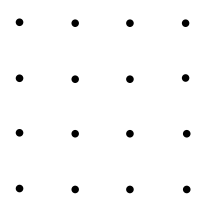
9th Grade Assignment – Week #15

Group Assignment: Puzzles!

1. Connect-the-Dot Squares



On the four-by-four grid shown on the right, connect four of the dots to make a square. How many possible squares are there? (Hint: there are more than 15.)

2. Stick Puzzles.

You will need either toothpicks or several equal-length pencils or pens.

With each puzzle, every stick must be part of a square or triangle. No two sticks may be placed on top of each other or side by side.

a) Shown here is a stick figure of a fish, which is swimming to the left. Move three sticks so that you end up with a fish that is swimming to the right.

b) There are five squares in this figure. Move three sticks so that you end up with exactly three squares.

c) Given a hexagon with 6 triangles (shown here), move two sticks so that you end up with exactly five equilateral triangles. See how many different solutions you can come up with.

Individual Work

- Pick and choose which problems you need to work on from **Factoring** Problem Sets #11 and #12.
- **Get ready for the test!** Especially look over problems from **Factoring** Problem Sets #9, #10, and #11. The test will be included as part of next week's assignment.

Problem Set #11

Section A - Solve.

1) $x^2 + 77 = 18x$
2) $(x - 4)(x - 10) = 55$
3) $(x - 4)(x - 7) = 0$
4) $3x^2 + 5 = (x + 7)^2 - 8$
5) $(x - 4)^2 = 7x^2 - x + 13$
6) $x^2 + 4x = 4x + 64$
7) $\frac{12}{x+6} = \frac{4}{3x+2}$
8) $6x^2 - 9x = 5x^2 + 2x - 24$
9) $x^2 + 6x = 3$

Section B - Solve.

10) $(2x - 3)(x + 8) = 60$
11) $7x^3 = 10x^3 - 300x$
12) $\frac{x-2}{2x-25} = \frac{3}{x+20}$
13) $6x^5 - 7x^4 = 11x^4 - 12x^3$
14) $(x + 3)(3x - 5) = 3x^2 + 4x - 15$
15) $7x - 5 = x(x + 7) - 105$
16) $7x - 5 = 7(x + 7) - 105$
17) $2x^2 - 5x = 3x^2 - x - 60$
18) $2x^2 - 5x = 2x^2 - x - 60$

19) $-12x + 3x^2 + 2x - 7 = 13x^2 - 20x - 8x^2 + 12x - 47$
20) $5x^2 + 3x^3(x - 3) = 5x^2(3x - 8)$

Problem Set #12

Group Work

Word Problems

(A segue way into the next unit.)

Algebra is the language of mathematics. Its power comes from its ability to succinctly express mathematical concepts that in English would be lengthy or awkward. Often, the challenge of a word problem is found in translating thoughts, which are expressed in English, into algebraic expressions and equations.

Translate into English.

Example: $3x + 5$

Solution: Five more than three times a number.

1) $2x + 3$
2) $3x - 8$

Translate into Algebra.

3) Four less than five times a number.
4) The square of one more than a number.

Find the Number.

5) Three less than twice a number is eight.

Homework

Solve.

6) $x^2 - 5x = 2x + 25 - 7x$
7) $(x - 4)^2 = x^2 + 16$
8) $5x = x^2 - 24$
9) $(x + 4)(x - 3) = 18$
10) $120 - 60x^2 = 420 - 490x$
11) $x - 5 = \frac{7x}{x+4}$
12) $\frac{5}{x-4} = \frac{x+2}{8}$
13) $\frac{5}{x-4} = \frac{8}{x+2}$
14) $(x - 7)^2 = 4x^2 + 7x + 79$
15) $5x^3 - 20x^2 = 3x^3 + 48x$
16) $2x^2 - 11x = (x + 8)(x - 5)$
17) $x^2 - 11x = (x + 8)(x - 5)$

Translate into English.

18) $x^2 + 10$
19) $6x - 1$

Translate into Algebra.

20) 13 more than twice a number.
21) Five less than half a number.

Find the Number.

22) Three more than twice a number is 24.

23) Solve: $2x^3(x - 4)(3x + 5) - (6x)(2x^2) = 2x^5 + 34x^4$