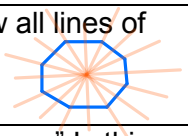
Geometry XL First Semester Final Review: HMH Chapters 1-6

1. Draw a regular octagon. On it, draw all lines of symmetry.



2. Draw line segment $\overline{AB}$. C is the midpoint of $\overline{AB}$. If AC = 8, find AB and BC. AB = 16, BC = 8

3. The relationship is: "is the same age as" Is this relationship (a) reflexive (b) symmetric (c) transitive? Give an example or counterexample for each of these.

TRUE (a) John is the same age as John.
TRUE (b) John is the same age as Sam & Sam is the same age as John.
TRUE (c) If John is the same age as Sam & Sam is the same age as Tom, then John is the same age as Tom.

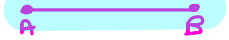
4. Given the points A (-2, 3) and B (6, -5) find
(a) the midpoint of $\overline{AB}$ $\left(\frac{-2+6}{2}, \frac{3-5}{2}\right) = (2, -1)$
(b) the length of $\overline{AB}$ $= \sqrt{(-2-6)^2+(3+5)^2} = \sqrt{64+64} = \sqrt{2 \cdot 64} = 8\sqrt{2}$
(c) the slope of $\overline{AB}$ $\frac{3--5}{-2-6} = \frac{8}{-8} = -1$

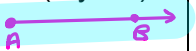
5. For the line y = 3x +2, find the equation of the line passing through the point (3,2) and
(a) parallel and (b) perpendicular to the given line.

See end

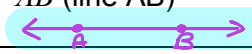
6. Define:
(a) supplementary angles Pair angles with sum 180°.
(b) complementary angles. Pair angles with sum 90°.

7. Draw (a) $\overline{AB}$ (segment AB) (b) $\overrightarrow{AB}$ (ray AB)



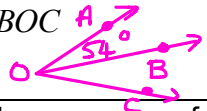


(c) $\overleftrightarrow{AB}$ (line AB)



8. Continue the pattern for the next 2 numbers:
(a) 1, 4, 9, 16, 25, 36, 49
(b) 1, 3, 6, 10, 15, 21, 28

9. B is in the interior of $\angle AOC$. If $\angle AOC = 70°$ and $\angle AOB = 54°$, find $\angle BOC$ $70° - 54° = 16°$



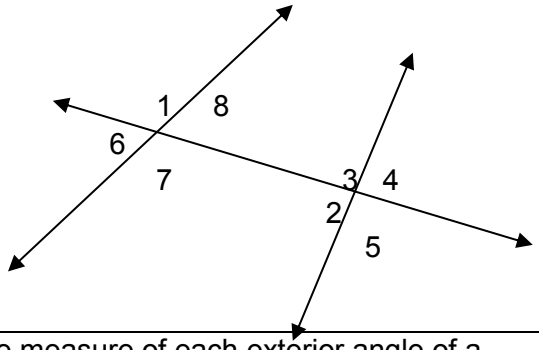
10. Let B be between C and A. Use the segment addition postulate to solve for x.
BC = 4x + 3, AB = 2x -1, AC = 62. Find BC.

$(2x-1)+(4x+3) = 62$ → $6x+2 = 62$ → $6x = 60$ → $x = 10$ → $BC = 4x+3 = 43$

11. Find the sum of the measures of the interior angles of a convex octagon. $(8-2)(180°) = 1080°$

12. Define what is meant by congruent.
All corresponding sides & angles are ≅ They are exactly the same

13.



What type of angles are:
(a) $\angle 1 and \angle 7$ (b) $\angle 1 and \angle 6$
(c) $\angle 1 and \angle 5$ (d) $\angle 3 and \angle 7$
(e) $\angle 2 and \angle 7$ (e) $\angle 1 and \angle 3$
(a) vertical ∠'s (b) linear pair
(c) alt. ext. ∠'s (d) alt. int. ∠'s
(e) same side int ∠'s (e) corresponding ∠'s

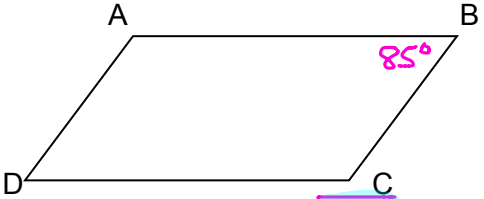
14. (a) The measure of each exterior angle of a regular hexagon is: $\frac{360°}{6} = 60°$
(b) The measure of each interior angle of a regular hexagon is: $\frac{(6-2)180°}{6} = 120°$ or $180° - 60° = 120°$

15. If ΔABC is congruent to ΔDEF then
(a) $\overline{BC} \cong$? $\overline{EF}$ and (b) $\angle A \cong$? ∠D

16. Define:
(a) an equiangular polygon All ∠'s ≅
(b) an equilateral polygon All sides ≅
(c) a regular polygon All ∠'s & sides ≅

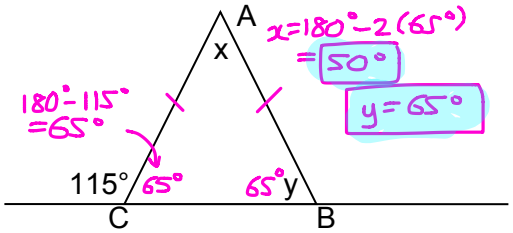
17. The angles of a hexagon differ from each other by 5° when put in ascending order. What are the angles?
$x + (x+5) + (x+10) + (x+15) + (x+20) + (x+25) = 720$
$6x + 75 = 720$
$x = 107.5°$
107.5°, 112.5°, 117.5°, 122.5°, 127.5°, 132.5°

18. For parallelogram ABCD, if m∠ABC = 85°, then:



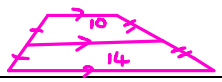
(a) m∠BCD =? $180° - 85° = 95°$
(b) m∠CDA =? 85°

19. $\overline{AC} \cong \overline{AB}$. Find the measure of x and y.



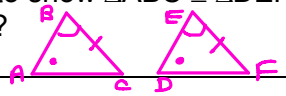
$x = 180° - 2(65°) = 50°$
$180° - 115° = 65°$
$y = 65°$

20. A trapezoid has parallel sides that measure 10 cm and 14 cm. What is the length of the midsegment?



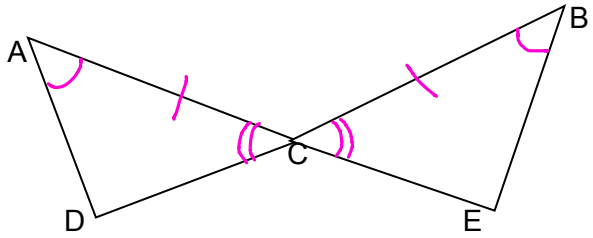
$\frac{10+14}{2}$ = 12 cm

21. Given $\angle B \cong \angle E$ and $BC \cong EF$. What other piece of information is needed to show $\Delta ABC \cong \Delta DEF$ by AAS Congruence Postulate?



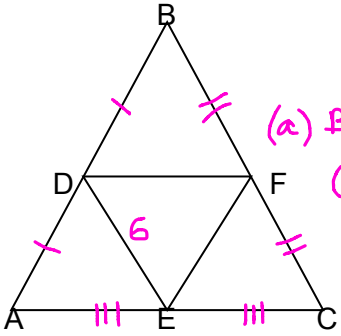
$\angle A \cong \angle D$

22. $\angle A \cong \angle B$ and $AC \cong BC$.



$\Delta ADC \cong \Delta BEC$ by what postulate? ASA

23.



(a) $BC = 2(6) = 12$

(b) $BC = 2DE$

$2x+1 = 2\left(\frac{3}{2}x - 2\right)$

$2x+1 = 3x-4$

$5 = x$

(a) D is the midpoint of AB, F is the midpoint of BC and E is the midpoint of AC. If DE = 6, find BC.

(b) If instead, BC = 2x + 1 and DE = $\frac{3}{2}x - 2$. Solve for x

24. Rewrite the statement in the if-then form: Every equilateral triangle has 3 congruent angles.

A Δ is equilateral IFF it has 3 $\cong$ angles.

25. Define (a) an acute triangle, (b) an obtuse triangle, (c) an isosceles triangle, (d) a scalene triangle

(a) All $\angle$'s acute (b) one obtuse $\angle$ (c) At least 2 $\cong$ sides. (d) No sides $\cong$

26. Solve:

3d + 5t = 42 $\times 4 \rightarrow$ 12d + 20t = 168

4d + 3t = 45 $\times 3 \rightarrow$ 12d + 9t = 135

11t = 33

t = 3

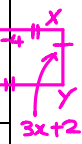
3d + 5t = 42

3d + 15 = 42

3d = 27

d = 9

27. WXYZ is a rectangle. WX = 5x -4 and XY = 3x +2 and the perimeter of the rectangle is 32. Find the numerical value of ZY.



$(5x-4)+(3x+2)=16$

$8x-2=16$

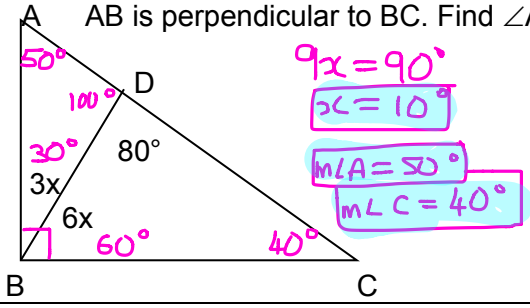
$8x=18$

$x=\frac{18}{8}=\frac{9}{4}=2.25$

$ZY = WX = 5x-4 = 5(2.25) = 7.25$

28. Define congruent polygons? All corresponding sides & $\angle$'s are $\cong$

29. AB is perpendicular to BC. Find $\angle A$ and $\angle C$.



$9x = 90°$

$x = 10°$

$m\angle A = 50°$

$m\angle C = 40°$

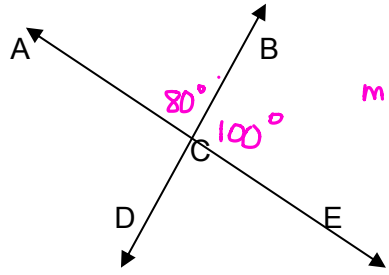
30. (a) The medians of a triangle all pass through which point? Centroid

(b) The angle bisectors of a triangle all pass through which point? Incenter

(c) The altitudes of a triangle all pass through which point? orthocenter

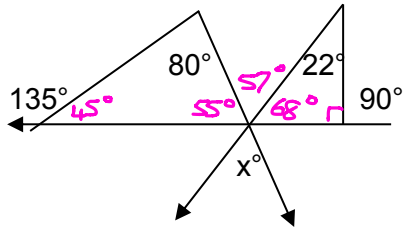
(d) The perpendicular bisectors of a triangle all pass through which point? circumcenter

31. If $\angle ACB = 80°$, what is $\angle BCE$?



$m\angle BCE = 100°$

32.



Find x

$m\angle x = 57°$

33. Two sides of a triangle are 8 and 11. What are the possible measurements of the third side?

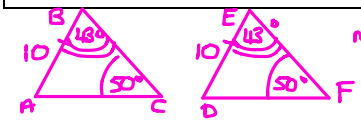
$3 < 3^{rd}\ side < 19$

diff ↙ ↘ sum

34. $\angle A$ and $\angle C$ are a linear pair. If $\angle A = 25°$ then $\angle C$?

$m\angle C = 180° - 25° = 155°$

35. $\Delta ABC \cong \Delta DEF$, AB = 10 feet, $m\angle C = 50°$ and $m\angle B = 43°$. Find (a) $\angle D$ and (b) DE



$m\angle D = 180° - 43° - 50° = 87°$

$DE = 10$

36. If A = (-3, 2) and B = (4, 5), find the length of AB

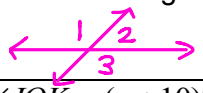
$AB = \sqrt{(-3-4)^2 + (2-5)^2} = \sqrt{49+9} = \sqrt{58}$

37. For the conditional statement, "If I buy Ms. Doherty presents, then she will be happy!"…. the underlined portion is called the ? hypothesis

38. Assume the following statements are true. "If I go to my geometry lesson, I will get homework. If get homework, then I will understand the work." I didn't go to my geometry lesson. The conclusion of the syllogism is: I will not understand the work.

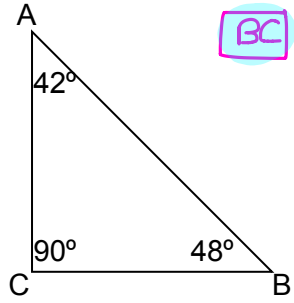
39. (A) How many points determine a plane? 3
(B) How many points determine a line? 2

40. $\angle 1$ and $\angle 2$ are supplementary angles and $\angle 1$ and $\angle 3$ are vertical angles. If $m\angle 2 = 65°$, then $m\angle 3 = ?$



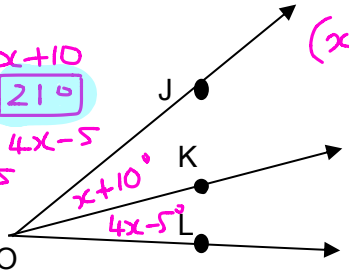
$180° - 65° = 115°$

41. Diagram not to scale.
The shortest side of the triangle is:



BC < AC < AB

42. If $m\angle JOK = (x+10)°$ and $m\angle KOL = (4x-5)°$, and $m\angle JOL = 60°$. Find $m\angle JOK$ and $m\angle KOL$



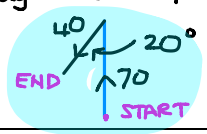
$(x+10)+(4x-5)=60°$
$5x+5=60$
$5x=55$
$x=11$

$m\angle JOK = x+10 = 21°$
$m\angle KOL = 4x-5 = 4(11)-5 = 39°$

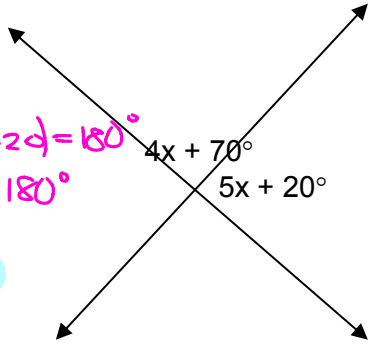
40 miles

43. If I study for my semester final, then I will do well.
(a) Find the converse of the above statement.
(b) Find the contrapositive of the above statement.
(a) If I do well in my semester final, then I studied
(b) If I don't do well in my semester final, then I didn't study

44. A pilot flies 70 miles due north and then flies N 20° W. Draw a diagram that represents this journey.

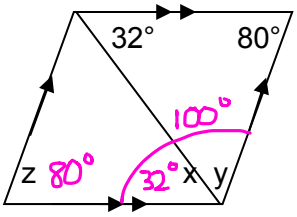


45. Solve for x:



$(4x+70)+(5x+20)=180°$
$9x+90°=180°$
$9x=90$
$x=10$

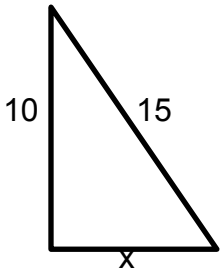
46. Find the values of the variables in the parallelogram:



$y = 100° - 32° = 68°$

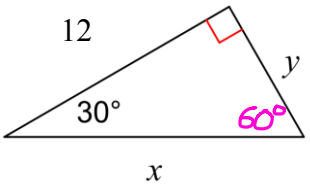
47. Define: (a) A rhombus (b) A rectangle (c) A square. Describe above using sides, angles and diagonals. (see end)

48. Find *x* in simplified radical form:



$x^2+10^2=15^2$
$x=\sqrt{125}$
$=\sqrt{25\cdot 5}=5\sqrt{5}$

49. Find x and y.



$1:\sqrt{3}:2$
$y:12:x$
$\div\sqrt{3}$ $\times 2$

$y=\frac{12}{\sqrt{3}}=\frac{12\sqrt{3}}{3}=4\sqrt{3}$

$x=2(4\sqrt{3})=8\sqrt{3}$

50. $\angle 1$ and $\angle 2$ are a linear pair. $m\angle 2 = 56°$. $m\angle 1 = ?$

$180° - 56° = 124°$

51. Find the equation of the perpendicular bisector of A = (3, 4) and B (7, 2)

midpoint AB: $\left(\frac{3+7}{2}, \frac{4+2}{2}\right) = (5,3)$

slope AB $= \frac{4-2}{3-7} = \frac{2}{-4} = -\frac{1}{2}$

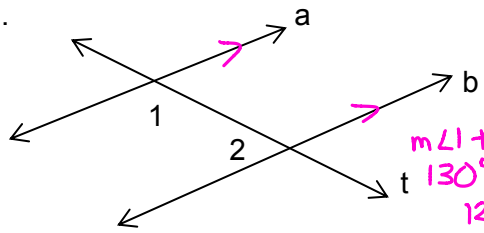
$\perp$ slope $= 2$

$y-3=2(x-5)$
$y-3=2x-10$
$y=2x-7$

52. If it is a triangle, classify it as right, obtuse or acute.
(a) 6, 11, 17 $6+11=17$ Not a △
(b) 8, 15, 17
(c) 9, 15, 17
(d) 7, 24, 26

(b) $8^2+15^2=17^2$ $289=289$ Right △
(c) $9^2+15^2>17^2$ $306>289$ Acute △
(d) 7^2+24^2 26^2 $625<676$ Obtuse △

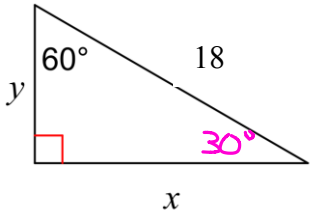
53.



Line a is parallel to b. If m∠1 = 130° and m∠2 = (3x-10)°, find x.

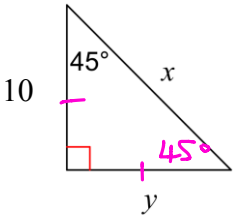
$m\angle 1+m\angle 2=180°$
$130°+(3x-10)=180°$
$120+3x=180°$
$3x=60°$
$x=20$

54. Find x and y.



30°-60°-90°
1 : √3 : 2
y : x : 18
×√3
÷2
y = 9
x = 9√3

55. Find x and y.



45°-45°-90°
1 : 1 : √2
10 : y : x
×√2
y = 10
x = 10√2

56. Draw an acute angle. Construct the **angle bisector** of the angle using a straight edge and a compass.

57. Draw a line segment. Construct the **perpendicular bisector** of the line segment using a straight edge and a compass.

58. Draw line m and a point A not on the line. Construct the parallel line to line m, through point A using a straight edge and compass.

59. Draw a triangle. COPY your triangle using a straight edge and compass.

Review all proofs – there will be proofs on the final!!!!

(5) $y=3x+2$; $(3,2)$

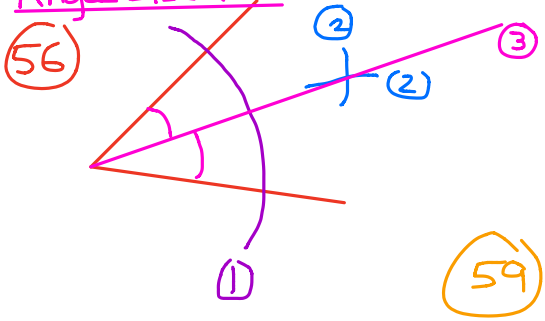
(a) parallel slope = 3
$y-2=3(x-3)$
$y-2=3x-9$
$y=3x-7$

(b) ⊥ slope = $-\frac{1}{3}$
$y-2=-\frac{1}{3}(x-3)$
$3y-6=-x+3$
$3y=-x+9$
$y=-\frac{1}{3}x+3$

(47) All are programs:
(a) Rhombus • All sides ≅
• opp ∠'s bisected
• Diagonals ⊥
(b) Rectangle • All ∠'s 90°
• Diagonals ⊥
(c) Square • Everything true for rhombus & rectangle.

Angle Bisector

(56)



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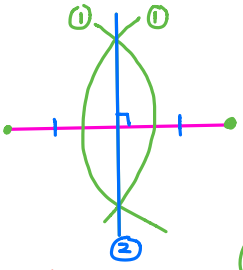

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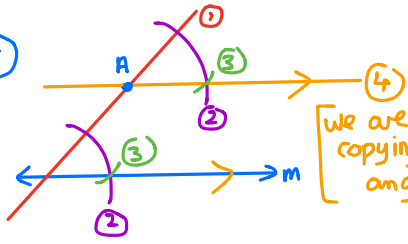

we are copying an angle

(59)