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Analytic Geometry
FBM #2 Study Guide
Chapters 1-9

Geometry FBM#2 – # of questions by topic

1. Properties → 1
2. Parallel lines (chapter 3) → 1
3. Congruent Triangles(chapters 4-5) → 3
4. Angles in a triangle → 3
5. Perpendicular/Angle Bisectors → 1
6. Parallelograms (chapter 7) → 6
7. Midsegment of a triangle → 1
8. Transformations → 1
9. Similar Triangles and proportional parts (chapter 8) → 4
10. Right Triangle trig (chapters 9-10) → 4

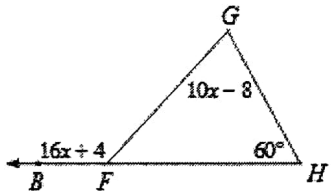
1. **TP = TP** Reflexive
2. **If $m < A = m < B$ and $m < B = m < C$, then $m < A = m < C$.** Transitive
3. **$2(x - 3) = 2x - 6$** Distributive
4. **If x = 8, then 8 = x.** symmetric
5. **If 3x = 90, then x = 30.** division
6. **If $x = y$, then $x - 2 = y - 2$.** subtraction

7. **The measures of the angles of a triangle are m< A = 3x + 4, m<B = 2x and m<C = 5x – 24. Solve for x and m<C**

$3x+4+2x+5x-24=180$
$10x-20=180$
$10x=200$
$x=20$

$m\angle C = 5(20)-24$
$= 76°$

8. **Find $m < G$**

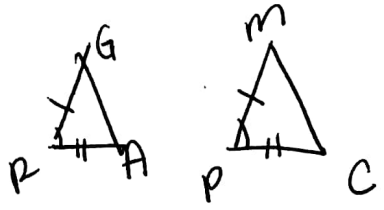


$10x-8+60=16x+4$
$10x+52=16x+4$
$48=6x$
$x=8$

$m\angle G = 10(8)-8$
$= 80-8$
$= 72°$

9. **Given: Δ RGA and ΔPMC with $\overline{RG} \cong \overline{PM}, \overline{RA} \cong \overline{PC}$, and $\angle R \cong \angle P$. Which method could be used to prove that Δ RGA ≅ ΔPMC? (Hint: Draw a picture)**

   a. SSS **b. SAS** c. HL d. ASA e. Not enough info.



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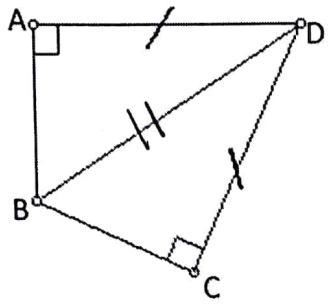
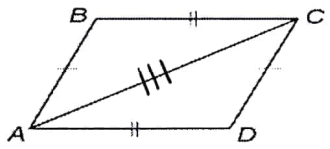
Determine if the triangles are congruent. MARK your diagrams! If so, write a congruency statement AND state the method of proving them congruent. If not, write "no congruence".

10.



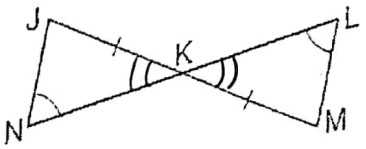
$\triangle ABD \cong \triangle CBD$ by HL

11.



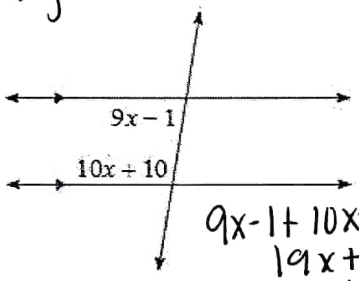
$\triangle ABC \cong \triangle CDA$ by SSS

12.



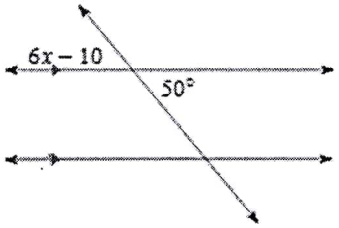
$\triangle NJK \cong \triangle LMK$ by AAS

13.



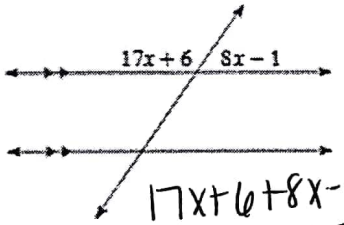
$9x-1+10x+10=180$
$19x+9=180$
$19x=171$
$x=9$

14.



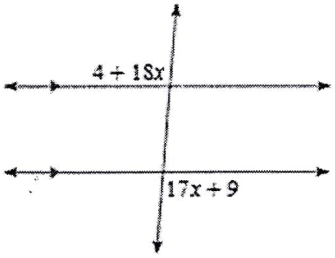
$6x-10=50$
$6x=60$
$x=10$

15.



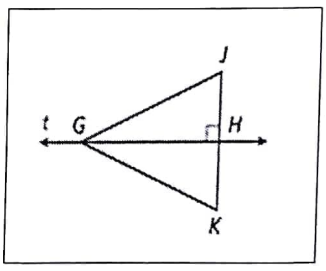
$17x+6+8x-1=180$
$25x+5=180$
$25x=175$
$x=7$

16.



$4+18x=17x+9$
$x=5$

17. Given that line t is the perpendicular bisector of $\overline{JK}$ and GK = 8.25, find GJ 8.25



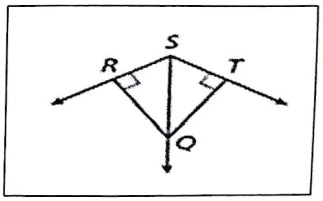
18. Given that line t is the perpendicular bisector of $\overline{JK}$, JG = x + 12 and KG = 3x − 16, and JH = x-7, find KG and JH.

$x+12=3x-16$
$28=2x$
$x=14$

$KG=3(14)-16$
$=26$

$JH=14-7=7$

19. Given that GJ = 70.2, JH = 26.5, and GK = 70.2, find JK. $26.5 \times 2 = 53$



20. Given that $m\angle RSQ = m\angle TSQ$ and TQ = 1.3, find QR 1.3

21. Given that $m\angle RSQ = 58^\circ$, RQ = 49 and TQ = 49, find $m\angle RST$

$58 \times 2 = 116^\circ$

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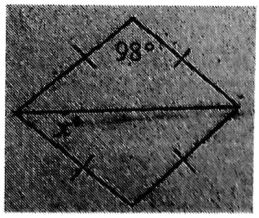
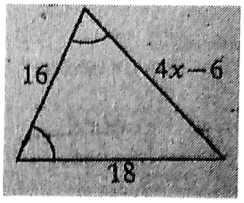
For problems 22-23, find the value of x.

22. 

$180 - 98 = \frac{82}{2} = \boxed{41°}$

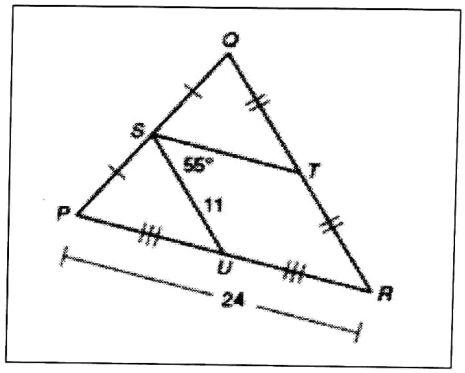
23. 

$4x - 6 = 18$

$4x = 24$

$\boxed{x = 6}$

Use the given diagram to answer questions 24 - 26.

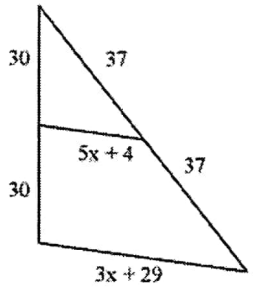


24. ST = $\boxed{12}$

25. PU = $\boxed{12}$

26. QR = $\boxed{22}$

27. Solve for x.



$2(5x + 4) = 3x + 29$

$10x + 8 = 3x + 29$

$7x = 21$

$\boxed{x = 3}$

#'s 28-30 List the additional properties of the diagonals of the following parallelograms

28. **Rectangle** diagonals are $\cong$

29. **Rhombus** diagonals are $\perp$, diagonals bisect opp. $\angle$s

30. **Square** diagonals are $\cong$, diagonals are $\perp$, diagonals bisect opp. $\angle$s.

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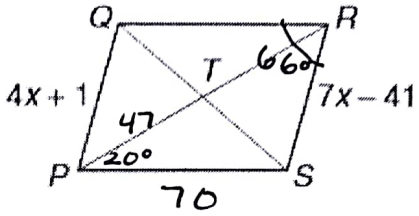
PQRS is a parallelogram. PT = 47, PS = 70, m<SPT = 20°, and m<QRS = 66°. Find each of the following measures.



31. RT 47

32. m < RSP 180 − 66 = 114°

33. QR 70

34. If PT = 2x and PR = 6x-1, find PT

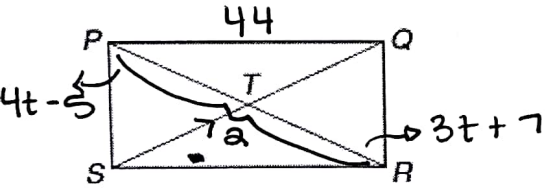
$2(2x) = 6x - 1$
$4x = 6x - 1$
$-2x = -1$
$x = 1/2$
$PT = 2(1/2) = 1$

35. m < QPT $66 - 20 = 46°$

36. RS

$4x + 1 = 7x - 41$
$42 = 3x$
$x = 14$
$RS = 7(14) - 41 = 57$

PQRS is a rectangle. PQ = 44, PR = 72, $m\angle SPT = (4t - 5)^\circ$, $m\angle QRT = (3t + 7)^\circ$. Find each of the following measures



37. SR 44

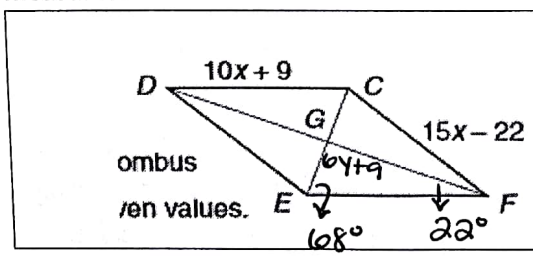
38. m < PSR 90°

39. TQ 36

40. m < QRP

$4t - 5 = 3t + 7$
$t = 12$
$3(12) + 7 = 43°$

CDEF is a rhombus. *The* $m\angle EGF = (6y + 9)^\circ$, $m\angle GEF = 68^\circ$, *and* $m\angle GFE = 22^\circ$. Find each of the following measures.



ombus
/en values.

41. x $10x + 9 = 15x - 22$, $31 = 5x$, $x = 6.2$
42. EF $10(6.2) + 9 = 71$
43. y $6y + 9 = 90$, $6y = 81$, $y = 13.5$
44. m<EFC 44°

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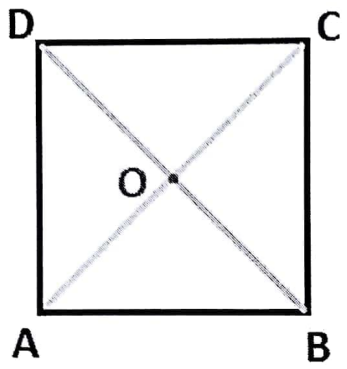
Given square ABCD



45. If m< ABC = 6x-2, solve for x

$6x-2=90$

$6x=92$

$x = 46/3$

46. If m<ADO = 8x+5, solve for x

$8x+5=45$

$8x=40$

$x=5$

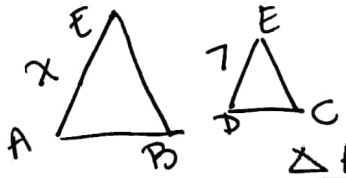
47. If AB = x+5 and DC = 2x-7, Find BC

$x+5=2x-7$

$12=x$

$BC = 17$

48. The scale factor ΔAEB to ΔDEC is 5:2. If DE = 7, then AE = ?

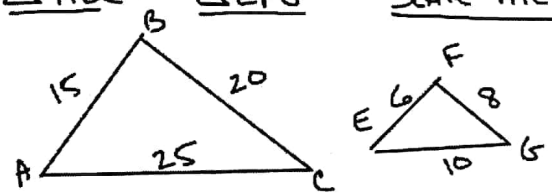


$\frac{x}{7}=\frac{5}{2}$

$2x=35$

$x=17.5$

49. Find the scale factor:



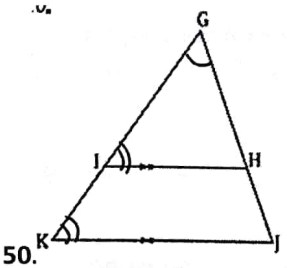
$\triangle ABC \sim \triangle EFG$

Scale Factor:

$\frac{15}{6}=\frac{5}{2}$

Determine if the triangles are similar. List the parts, the postulate or theorem used, and if similar, write a similarity statement. If not similar, show enough work to prove why.

50.



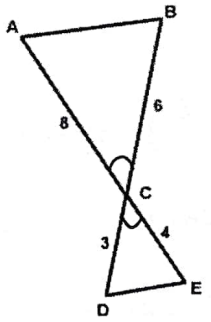
$\angle G \cong \angle G$

$\angle GIH \cong \angle GKJ$

$\triangle GIH \sim \triangle GKJ$

by AA

51.



$\frac{AC}{EC}=\frac{8}{4}=2$

$\frac{BC}{CD}=\frac{6}{3}=2$

$\angle ACB \cong \angle ECD$

$\triangle ACB \sim \triangle ECD$

by SAS~

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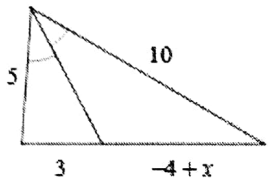
52. Find the value of x. $\frac{3x+7}{4} = \frac{x+3}{2}$

$6x+14 = 4x+12$

$2x = -2$

$\boxed{x = -1}$

53. Find x



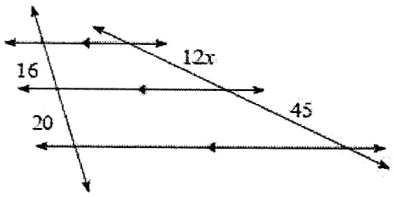
$\frac{5}{10} = \frac{3}{-4+x}$

$30 = -20 + 5x$

$50 = 5x$

$\boxed{x = 10}$

54. Solve for x.

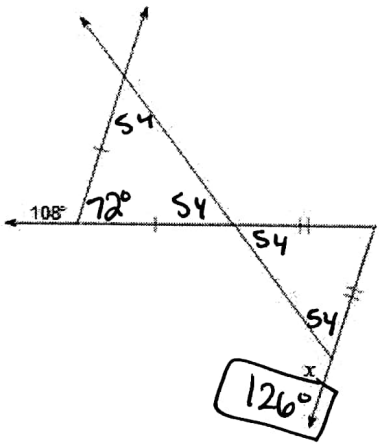


$\frac{16}{20} = \frac{12x}{45}$

$240x = 720$

$\boxed{x = 3}$

55. Solve for x.



56. Write the following formulas

a. **Pythagorean Theorem (Right Triangle)** $a^2 + b^2 = c^2$

b. **45-45-90** L → H multiply by $\sqrt{2}$ H → L divide by $\sqrt{2}$

c. **30-60-90** SL → LL mult. by $\sqrt{3}$ LL → SL divide by $\sqrt{3}$
SL → H mult. by 2 H → SL divide by 2

d. **Trig Ratios**

$\sin\theta = \frac{opp}{hyp}$ $\cos\theta = \frac{adj}{hyp}$ $\tan\theta = \frac{opp}{adj}$

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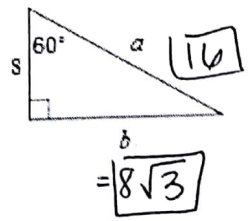
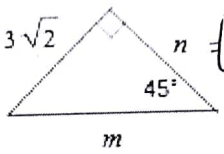
57. Find the missing sides.



$a = 16$

$b = 8\sqrt{3}$

58. Find the missing sides.



$n = 3\sqrt{2}$

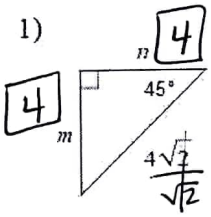
$3\sqrt{2} \cdot \sqrt{2}$

$= 3\sqrt{4}$

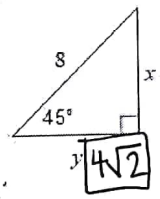
$= 3 \cdot 2 = 6$

Find the missing side lengths. Leave your answers as radicals in simplest form.

1)

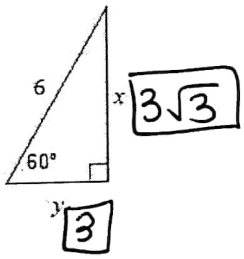


2)



$\frac{8}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{8\sqrt{2}}{2} = 4\sqrt{2}$

3)



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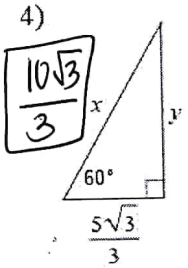
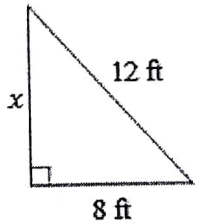


$\frac{5\sqrt{3}}{3} \cdot \frac{\sqrt{3}}{1} = \frac{5\sqrt{9}}{3} = \frac{5 \cdot 3}{3} = \frac{15}{3} = 5$

63. Find the missing side in simplified radical form



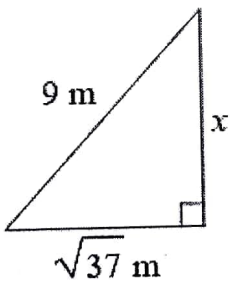
$x^2 + 8^2 = 12^2$

$x^2 + 64 = 144$

$\sqrt{x^2} = \sqrt{80}$

$40 < 4 \cdot 10 < 2 \cdot 2 \cdot 5$

$4\sqrt{5}$ ft



$\sqrt{37}^2 + x^2 = 9^2$

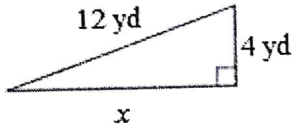
$37 + x^2 = 81$

$\sqrt{x^2} = \sqrt{44}$

$4 \cdot 11$

$2\sqrt{2}$

$x = 2\sqrt{11}$ m



$x^2 + 4^2 = 12^2$

$x^2 + 16 = 144$

$\sqrt{x^2} = \sqrt{128}$

$64 \cdot 2$

$8\sqrt{2}$

$x = 8\sqrt{2}$ yd

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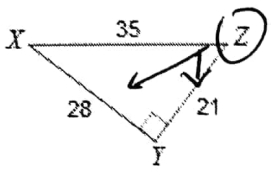
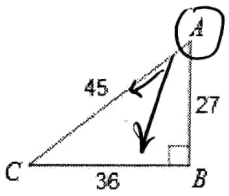
Express answers as a ratio and a decimal.

64. $\tan Z$



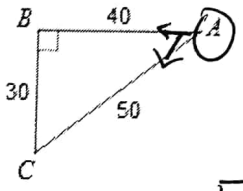
$\tan Z = 28/21 = \boxed{4/3}$

65. $\sin A$



$\sin A = \frac{36}{45} = \boxed{4/5}$

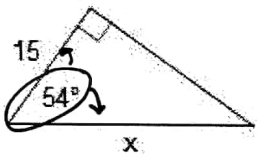
66. $\cos A$



$\cos A = \frac{40}{50} = \boxed{4/5}$

Find the missing side. Round to the nearest tenth.

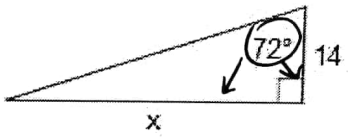
1)



$\cos 54 = \frac{15}{x}$

$x = \frac{15}{\cos 54} = \boxed{25.5}$

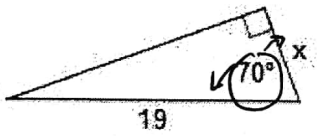
2)



$\tan 72 = \frac{x}{14}$

$\boxed{x = 43.1}$

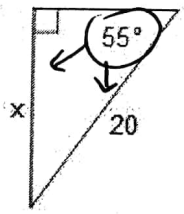
3)



$\cos 70 = \frac{x}{19}$

$\boxed{x = 6.5}$

4)



$\sin 55 = \frac{x}{20}$

$\boxed{x = 16.4}$