Review Exercise for Final Semester II Exam (G10)

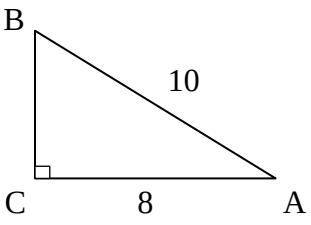
1. Find the radius and the center of the following circles:
   a. $x^2 + y^2 + 2x - 4y - 11 = 0$
   b. $x^2 + y^2 - 6x + 4y + 4 = 0$
   c. $2x^2 + 2y^2 - 2x + 2y - 1 = 0$
   d. $3x^2 + 3y^2 - 2x - 3y + 1 = 0$

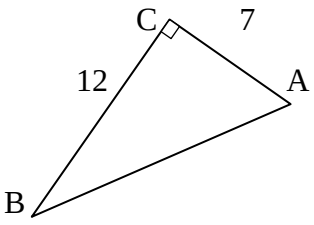
2. Determine of the value A , B and C such that the circle $x^2 + y^2 + Ax + By + C = 0$ passes through the three points (-6,6) , (-2,8) and (1,-1).

3. Find the Domain of the following functions:
   a. $y = 4\sqrt{x-3}$
   b. $y = \dfrac{x}{\sqrt{5-x}}$
   c. $y = \dfrac{1}{5 - 3x - 2x^2}$

4. Find the Range of the following functions:
   a. $y = 9 - x^2, \left(x \le 2\right)$
   b. $y = x^2 - 4, \left(x \ge 5\right)$
   c. $y = \dfrac{1}{x^2 - 25}, \left(x > 1\right)$

5. Find sinA and cosA of the following figures:

a). 

b). 

6. Find sinA and tanA for right-angled triangle ABC, if cosA=$\dfrac{1}{3}$.

7. Find the area of the following triangles:
   a. b=4cm , c=5cm and A=45º
   b. a=4cm, b= 8cm and c=10cm

8. What kind of triangle ABC if
   a. $\sin^2 A + \sin^2 B = \sin^2 C$
   b. $b\cos A = a\cos B$
   c. $a\sin A = b\sin B$

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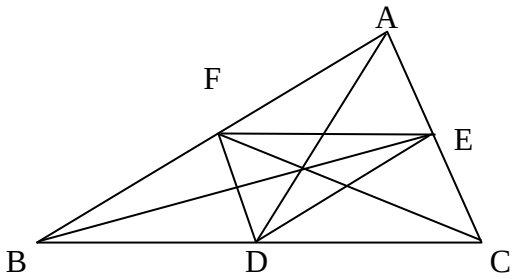
9. Is a triangle with the following three sides an acute, right or obtuse triangle?
   a. 3,7,11
   b. 4,6,9

10. Given points $A(2,-6)$, $B(3,1)$ and $C(-3,4)$. Calculate the magnitude of each vector $\overrightarrow{BC}$ and $\overrightarrow{CA}$.

11. Take *D, E* and *F* as the midpoint of sides *BC, CA* and *AB* of ΔABC. Suppose that $\overrightarrow{AB}=\vec{b}$ and $\overrightarrow{AC}=\vec{a}$, express $\overrightarrow{AD}$, $\overrightarrow{BE}$, $\overrightarrow{CF}$, $\overrightarrow{DE}$, $\overrightarrow{EF}$, $\overrightarrow{FD}$ in term of $\vec{a}$ and $\vec{b}$.



12.
   a. Find the dot product of of $\vec{a}$ and $\vec{b}$ if $|\vec{a}|=4$, $|\vec{b}|=5$ and $\cos\theta=30^o$.
   b. Find the dot product of of $\vec{a}$ and $\vec{b}$ if $\vec{a}=(2,1)$ and $\vec{b}=(2,-5)$.
   c. Find the equation of straight line passing through point *P*(-3,4) and perpendicular to vector $\vec{n}(1,2)$.
   d. Find the angle θ between vector $\vec{a}=\left(-1,\sqrt{3}\right)$ and $\vec{b}=(-3,0)$.
   e. Find the distance from point A(1,-2) to the straight line $2x+4y-3=0$.

13. Isosceles right triangle *LMN* has $\angle L$ as the right angle. Take *x* as the length of *LM*, draw perpendicular *LH* from *L* to side *BC*. Find the following dot products.
   a. $\overrightarrow{ML}\cdot\overrightarrow{NL}$
   b. $\overrightarrow{LH}\cdot\overrightarrow{ML}$
   c. $\overrightarrow{LM}\cdot\overrightarrow{NM}$

14. The following tables give the distribution of marks obtained by the different classes in various tests. For each table, find the mean, the median and the mode.

   a.

Mark	0	1	2	3	4	5	6
Frequency	3	5	8	8	5	7	4

   b.

Mark	0	1	2	3	4	5	6
Frequency	10	11	8	23	18	20	11

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15. A bag contains 8 red balls, 5 blue balls and 12 green balls. Find the probability of selecting at random:
    a. a green ball,
    b. a blue or a red ball,
    c. a red or a green ball

16. Four coins are tossed at the same time. List all the possible outcomes. Find the probability of obtaining:
    a. one head and three tails
    b. at least one head,
    c. two heads and two tails.

17. Without using a calculator, evaluate
    a. $\frac{10!}{6!4!}$
    b. $\frac{(n!)^2}{(n-1)!(n-2)!}$
    c. ${}^{10}P_2$
    d. ${}^{9}C_3$
18. Expand each of the following:
    a. $(1+2x)^5$
    b. $(2-3x)^4$