Integrated Math 8 summer work

These are the concepts and skills that are most important to bring into Integrated Math 8. Your ability to do the following problems will be a good indicator of how ready you are.

- Writing and solving proportions and linear equations in one variable
- Identifying & writing equations for linear & inverse relationships from graphs, tables, & verbal descriptions
- Finding and interpreting a linear regression equation, correlation coefficient and one-variable statistics from sets of data
- Using the Pythagorean Theorem, rational and irrational numbers

Writing and solving proportions and equations
Even if you can solve these problems mentally, get the practice writing and solving a proportion or equation.

1. Sandy bought a soft drink for 4 dollars and 7 candy bars. She spent a total of 32 dollars. How much did each candy bar cost ?

2. You find that your watch gains 2 minutes in 6 hours. How much will it gain in 3 days?
3. Janine has job offers at two companies. One company offers a starting salary of $28.000 with a raise of $3000 each year. The other company offers a starting salary of $36,000 with a raise of $2000 each year. After how many years would Janine's salary be the same with both companies, and what would that salary be?
4. A yard of fabric costs $12.99. How much will 2 feet cost?
5. A crew of loggers cleared ½ acre of lumber in 4 days. How long will it take the same crew to clear 2 ¾ acres of lumber?
6. The sum of three consecutive numbers is 81. What is the smallest of the three numbers?
7. $6x - 3(6 - 5x) + 3x = 10 - 4(2 - x)$
8. $5x - [7 - (2x - 1)] = 3(x - 5) + 4(x + 3)$
9. $\dfrac{x+2}{5} = \dfrac{x-8}{3}$

Working with linear and non-linear relationships

1. Write the equation for the line passing through each of the pairs of points below.
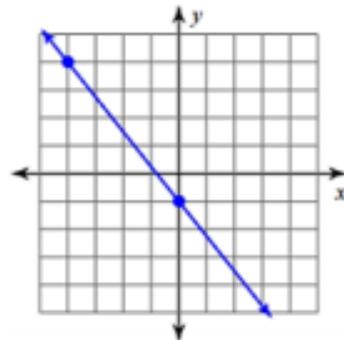   a. (3, -20), (5, 8)   b. (12, -18), (-15, -18)

2. Can an equation be written for a line passing through all three of these points: (-3, 7), (2, 5), and (5, 3)? If so, find the equation. If not, explain why.

3. Write **two** equations for the pair of points: one for a linear equation, one for an inverse equation.

   (2, 4) and (1, 8)

4. Write the equation for the line shown on this graph

5. For the Choir fundraiser, Allie has a specific amount of money she can spend on tickets. She has enough to afford 15 tickets that cost $5 each. How many tickets can Allie buy if each cost $3? Write an equation to show how many tickets Allie could buy if each cost $x.

6. A salesperson receives a base salary of $35,000 and a commission of 10% of the total sales. Write an equation that shows the salesperson's income (salary + commission) based on total sales of k dollars. Then use your equation to find the total sales if the salesperson's income was $60,000.

Linear regression equation, correlation coefficient and one-variable statistics

Consumer Reports published a study of fast-food items. The table and scatter plot below display the sodium content (in mg) and number of calories per serving for **16** fast-food items.

| Sodium (mg)	Calories (kcal)
1,042	268
921	303
250	260
970	300
1,120	315
350	160
450	200
800	320
1,190	420
570	290
1,215	285
1,160	390
520	140
1,120	330
240	120
650	180
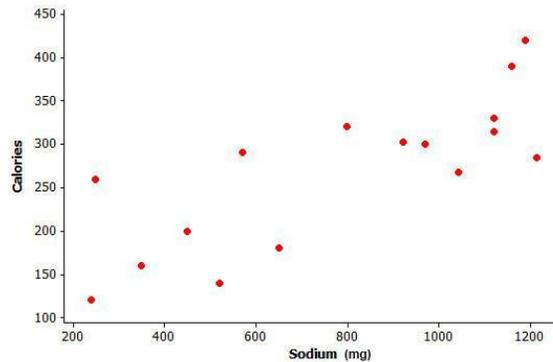
1. Find the linear regression equation. Tell what the slope and y-intercept mean in context.
2. Find the correlation coefficient and use it to describe the strength of the relationship between sodium and calories in these 16 fast-food items.
3. Using just the calories data, construct a box-and-whisker plot, and find the mean and standard deviation.

Using the Pythagorean Theorem, rational and irrational numbers

1. Find the exact length of each missing side.

a

b

c

d
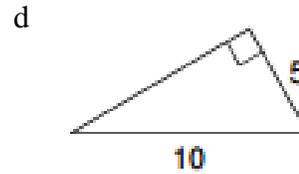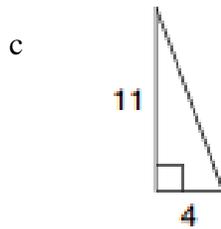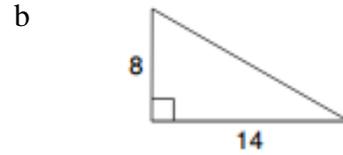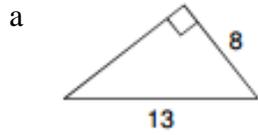
2. Decide whether each of these triangles is a right triangle.

a

b
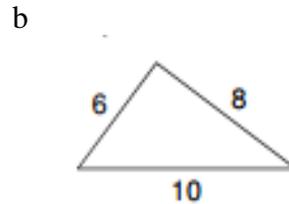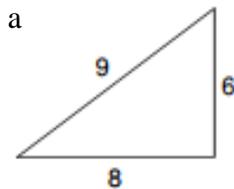
3. Find the diagonal of a rectangle with length = 40 and width = 55.

4. The length of each leg of an isosceles right triangle is 4 cm. What is the exact length of the hypotenuse?

5. Scott wants to swim across a river that is 400 meters wide. He begins swimming perpendicular to the shore he started from but ends up 100 meters down river from where he started because of the current. How far did he actually swim from his starting point?