9th Grade Assignments – Week #8 – Lecture #1

Algebra Individual Work

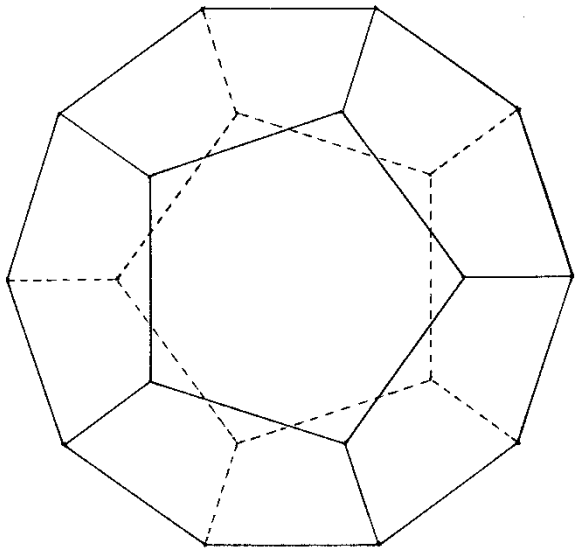
- Do what you can from p27 (Problem Set #9).

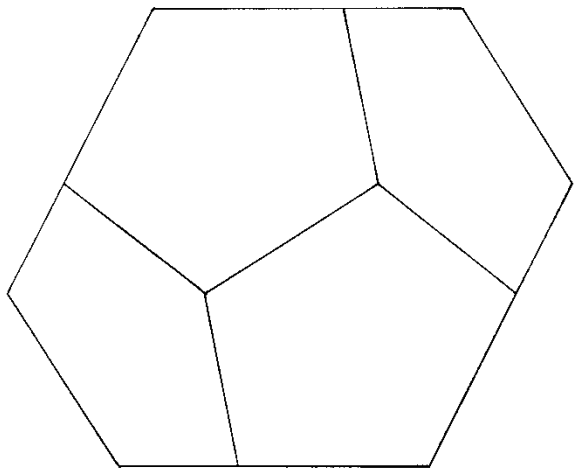
Group Work

- Help out each other with your drawings.

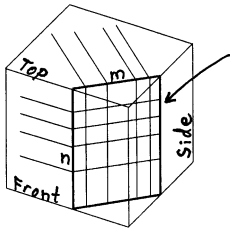
Geometry Assignment: **Do what you can!**

- If you haven't done so already, finish the *Three Views of a Dodecahedron* from last week.
- **Rotated View of a Dodecahedron.** Use the template on the next page, where the top and front views are given. You just need to do the rotated view, as I explained in the lecture. (There are also additional written instructions on a page at the end of this document.)
- Read my *High School Source Book* for ideas for other more advanced drawings.





Instructions for Drawing a Rotated View



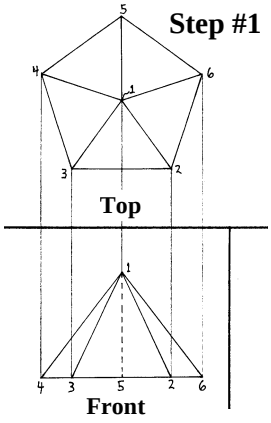
The **rotated** new image plane is perpendicular to the top view, and rotated 42° from the side view toward the front view.

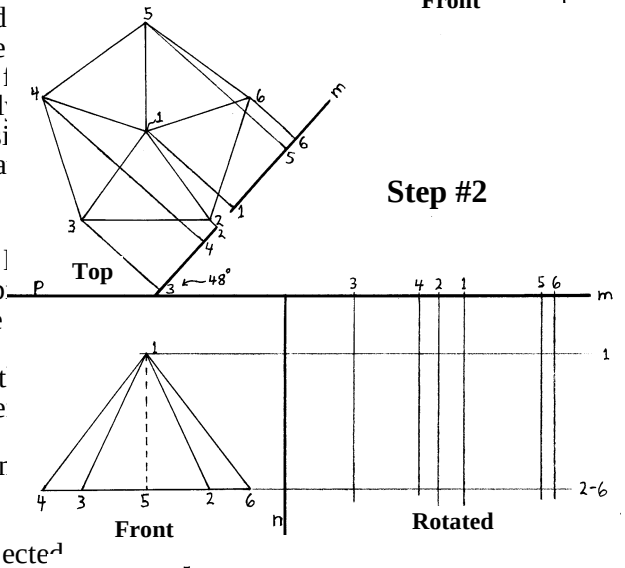
Creating the image plane for a rotated view:

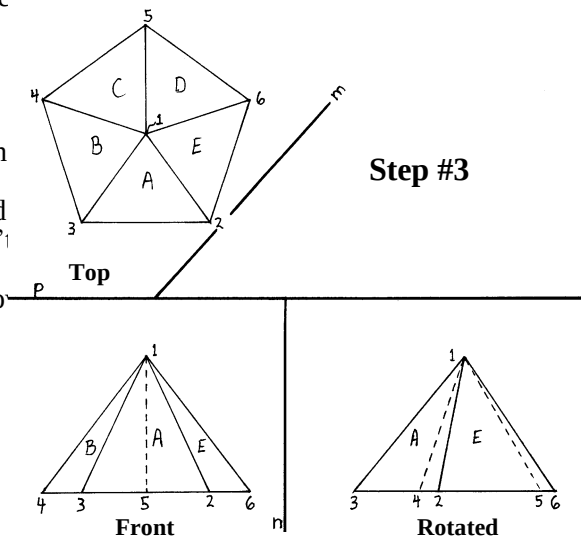
- The desired rotated view is achieved by creating an image plane which is a vertical section of the viewing box. The rotation we are dealing with here is between the front view and the side view. We can imagine that this rotated image plane serves as our painter's canvas, upon which we draw our view of the solid. (See drawing on the right.)
- A rotated view (also called a primary auxiliary view) must be perpendicular to one of the three principle views – top view, front view, or side view. Here, we will create a rotated view that is perpendicular to the top view.

Drawing a rotated view:

- As we mentioned before, once we know the top view and the front view, we have enough information to construct any desired view. In the same manner that we employed to construct the side (or profile) view, we simply follow the below steps (in this case, to draw a 42° rotated view of a pentagonal pyramid with an arbitrary height):
  - **Step #1.** Draw the top view and the front view.
  - **Step #2.** From each point in the front view, draw (horizontal) construction lines perpendicularly to the fold line (lines n in the drawing). Extend these lines past and perpendicular to the fold line in the rotated view. The fold line, m, is drawn at a 48° angle the top view. Therefore the construction lines f the points in the top view do not go horizontall across the page (as they did in for the normal si view construction); the construction lines run a 42° angle. In the below drawing, note the following:
    - The points on line m (which is the folding l between the top and rotated views) are cop with a compass from the top view onto the rotated view.
    - In the rotated view, line m looks as if it is t same line as line p (the folding line betwee top and front views).
    - In the top view, line m can be drawn startir anywhere on line P, as long as the 48° angle is maintained, and all of the points of the solid can be successfully projecte (by the perpendicular construction lines) onto line m.
  - **Step #3.** We can now locate and label all of the points in the rotated view, and finally draw all of the edges of the solid, carefully considering which edges are in the background, and should therefore be dotted. With the final drawing, we have erased all construction lines (which the students shouldn't do) and have labeled the faces that are in the foreground (which the students should instead sho with color).







Problem Set #9

Section A

Simplify.

1) $x^2 + y^2 - 3x^2 + 4y^3$
2) $xy + xy^2 + x^2y$
3) $(xy^2z^3)^4$
4) $x^5yz^4 + x^5yz^4$
5) $(x^5yz^4)(x^5yz^4)$
6) $5xy^2(2xy^3 - 6x^4y - 7x^5)$
7) $(4x^3z^6)(5x^5y^3)(2x^2y^4)$
8) $10x^2y^5(2x^4y^3z^2)^3$
9) $3x^4(9x - 2)(x - 5)$
10) $10x^3(x - 4)^2$
11) $(x - 10)^3$
12) $(x + 5)(x + 7)$
13) $(x - 3)(x + 6)$
14) $(x + 5)(x - 8)$
15) $(x - 1)(x - 12)$
16) $(x - 4)(x + 4)$
17) $(x^3 - 4)(x + 4)$
18) When multiplying two binomials, under what conditions does your final answer end up with…
    a) Four terms?
    b) Two terms (binomial)?
19) a) Simplify $(x - 3)^2$

    Evaluate both given x = 7

    b) $(x - 3)^2$
    c) $x^2 - 6x + 9$

    Evaluate both given x = –2

    d) $(x - 3)^2$
    e) $x^2 - 6x + 9$
    f) What do the above answers demonstrate?

20) **Simplify.** Assume that x is positive.
    a) $\sqrt{36x^{36}}$ b) $\sqrt{100x^{100}y^4}$
21) **Simplify.** Give answers without negative exponents.
    a) $(\frac{3}{4})^{-1}$ e) $6x^{-3}$
    b) 13^0 f) $\frac{6}{x^{-3}}$
    c) 40^{-2} g) $\frac{7x^{-4}}{x^5}$
    d) $(\frac{2}{3})^{-2}$ h) $\frac{12x^8y}{16x^2y^5}$

Section B

Simplify, and give your answers in two forms:
a) With denominators, but without negative exponents.
b) With negative exponents but without denominators.

Example: $\frac{4x^3}{x^8}$

Solutions:

a) $\frac{4}{x^5}$ **b)** $4x^{-5}$

22) $\frac{7x^2}{x^5}$ **a)** **b)**

23) $\frac{6x^5y^7}{x^3y^{10}}$ **a)** **b)**

Simplify.

24) $(x^5 - 6y)^2$
25) $(x^5 + 6y)(x^5 - 6y)$
26) $(x^5 + 6y)(x^8 - 6y)$
27) $(x^3 - 6y^2)(3x^3 + 2y^2)$
28) $(2x - 3)(x - 5)(x + 2)$
29) $(x + 4)^2(x - 1)^2$