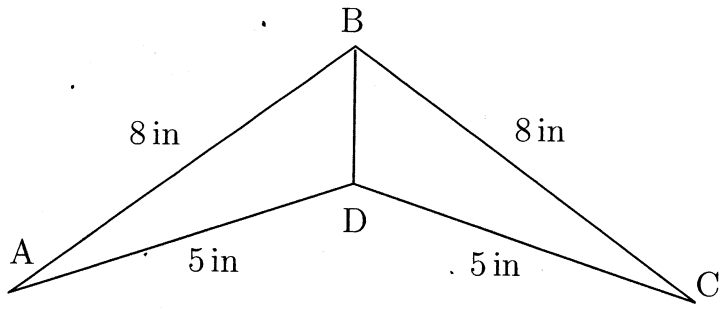
Math 206 - Test 3
April 23, 2014

Name key

Score _____

Show all work. Supply explanations when necessary.

1. (2 points) Referring to the figure below, name a pair of congruent triangles. Explain how you know they are congruent.

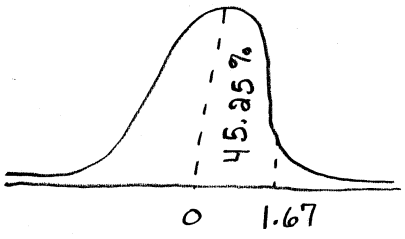


$\triangle ABD \cong \triangle CBD$

They are congruent by the SSS property:

$\overline{AB} \cong \overline{CB}$, $\overline{AD} \cong \overline{CD}$, $\overline{BD} = \overline{BD}$.

2. (4 points) The cholesterol content of eggs is normally distributed with mean 215 mg and standard deviation 15 mg. In a sample of 500 eggs, about how many have a cholesterol content of more than 240 mg?



$$Z = \frac{240 - 215}{15} = \frac{25}{15} \approx 1.67$$

Look up 1.67 to get 0.4525

More than 240 $\rightarrow$ $0.5 - 0.4525$

$= 0.0475$

$= 4.75\%$

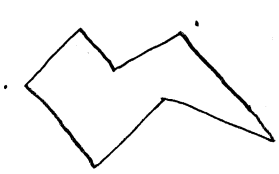
4.75% of 500

$\approx \boxed{24}$

3. (2 points) Find the measure of each interior angle of a regular nonagon.

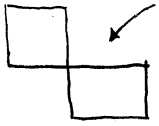
$$\frac{(9-2)\,180^\circ}{9} = \boxed{140^\circ}$$

4. (1 point) Sketch a concave heptagon.



7 SIDES, "CAVED IN"

5. (1 point) Sketch a closed polygonal curve that is not a polygon.

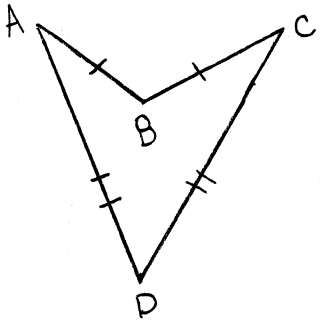


NOT SIMPLE

6. (1 point) Sketch a simple curve that is not a closed curve.

7. (1 point) Sketch a symbol or figure that has line symmetry but not turn symmetry.

8. (2 points) Sketch a concave kite and explain what makes the figure a kite.

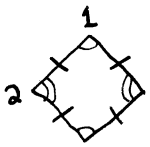


A KITE HAS TWO PAIRS OF ADJACENT CONGRUENT SIDES.

$\overline{AB} \cong \overline{CB}$

$\overline{AD} \cong \overline{CD}$

9. (2 points) Sketch a rhombus that has 90° turn symmetry. What is a more specific name for the figure you drew?



TO HAVE 90° TURN SYMMETRY, THE ANGLE AT VERTEX 1 MUST BE CONGRUENT TO THE ANGLE AT VERTEX 2. IT FOLLOWS THAT ALL ANGLES ARE CONGRUENT, I.E. 90° EACH. IT'S A SQUARE.

10. (1 point) What does CPCTC stand for?

CORRESPONDING PARTS OF CONGRUENT TRIANGLES ARE CONGRUENT

11. (2 points) Each interior angle of a regular n-gon measures 172.5°. Find n.

$$\frac{(N-2)\,180}{N} = 172.5$$

$$180N - 360 = 172.5N$$

$$7.5N = 360$$

$$\boxed{N = 48}$$

12. (3 points) Fred scored 93 on a test with mean 88 and standard deviation 9. Mary scored 10.8 on a test with mean 12 and standard deviation 2. Compute the corresponding z-scores. Who scored better? How do you know?

$$z_{\text{FRED}} = \frac{93-88}{9} = \boxed{0.\overline{5}}$$

$$z_{\text{MARY}} = \frac{10.8-12}{2} = \boxed{-0.6}$$

FRED SCORED MUCH BETTER BECAUSE HIS SCORE IS ABOVE THE MEAN.

MARY'S IS BELOW THE MEAN.

13. (3 points) Indicate whether each statement is true or false.

(a) F A rectangle is a square.

(b) T A square is a kite.

(c) T A rhombus is a trapezoid.

(d) T An equilateral triangle is an acute triangle.

(e) T A parallelogram is a quadrilateral.

(f) F An isosceles triangle is a scalene triangle.

14. (5 points) An angle measures $110°45'12''$.

(a) Is this angle a right, acute, straight, or obtuse triangle?

OBTUSE, $90° < \theta < 180°$

(b) Find the measure of the angle's supplement in degrees/minutes/seconds.

$180° = 179° 59' 60''$

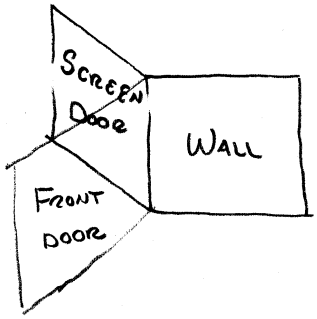
$$\begin{array}{r} 179°\ 59'\ 60'' \\ 110°\ 45'\ 12'' \\ \hline 69°\ 14'\ 48'' \end{array}$$

(c) Convert your part (b) answer to degrees in decimal form.

$69°$, $\frac{14'}{1} \cdot \frac{1°}{60'} = 0.2\overline{3}$, $\frac{48''}{1} \cdot \frac{1°}{3600''} = 0.01\overline{3}$

$$(69 + 0.2\overline{3} + 0.01\overline{3})° = \boxed{69.24\overline{6}° \approx 69.247°}$$

15. (1 point) Describe a real-world situation in which three planes meet along a common line.

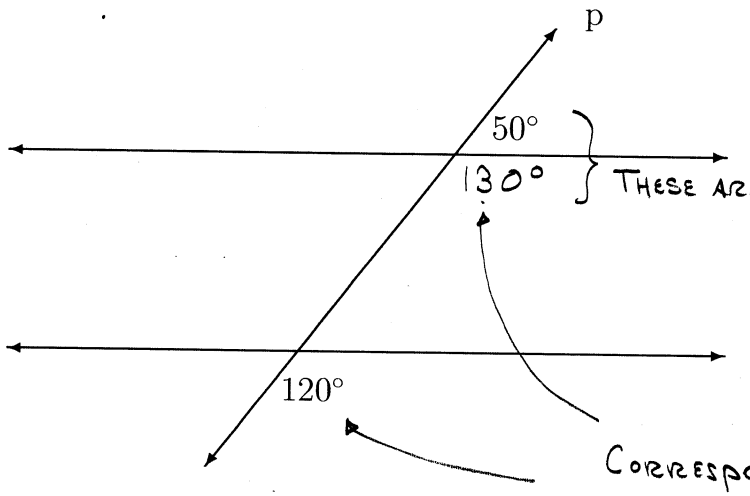


ALONG A HOUSE'S FRONT DOORWAY WHERE SCREEN DOOR, FRONT DOOR, AND WALL MEET

16. (1 point) Suppose Quadrilateral $PQRS$ is congruent to Quadrilateral $ABCD$. What angle in Quadrilateral $ABCD$ has the same measure as $\angle PSQ$?

It must be $\angle ADB$.

17. (2 points) In the following figure, are lines q and r parallel? Explain your reasoning.

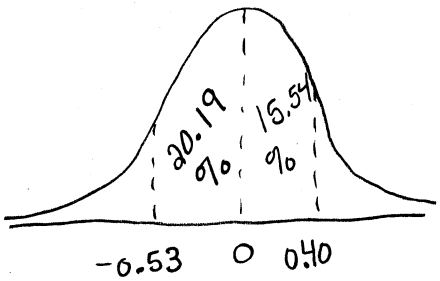


These are supplementary.

Corresponding $\angle$'s are NOT congruent.

q & r cannot be parallel.

18. (4 points) Ignoring hybrids and electric cars, gas mileages are normally distributed with mean 20.3 mpg and standard deviation 4.3 mpg. About what percent of cars have gas mileages between 18 mpg and 22 mpg?



$$z_{18} = \frac{18-20.3}{4.3} \approx -0.53$$

Look up 0.53 to get 0.2019

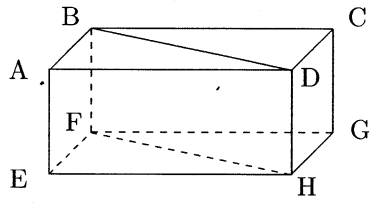
$$z_{22} = \frac{22-20.3}{4.3} \approx 0.40$$

Look up 0.40 to get 0.1554

20.19% + 15.54%

= 35.73 %

19. (2 points) Referring to the figure below, indicate whether each statement is true or false.



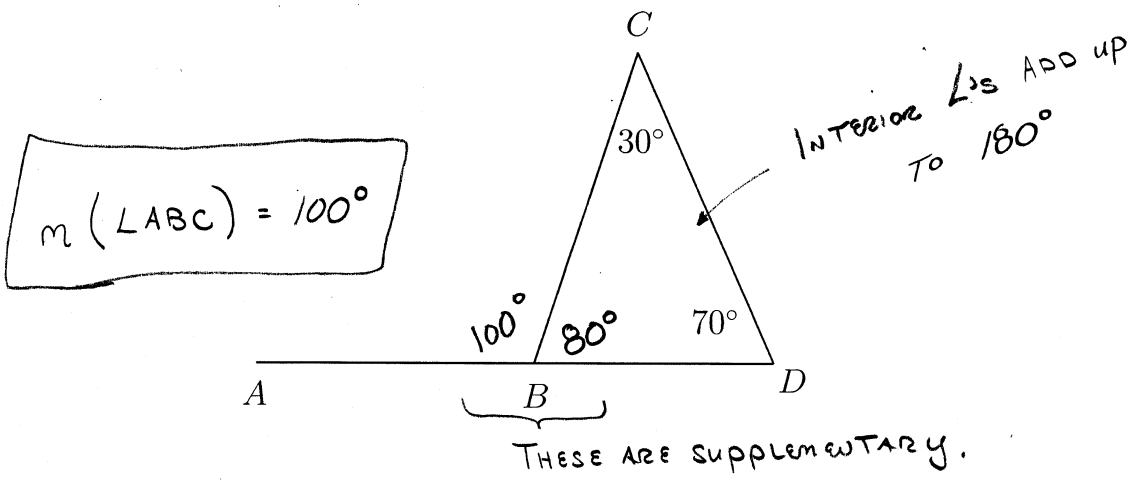
(a) F Points A, B, and H are noncoplanar.

(b) F $\angle ABD$ and $\angle ABC$ are adjacent.

(c) F Lines $\overleftrightarrow{BD}$ and $\overleftrightarrow{FH}$ are skew lines.

(d) T The lines $\overleftrightarrow{AE}$, $\overleftrightarrow{AD}$, and $\overleftrightarrow{AF}$ are concurrent.

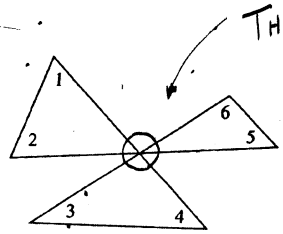
20. (3 points) In the following figure, $\overleftrightarrow{AD}$ is a line. Find $m(\angle ABC)$. Explain your reasoning.



21. (2 points) Find the measure of each exterior angle of a regular dodecagon.

$$\frac{360^\circ}{12} = \boxed{30^\circ}$$

22. (3 points) Find the sum of the measures of the numbered angles. Show work or explain your reasoning.



THESE ANGLES HAVE MEASURES THAT ADD UP TO 360°.

THERE ARE 3 PAIRS OF CONGRUENT VERTICAL L'S, SO THE INTERIOR L'S OF THE TRIANGLE AT THE CENTER ADD UP TO $\frac{360^\circ}{2} = 180^\circ$

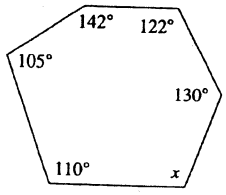
CENTER INTERIOR L'S

$+ m(\angle 1) + m(\angle 2) + \ldots + m(\angle 6)$

$= 3 \times 180^\circ = 540^\circ$

$540^\circ -$ CENTER INTERIOR L'S $=$ $\boxed{360^\circ}$

23. (2 points) Find the value of x in the figure below.



INTERIOR L'S ADD UP TO $4(180^\circ)$

$= 720^\circ$

$720^\circ - (105^\circ + 142^\circ + 122^\circ + 130^\circ + 110^\circ)$

$= \boxed{111^\circ}$