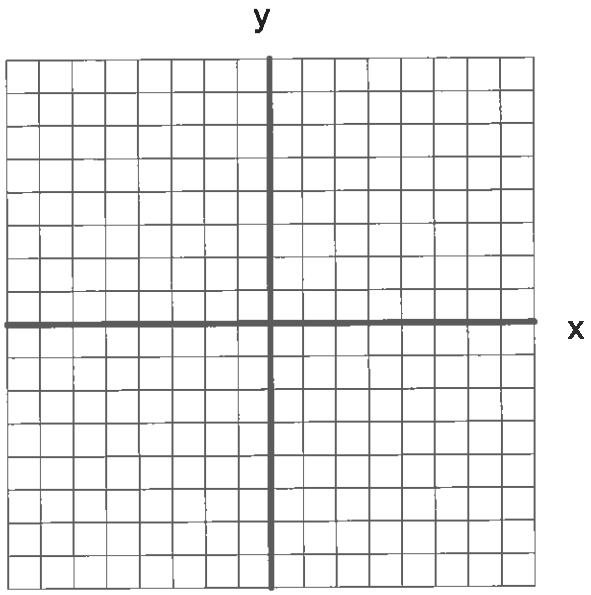



12) $3y = 6x + 9$



**Problems13 and 14, graph both lines on the same coordinate plane.**

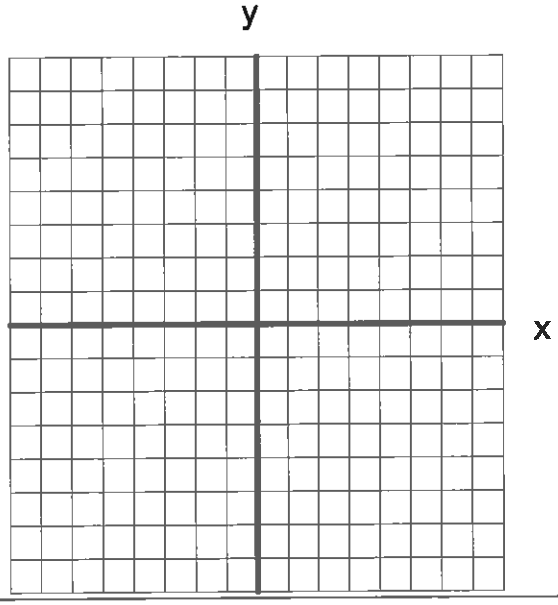
13) Graph the line $y = \frac{2}{3}x + 2$, and then graph the line $y = \frac{-3}{2}x + 6$.




How are these lines related? Are they parallel, perpendicular or neither? How do you know?

14) Graph the following two lines: $2x + 5y = 10$ *and* $y = x - 5$

Find their point of intersection: (  ,  )



**Solve the systems of equations below by the linear combination (elimination) method.**

| | |
|---|---|
| 15) $2x - y = 1$<br>$-2x - 5y = 5$ | 16) $3x + y = 6$<br>$3x - 4y = -9$ |
| 17) $-2x + 3y = 14$<br>$x - 4y = -12$ | 18) $-5x + 3y = 15$<br>$6x - 2y = -18$ |

**Solve the systems of equations below by the substitution method.**

| | |
|---|---|
| 19) $x + 4y = -4$<br>$3x + 2y = 8$ | 20) $3x = 9$<br>$-2x + y = -8$ |

# PART 3
## QUADRATIC EQUATIONS
### $y = ax^2 + bx + c$

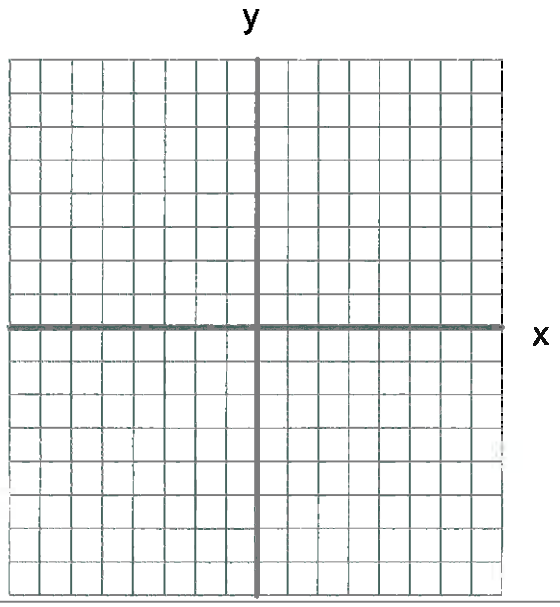
**Factor and solve the following quadratic equations.**

| | |
|---|---|
| 21) $x^2 - 11x + 30 = 0$ | 22) $x^2 - 3x - 70 = 0$ |
| 23) $x^2 - 2x = 63$ | 24) $x^2 - 12x = 64$ |
| 25) $3x^2 + 9x - 12 = 0$ | 26) $5x^2 - 22x - 15 = 0$ |
| 27) $8x^2 - 16x + 6 = 0$ | 28) $2x^2 - 15x = -28$ |

Remember, the graph of a quadratic is a parabola.

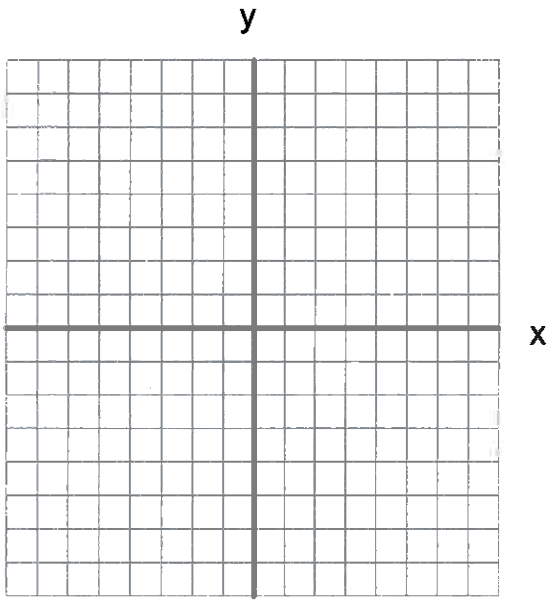
29) Graph $x^2 - 6x + 5 = 0$

What are the x-intercepts? _____
What is the vertex: (  )




30) Graph $x^2 - 2x - 8 = 0$

What are the x-intercepts? _____
What is the vertex? (  )



**Solve the following quadratic equations by using the quadratic formula.**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

| | |
|---|---|
| 31) $4x^2 - 13x + 3 = 0$ | 32) $3x^2 - 5x - 12 = 0$ |
| 33) $8x^2 + 6x - 1 = 0$ | 34) $9x^2 + 14x + 3 = 0$ |

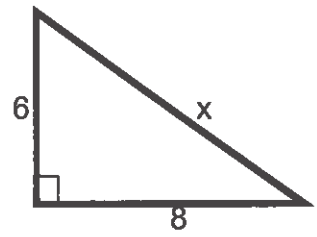
# PART 4
## RADICALS

**In problems 35-38, simplify the radicals. In problems 39-42, solve for x. If necessary, express your answer as a simplified radical. *Find all solutions for x!***

| | | | |
|---|---|---|---|
| 35) $\sqrt{32}$ | 36) $\sqrt{72}$ | 37) $\sqrt{363}$ | 38) $\sqrt{245}$ |
| 39) $x^2 = 81$ | 40) $3x^2 = 363$ | 41) $5x^2 + 3 = 128$ | 42) $2x^2 = 144$ |

**Problems 43-46, find the length of the missing side of the right triangle. Review the Pythagorean Theorem: $a^2 + b^2 = c^2$ ! Express your answer as a simplified radical.**

43)

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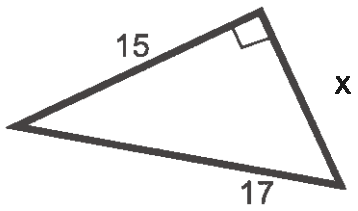


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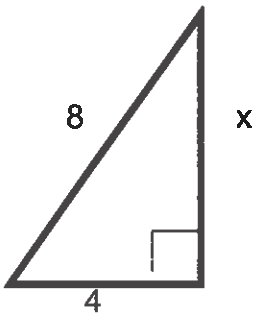


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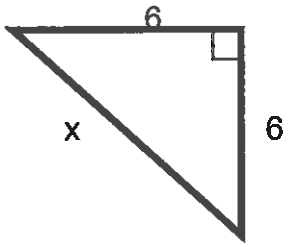


# PART 5

## PERIMETER, AREA, SURFACE AREA, VOLUME

47) Find the length of the side of a rectangle with area of $96in^2$ and width of $12in$.

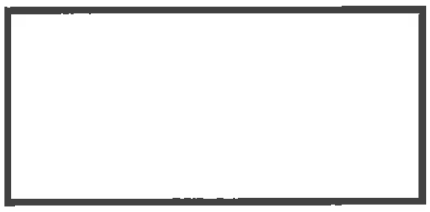
48) Find the perimeter of a square with area $256ft^2$.

49) If the circumference of a circle is $18\pi$ What is the area? Leave in terms of $\pi$.

50) Area of a trapezoid is $\frac{1}{2}$h ( $b_1 + b_2$) The area is 144 $in^2$ and the sum of the bases is $36in$. What is the height?

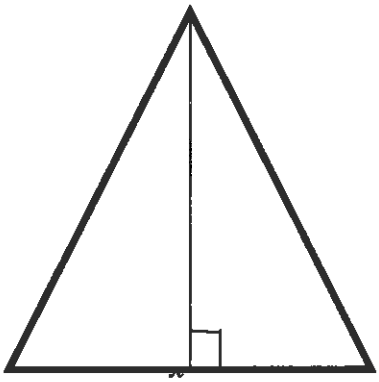
51) **Room Dimensions**

The area of a room shown below is $320\ ft^2$ . If the length is $20\ in$, what is the perimeter?

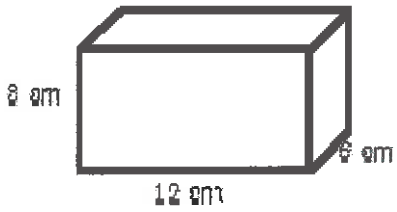


52) **Dimensions of a Triangle.**

The area of an isosceles triangle is $52in^2$. The height is $8\ in.$ What is the length of the base?_____



53) The following is a rectangular prism. Find its surface area and volume.



# PART 6

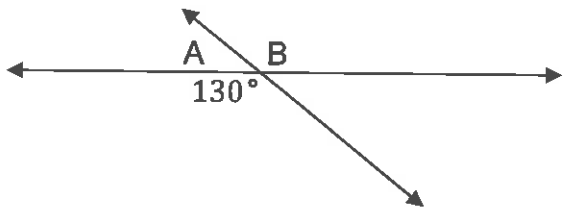
## ANGLE RELATIONSHIPS

- **Supplementary angles are two angles whose sum is $180°$:**
- **Complementary angles are two angles whose sum is $90°$**

54) $\measuredangle A$ *and* $\measuredangle B$ are supplementary.

The measure of $\measuredangle B$ is three times the measure of $\measuredangle A$.
Write an equation and solve for the measure of $\measuredangle A$ *and* $\measuredangle B$.

55) $m\measuredangle A = (x + y)$ and $m\measuredangle B = (x - y)$. Find x and y.
*Hint: Use a system of equations to solve this.*




56) $\measuredangle A$ *and* $\measuredangle B$ are complementary.

$m\measuredangle A = \frac{3}{4}x - 13$ and $m\measuredangle B = 3x - 17$

Find $m\measuredangle A$ and $m\measuredangle B$.