Math 206 - Test 3

April 18, 2018

Name __key__

Score _____

Show all work to receive full credit. Supply explanations where necessary.

1. (6 points) Survey participants were asked how much time they spend on morning hygiene and grooming. The numbers below are their responses, in minutes, listed in numerical order. Determine the quartiles, the interquartile range, and the boundary values for outliers. Then sketch the boxplot on the attached graph paper. (Do all work by hand, but you may check your work on your calculator.)

$n = 18$

4, 6, 7, 9, 14, 15, 15, 16, 18, 18, 25, 26, 30, 32, 41, 45, 55, 63

$Q_1 = 14$

$MED = \dfrac{18+18}{2} = 18$

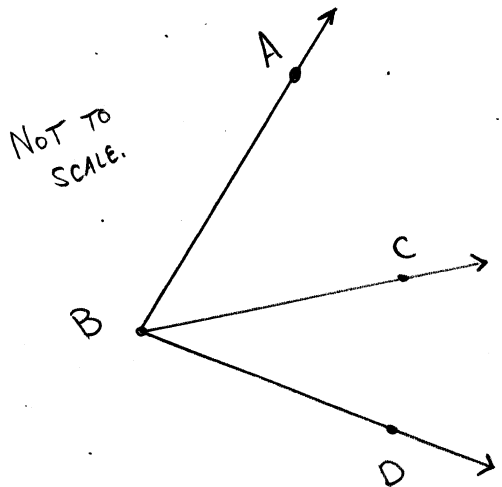$Q_3 = 32$

$IQR = Q_3 - Q_1 = 32 - 14 = 18$

BOUNDARIES:

$Q_1 - 1.5 \times IQR = 14 - 1.5(18) = -13$

$Q_3 + 1.5 \times IQR = 32 + 1.5(18) = 59$

* 63 IS AN OUTLIER.

BOXPLOT ON GRAPH PAPER.

2. (2 points) $\angle ABC$ and $\angle CBD$ are adjacent angles with measures $34° 18' 49''$ and $40° 50' 21''$, respectively. Find the measure of $\angle ABD$. Write your answer in degrees/minutes/seconds.

NOT TO SCALE.

$$34° \quad 18' \quad 49''$$
$$+ \quad 40° \quad 50' \quad 21''$$
$$\overline{74° \quad 68' \quad 70''}$$

$\Rightarrow 74° \ 69' \ 10''$

$\Rightarrow \boxed{75° \ 9' \ 10''}$

1

3. (3 points) Suppose the heights of trees in an orchard are normally distributed with mean 112 inches and standard deviation 14 inches.

   (a) What percent of trees in the orchard have heights between 95 inches and 125 inches?

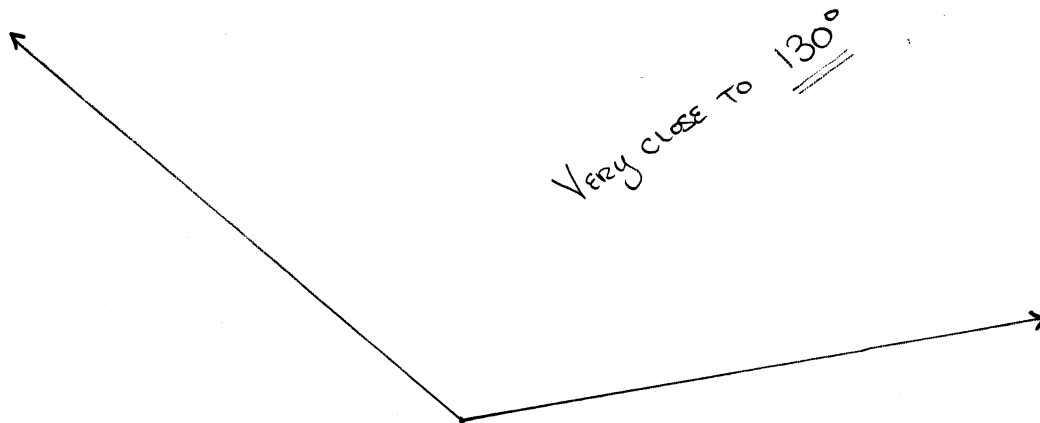 $$\text{normalcdf}(95, 125, 112, 14) \approx 0.7111$$

   $$\approx \boxed{71\%}$$

   (b) What percent of trees in the orchard have heights greater than 140 inches?

   $$\text{normalcdf}(140, 999999, 112, 14) \approx 0.02275$$

   $$\approx \boxed{2.3\%}$$

4. (2 points) Use a straightedge to sketch an obtuse angle. Then use your protractor to find the measure of the angle.

   VERY CLOSE TO $130°$

5. (4 points) The boxplot shown below describes a certain collection of data. Find approximate values for the quartiles and the interquartile range. Based on your approximations, what would be the boundary values for outliers?

   -3 -2 -1 0 1 2 3 4 5 6
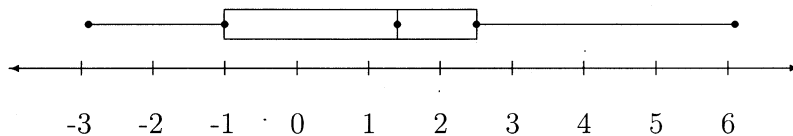
   $Q_1 = -1$
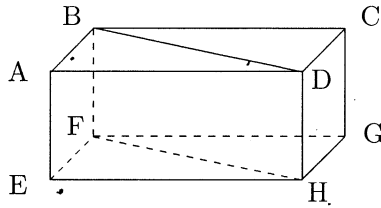
   $\text{MED} = 1.3$

   $Q_3 = 2.5$

   $\text{IQR} = 2.5 - (-1) = 3.5$

   BOUNDARIES:

   $Q_1 - 1.5 \times \text{IQR} = -1 - 1.5 \times 3.5$
   $= -6.25$

   $Q_3 + 1.5 \times \text{IQR} = 2.5 + 1.5 \times 3.5$
   $= 7.75$

6. (4 points) Refer to the following three-dimensional figure. Be sure to use correct notation for your answers below.

(a) Find a pair of skew lines or explain why it is not possible.

$$\overleftrightarrow{AB} \quad \& \quad \overleftrightarrow{DH}$$

(b) Find three concurrent lines or explain why it is not possible.

$$\overleftrightarrow{AB}, \ \overleftrightarrow{AD}, \ \overleftrightarrow{AE}$$

(c) Find three points that are not coplanar or explain why it is not possible.

NOT POSSIBLE; ANY THREE POINTS MUST BE COPLANAR.

(d) Find a dihedral angle.

DIHEDRAL ∠ B - $\overline{AE}$ - D.

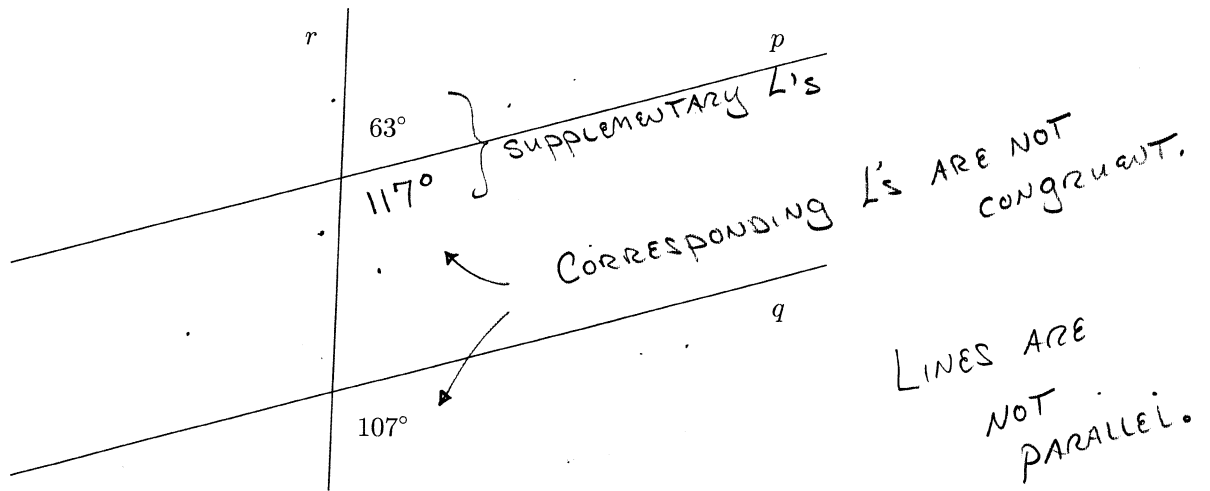IS THE DIHEDRAL ∠ FORMED ALONG THE EDGE $\overline{AE}$,

7. (1 point) Suppose that a line is taken at random from each of two parallel planes. Must the lines be parallel? Explain your reasoning. (It might help to refer to the figure above.)

No, FOR EXAMPLE LOOK AT

$$\overleftrightarrow{AD} \quad \text{AND} \quad \overleftrightarrow{EF} \quad \text{IN THE FIGURE}$$

ABOVE.

THEY ARE NOT PARALLEL BUT LIE IN PARALLEL PLANES (TOP & BOTTOM FACES)

8. (2 points) Determine whether the lines p and q are parallel. Explain how you know.

r

p

$63°$ } SUPPLEMENTARY ∠'s

$117°$

CORRESPONDING ∠'s ARE NOT CONGRUENT.

q

$107°$

LINES ARE NOT PARALLEL.

9. (6 points) Sketch each of the following or explain why it is not possible.
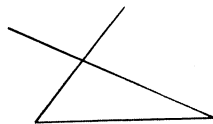
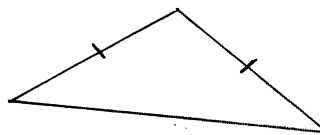(a) A concave quadrilateral

(b) A rhombus that is not a kite

NOT POSSIBLE. A RHOMBUS IS A SPECIAL KIND OF KITE.

(c) A polygonal curve that is neither simple nor closed

(d) An obtuse, isosceles triangle

(e) A parallelogram with exactly one right angle

NOT POSSIBLE, A PARALLELOGRAM WITH A RIGHT ∠ IS A RECTANGLE. AND RECTANGLES AUTOMATICALLY HAVE 4 RIGHT ∠'s.

(f) An equilateral triangle that is not isosceles

NOT POSSIBLE. ISOSCELES △ HAS AT LEAST TWO CONGRUENT SIDES. EVERY EQUILATERAL △ IS AUTOMATICALLY ISOSCELES.

4

10. (3 points) The parallel lines p and q are cut by transversal r. The measure of one of the angles is shown below. Find the measures of the seven (7) other angles and, for each one, briefly tell how you know.

r

p

③ 118°   62°   ⑧ 118°

① 62°   ⑤

q

P ǁ q

⑦ 118°   62°   ⑥

62°   118°

④
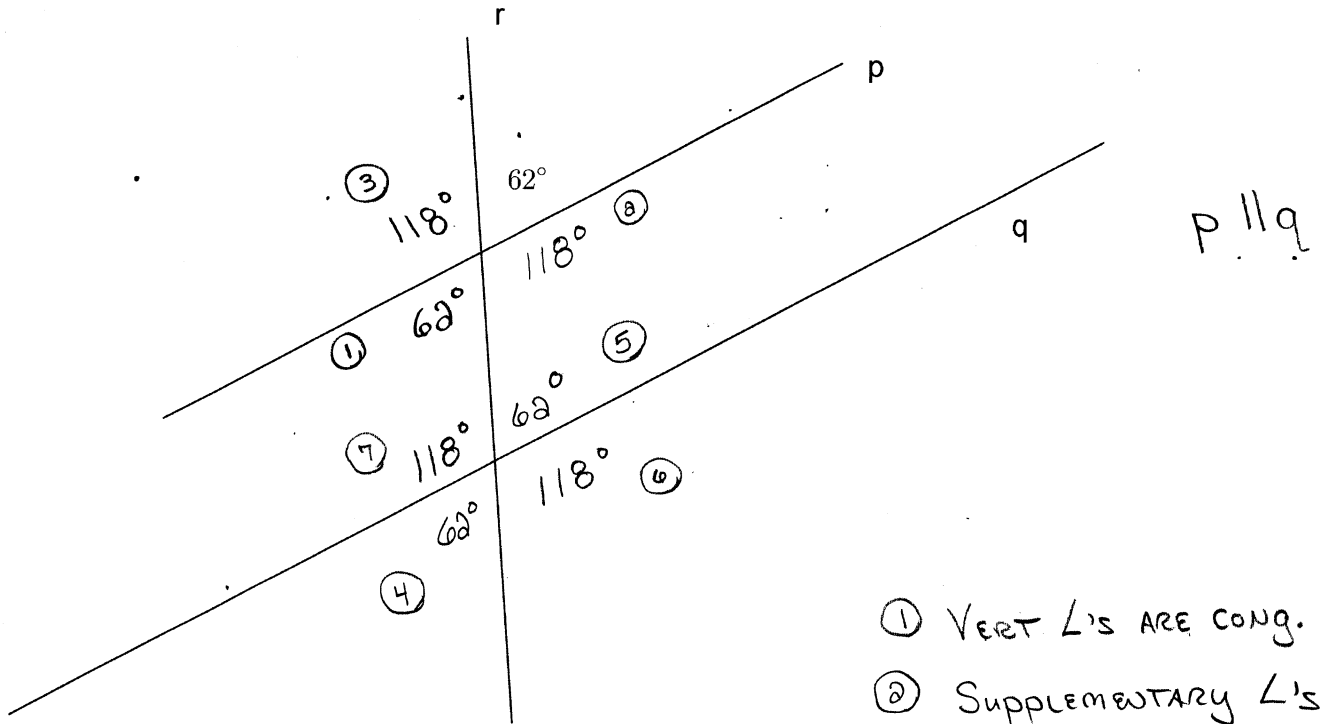
① VERT ∠'S ARE CONG.

② SUPPLEMENTARY ∠'S

③ VERT ∠'S ARE CONG.

④   ① & ④ ARE
         CORRESPONDING ∠'S
         ⟹ CONG.

⑤ VERT ∠'S ARE CONG.

⑥ CORRESPONDING ∠ WITH ②

⑦ CORRESPONDING ∠ WITH ③

11. (1 point) How many congruent sides does a scalene triangle have? ___0___ (NONE)

12. (1 point) What is the name of a polygon with 9 sides? ___NONAGON___

13. (5 points) Fill in a correct word.

   (a) A ____SEGMENT____ is a subset of a line consisting of two endpoints and all points in between.

   (b) A angle whose measure is between 0° and 90° is called an ____ACUTE____ angle.

   (c) An angle is formed when two rays share a common endpoint. That common endpoint is called the ____VERTEX____.

   (d) Two angles that together make a right angle are called ____COMPLEMENTARY____ angles.

   (e) An infinite set of points that forms a flat, two-dimensional surface is called a ____PLANE____.

14. (2 points) Determine whether each statement is true or false.

   (a) ____T____ $\overleftrightarrow{AB}$ is the same line as $\overleftrightarrow{BA}$.

   (b) ____F____ $\overrightarrow{AB}$ is the same ray as $\overrightarrow{BA}$.

   (c) ____F____ Adjacent angles are congruent.

   (d) ____T____ Three noncollinear points determine a unique plane.

15. (2 points) Two lines are cut by a transversal. Which of these would prove that the lines are parallel? Circle all that apply.

   (a) A pair of vertical angles are congruent.
   (b) A pair of corresponding angles are congruent.
   (c) A pair of adjacent angles are congruent.
   (d) A pair of alternate interior angles are congruent.
   (e) A pair of alternate exterior angles are congruent.

6

16. (4 points) Refer to the figure below.
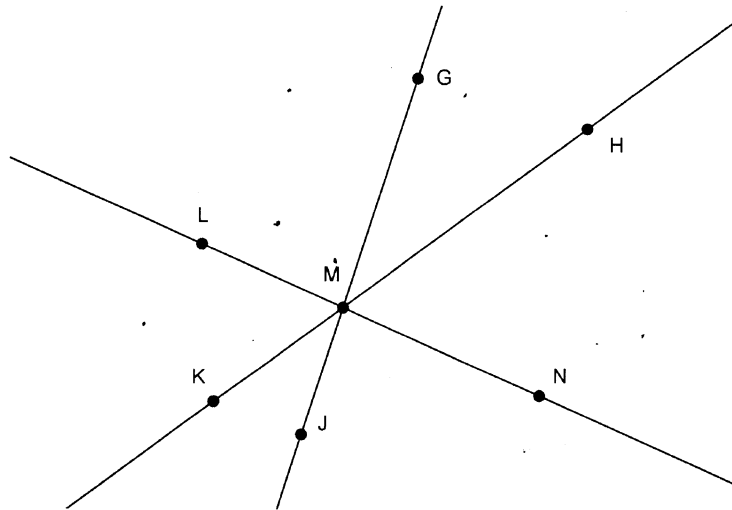
(a) Name a pair of adjacent angles.

$\angle HMN$ AND $\angle NMJ$

(b) Name a pair of vertical angles.

$\angle GMH$ AND $\angle JMK$

(c) Name a pair of angles that are not adjacent.

$\angle LMG$ AND $\angle LMH$ (THEY OVERLAP!)

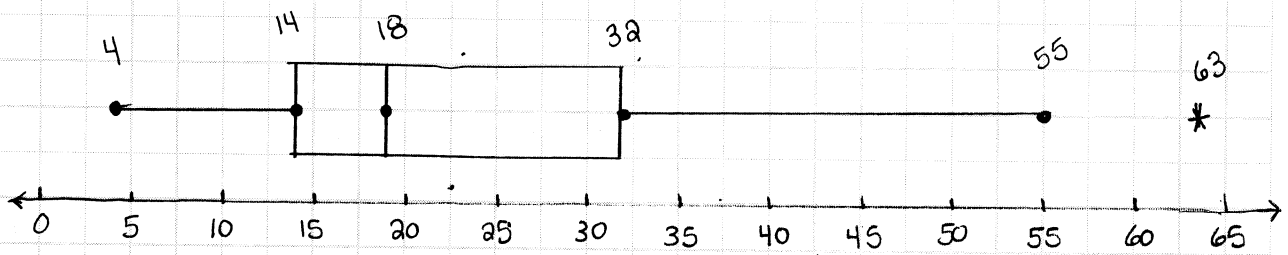(d) Name a pair of angles that are supplementary.

$\angle KML$ AND $\angle LMH$.

17. (2 points) Two angles are supplementary. One of the angles has degree measure x and the other has degree measure $4x + 50°$. Find x.

$$x + 4x + 50° = 180°$$
$$5x = 130°$$
$$\boxed{x = 26°}$$

Hygiene Times (min)