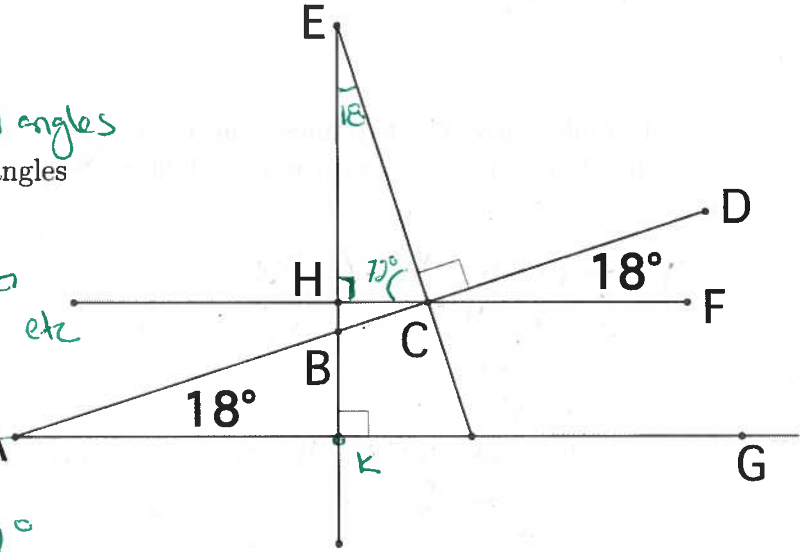
tcore 122: Midterm

Key

1. [8] (Quiz 1 #2)Consider the diagram on the right. Find:



(a) the measure of $\angle BCH$

(+1) 18° b/c vertical angles

(b) a pair of corresponding angles where we treat $\overrightarrow{AD}$ as a transversal of F and G

(+1) ∠DCF & ∠CAG or ∠DCH & ∠BAJ etc

(c) the measure of $\angle HCE$

(+1) 90 − 18 = 72   72°

(d) the measure of $\angle ACF$.

(+1) 180° − 18 = 162   162°

(e) a pair of similar triangles

(+2) △AKB ~ △EHC ~ △CHB

stated (+.5)   ID'd some measurements (+.5)   got it (+1)

(f) whether F is parallel G or not. *Justify* your answer. (Hint: Consider using some of your work from above.)

(+2) The corresponding angles ∠DCF & ∠CAG are the same measure. So by thm from WKS 3 F // G.

stated justify (+.5)   justified (+1)   (+.5)

2. Consider the tools, physical tools, for a moment....

(a) [2] (Lecture 3/28) What tools are you allowed to use during patty paper worksheet investigations?

patty paper (as many as you'd like) & a pencil

+.5 stated
+.5 sense
+1 got it

(b) [2] (Lecture 4/11) Name two tools mathematicians born before 100AD could use to study geometry problems?

straightedge's, sand, abacus's, rulers (no agreed upon metric though), compass

+.5 stated
+.5 sense
+1 for 2 tools.

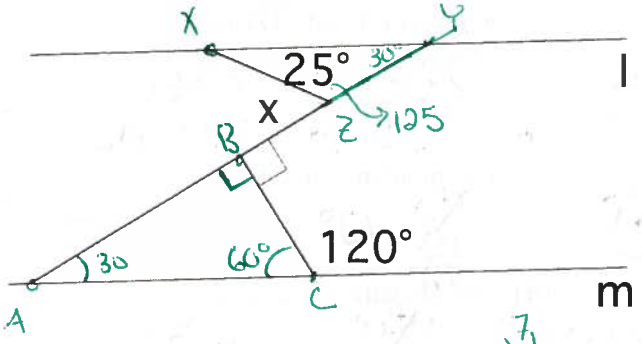
(c) [2] (Lecture 4/11) Name two tools mathematicians born before 100AD could *not* use to study geometry problems?

paper, calculators, rulers (with an agreed upon metric), protractors (with an agreed upon metric)

+.5 stated
+.5 sense
+.5 for 1st
+.5 for 2nd

3. [2] (Wheater §1.3) Make a conditional statement that is false, but whose converse is true. +.5 stated w/conditional statement.
   +.5 converse.
   +1 truth values for each.

4. [4] (Quiz 2 #3) The two lines l and m are parallel. Find the measure of angle x. Make sure that your *reasoning* is easy to follow. Note, this diagram is not drawn to scale.



I worked on the △ABC first. The angle at C was the complement of 120° & B was a right angle. Thus I could find the 3rd angle measure in the △ABC.

Since m // l I know the angle in the △XYZ next to Y. Since the sum of angles in a △ is 180 the angle next to vertex Z must be 125°.

Since x is the complement of 125°

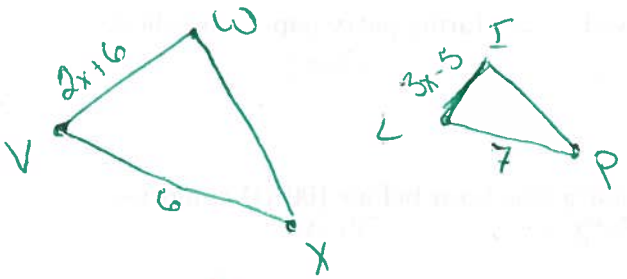
x = 55°

180 − 55 = 125

180 − 120 = 60

+.5 stated
+.5 stated reasoning
+1 angles in △ add
+1 corresponding ∠
+.5 complementary ∠
+.5 alg

5. [4] (Wheater §7.4 #18) If $\triangle VWX \sim \triangle LIP$, $VW = 2x + 6$, $VX = 6$, $LP = 7$, $LI = 3x - 5$, find the measure of LI



+1 started/plan
+.5 similar △ ratio
+1 used ratio right
+1 alg to solve for x
+.5 found LI

To find the measure of LI we'll first need to find the value of x.

B/C △VWX ~ △LIP

$$\frac{VW}{VX} = \frac{LI}{LP} \Rightarrow \frac{2x+6}{6} = \frac{3x-5}{7}$$

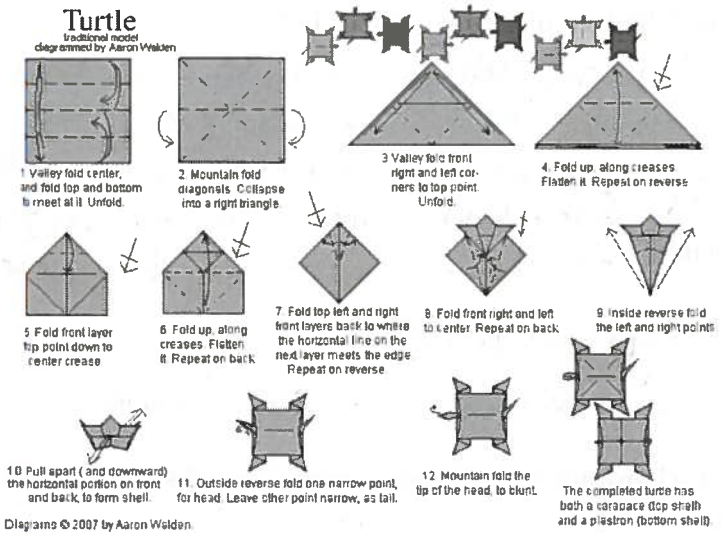
$$\Rightarrow 14x + 42 = 18x - 30 \Rightarrow 72 = 4x$$

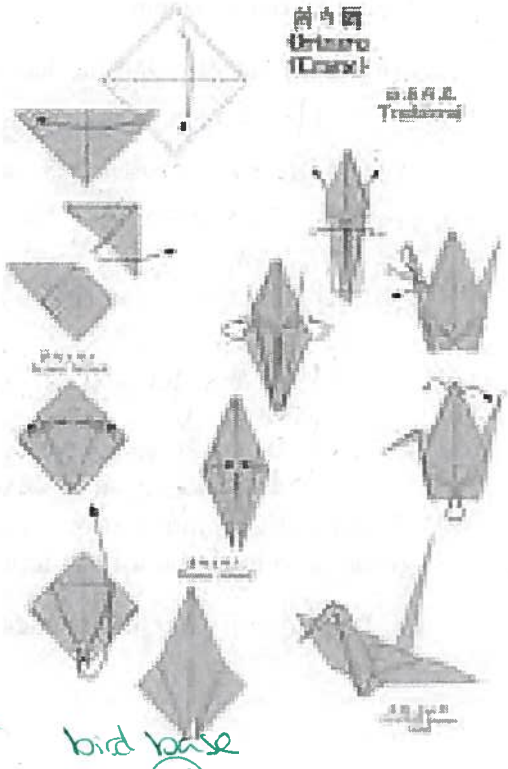
$$\Rightarrow x = \frac{72}{4} = \frac{36}{2} = 18$$

Thus LI = 3(18) − 5
= 54 − 5 = 49

+2.5
54

6. [4] (Lecture 4/20) Identify the base each of the origami directions below make use of.





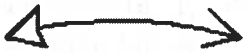
water bomb (+2)

bird base (+2)

7. [3](Lang) Identify what the origami symbols below mean.

mountain fold (+1)

flip paper over (top to bottom) (+1)



fold & then unfold (+1)

8. [3] (Quiz 3 #5) Justify the following quote found on page 46 of Lang's text:

Generally, the more long points a model has, the smaller the final model will be relative to the size of the square.

The more long points a model has the more paper that needs to be used in connecting the various long points. This means the bulk of the paper will be used up in the 'connecting' instead of the 'points'.

(+1) started
(+1) reasons
(+1) sense/clear

9. Okasha spends chapter 1 of his book *Philosophy of Science, a Very Short Introduction* trying to define science.

   (a) [1] What did Okasha decide the definition of science should be?

He didn't seem happy with any definitions but drew a parallel to the idea of defining games. Games have a set of criteria that maybe satisfied, but no one game necessarily satisfies all the criteria. Science thus has criteria (ex falsifiability, experiments, logic, etc), but not all sciences satisfy all the criteria.

   (b) [1] How would you define a scientist?

(My thought - there is no right answer here)
A scientist is one who uses experiments to test falsifiable theories to investigate the world.

10. (Technical Communication Today) Richard Johnson-Sheehan gave a long list of suggestions to authors of instruction sets.

   (a) [1] Identify one of his suggestions that you use well.

List of possible suggestions:
1) order steps sequentially
2) use command voice
3) put only 1 action per step
4) Number the steps
5) add comments: rules + examples

   (b) [1] Identify one of his suggestions that you think *if you used this suggestion*, it would improve your write-ups for the worksheets.

6) provide feedback
7) refer to graphics

11. [2] (Lecture 4/20) What was the most surprising/interesting information you learned from the video *Between the Folds* shown on 4/20?

+.5 stated
+.5 sense
+1 in movie

12. [10] Consider a patty paper square where each side has length one. The area of this square is then one square unit. Find a *square* inside the patty paper that has half the area of the original patty paper. Explain your process and *justify* why your method works.

Hint: the area of a square is base · height or $(\text{base})^2$.

This is a patty paper exercise so the only tools you may use are patty paper(s), a pencil, and a calculator.

(+2) Clarity: clear +2
mostly clear +1.5
somewhat clear +1

(+2) Directions

if found an answer

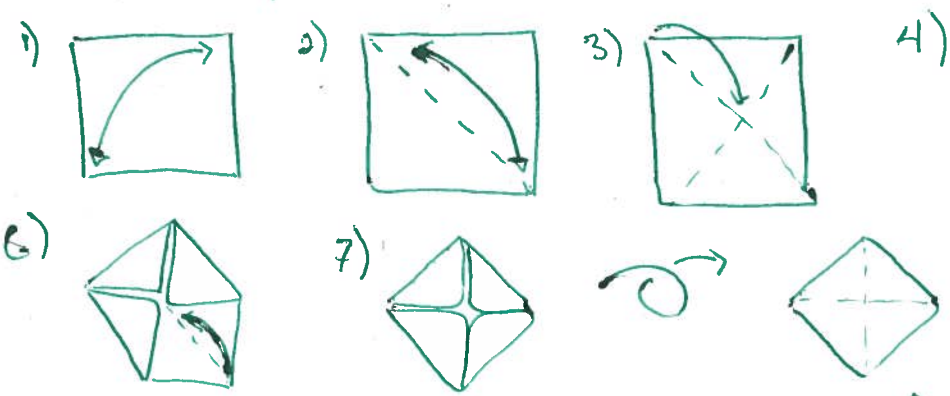
+1.5 stated just
+.5 sides eq. length
+.5 angles 90°
+3.5 area is ½ of original

(+6) Reasoning: +1.5 actively trying things
+1.5 building effectively on past failures
+1.5 building effectively on class knowledge
+1.5 justification

+.5 refer to area
+.5 area of □
+.5 compute orig area of □
+.5 height
+1 get it.

process 4.5 explanation 5.5 correctness 0

Process/Directions:



This square is ½ the area of the original.

Justification: we can take the final object and fold (& unfold) along the diagonals to make sure each side has the same length as each of the others. (folding the diagonal allows us to lay one side directly ontop of the other so as to compare lengths). Taking another patty paper's corner & comparing these with the corners in our square verify the angles in our new shape are 90°. The area is half the original b/c the paper is exactly 2 layers thick in our new small square, thus we've divided the 1 sq unit in half.