18 equally distributed ques
110 mins.

MATH-1312 Final Review

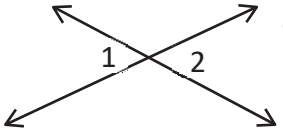
Final Exam covers chapters 1- 6, 8 (only sections covered in class) from the textbook.

How to study: Study the class notes, review homework problems, and try to do as many exercises as you can from the textbook. Note that answers are provided at the back of the book to all odd numbered problems. You need to know what definitions mean and theorems and postulates as facts but you do not need to memorize them word by word. Here I provide some examples for you. This is not a complete list, studying only these examples is not enough!

1. Find x if m∠1 = 9x— 4 and m∠2 = 3x + 14

$m\angle 1 = m\angle 2$ (V. A)

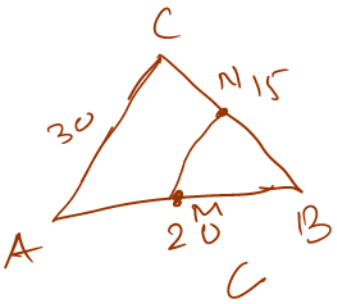
$9x - 4 = 3x + 14 \Rightarrow 6x = 18 \Rightarrow x = 3$



$m\angle 1 = 9(3) - 4 = 23°$

$m\angle 2 = 23°$

2. In △ABC, AB= 20 BC=15 and AC= 30. Find MN if M and N are the mid-points of AB and BC respectively.



$MN = \frac{1}{2}(AC)$

$= \frac{1}{2}(30) = 15$

3. Determine the type of triangle if the lengths of the sides are as follows

a) 5, 7, and 4

$a^2 \quad b^2 \quad c^2$

$5^2 \quad 4^2 \quad 7^2$

$25 + 16 = 41 < 49$

Obtuse

b) 6, 7, and 8

$6^2 + 7^2 \quad 8^2$

$36 + 49 = 85 > 64$

Acute

c) 9, 12, and 15

$9^2 + 12^2 \quad 15^2$

$81 + 144 \quad 225 = 225$

Right

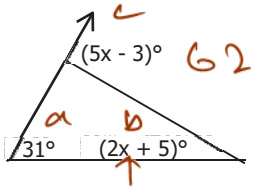
d) 4, 9, and 3

Not a △ as $4 + 3 = 7 > 9$ X

4. You took some triangles and saw all the sides are equal in length. Then, you concluded all triangles have all 3 sides equal. What type of reasoning did you use

Inductive

5. Find x.



$a+b=c$

$31+2x+5 = 5x-3$

$2x+36 = 5x-3$

$39 = 3x$

$13 = x$

$2(13)+5$

$26+5$

$= 31$

6. The measure of each exterior angle of a regular polygon is 40°. How many sides does it have?

$E = \frac{360}{n}$

$40 = \frac{360}{n} \Rightarrow n = \frac{360}{40} = 9$

$I = 120$

$I = \frac{(n-2)180}{n}$

$120 = \frac{(n-2)180}{n} \Rightarrow n = 6$ (solve it)

$I = 120$

$I = 60$

$E = \frac{360}{n}$

$60 = \frac{360}{n}$

$n = 6$

7. Suppose that the perimeter of a quadrilateral is 70 and the lengths of the sides are in ratio 2: 3: 4: 5. Find the measure of each side (order them).

$2x+3x+4x+5x = 70$

$14x = 70$

$x = 5$

$2x = 10$

$3x = 15$

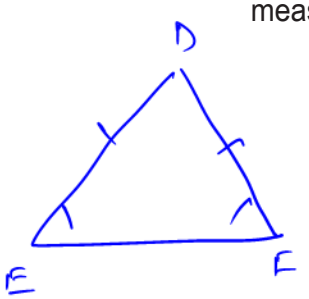
$4x = 20$

$5x = 25$

The ratio of all the $\angle$s are 2:3:4:5

$2x+3x+4x+5x = 360$

8. $\triangle DEF$ is isosceles. D is the vertex angle, $m\angle E = 2x+40$, and $m\angle F = 3x+22$. Find the measure of each angle.



$m\angle E = m\angle F$

$2x+40 = 3x+22$

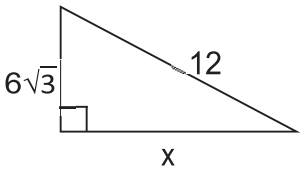
$18 = x$

$m\angle E = 2(18)+40 = 76°$

$m\angle F = 76°$

$m\angle D = 180-76-76 = 28°$

9. Find x



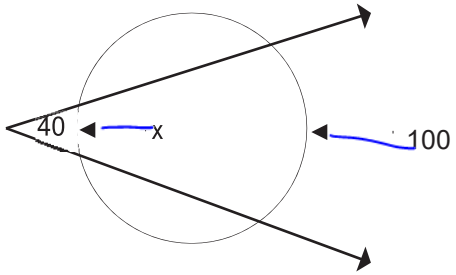
$(6\sqrt{3})^2 + x^2 = 12^2$

$108 + x^2 = 144$

$x^2 = 36$

$x = 6$

10. Find the value of x in the circle below.

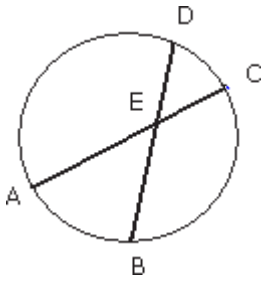


$40 = \frac{1}{2}(100 - x)$

$80 = 100 - x$

$x = 20$

11. Find AC given DE = 5, BE = 16, and AE = 10.



$AE \cdot EC = DE \cdot EB$

$10 \cdot EC = 5 \cdot 16$

$EC = \frac{5 \cdot 16}{10}$

$EC = 8$

$AC = 10 + 8 = 18$

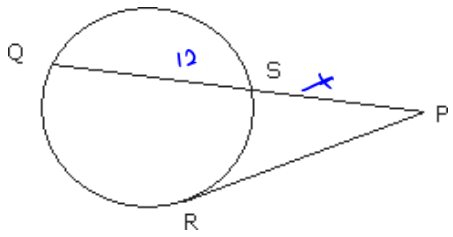
12. Given PR = 8, PS = 4, find PQ.

$8^2 = PR \cdot PS$

$8^2 = PQ \cdot 4$

$64 = 4PQ$

$16 = PQ$



$PR^2 = PQ \cdot PS$

$RP = 8 \quad QS = 12 \quad PQ?$

$8^2 = (12 + x) \cdot x$

$64 = 12x + x^2$

$x^2 + 12x - 64 = 0$

$x^2 + 16x - 4x - 64 = 0$

$x(x + 16) - 4(x + 16) = 0$

$(x + 16)(x - 4) = 0 \Rightarrow x = -16, 4$

$PQ = 4 + 12 = 16$

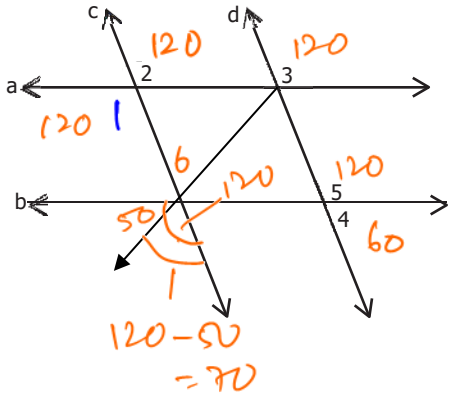
13. Given $\Delta RTS \sim \Delta UWV$ (not shown). Find WV if RT = 4, UW = 6, and TS = 8.

$\frac{RT}{UW} = \frac{TS}{WV} = \frac{RS}{UV}$

$\frac{4}{6} = \frac{8}{WV}$

$WV = \frac{6 \cdot 8}{4} = 12$

14. Find measure of all angles if m∠2 = 120°.



$m\angle 1 = m\angle 2$ (VA)

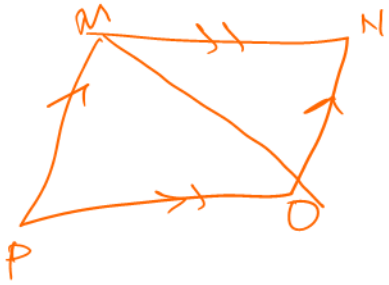
$m\angle 3 = m\angle 2$ (Corresp)

$m\angle 5 = m\angle 3$ (Corresp ∠)

$m\angle 4 = 180 - 25 = 180 - 120 = 60°$

$m\angle 6 = 70°$

15.Name the additional pair of parts that must be congruent for us to use the SSS method. In a parallelogram MNOP with diagonal MO, ΔMNO congruent to ΔOPM.

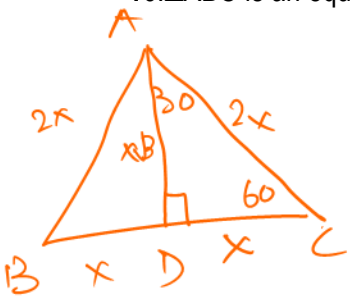


$\triangle MNO \cong \triangle OPM$ SSS

$\overline{MP} \cong \overline{NO}$, $\overline{MN} \cong \overline{OP}$ } opp sides of llgm are ≅

∴ we need $\overline{MO} \cong \overline{MO}$

16.ΔABC is an equilateral triangle with altitude AD on BC. If AD=10, find BD and AC.



$DC = BD = x$

$AB = AC = 2x$

$AD = x\sqrt{3}$

$x\sqrt{3} = 10$

$x = \frac{10}{\sqrt{3}} = \frac{10\sqrt{3}}{\sqrt{3}\cdot\sqrt{3}} = \frac{10\sqrt{3}}{3}$

$BD = \frac{10\sqrt{3}}{3}$

$AC = 2x = 2 \cdot \frac{10\sqrt{3}}{3} = \frac{20\sqrt{3}}{3}$

17. State whether the following statements are Always true, Sometimes true, or Never true.

A. If AM = MB, then A, M, and B are collinear. ST

B. The bisectors of vertical angles are opposite rays. AT

C. If two angles are congruent, then they are right angles. ST (They can be 30° each, 60° each)

D. Supplementary angles are adjacent. ST

E. The supplement of an obtuse angle is another obtuse angle. NT

F. A right triangle has two complementary angles. AT

G. Complementary angles are congruent. ST (30-60, 45-45, 20-70)

H. A rectangle is a square. ST

I. A square is a rectangle. AT

18. Given ABCD is an isosceles trapezoid with bases AB and CD. We need to prove AD=BC. What should be the first statement in indirect proof?

If P, then Q

$\sim Q$

Q

$\sim Q \Rightarrow AD \neq BC$

19. Find the exact circumference of a circle whose area is 6.25π

$A = 6.25\pi$

$\pi r^2 = 6.25\pi$

$r^2 = 6.25$

$r = 2.5$

$C = 2\pi r$

$= 2\pi (2.5)$

$= 5\pi$

20. Assuming that a 90° arc has an exact length of 4π, find the length of the radius of the circle.

$\ell = \frac{m}{360} \cdot C$

$4\pi = \frac{90}{360} \cdot C$

$4\pi = \frac{1}{4} \cdot C$

$16\pi = C$

$16\pi = C$

$16\pi = 2\pi r$

$16 = 2r$

$8 = r$

Formulas to be provide on the Final Exam.

They will be a link!

$C = \pi d$

$P = \frac{m}{360} \cdot C$

$C = \pi d = 2\pi r$

$\ell = \frac{m}{360} \cdot C$