ALAAWAA

Gem

# Mathematics

## نماذج امتحانات

### الصف الثالث الإعدادى

الفصل الدراسى الثانى

2021

# Al-Adwaa Model 1

## Algebra

**1 Choose the correct answer:**

**(1)** The simplest form of $n(x) = \frac{x+3}{x-3} \times \frac{x-3}{x^2-9}$ is .....

(a) $\frac{1}{x+3}$ (b) $\frac{1}{x-3}$ (c) $x+3$ (d) $x-3$

**(2)** If A and B are two mutually exclusive events, then P(A ∪ B) = .....

(a) P(B) (b) P(A ∩ B) (c) P(A) + P (B) (d) P(A)

**(3)** The set of zeroes of the function $f(x) = x(x^2 - 2x + 1)$ is .....

(a) $\{0, 1\}$ (b) $\{0, -1\}$ (c) $\{0\}$ (d) $\{1\}$

**(4)** The ordered pair which satisfies each of the following equations: $x$ y = 2,

$x$ – y = 1 is .....

(a) (1, 2) (b) (2, 1) (c) (1 ,1) (d) (3, 1)

**(5)** The domain of the function $f: f(x) = \frac{2-x}{7}$ is .....

(a) $\mathbb{R} - \{7\}$ (b) $\mathbb{R} - \{2, 7\}$ (c) $\mathbb{R} - \{2\}$ (d) $\mathbb{R}$

**(6)** The domain of $n: n(x) = \frac{3x+4}{x^2+25} + \frac{x-2}{x^2+7}$ is .....

(a) $\mathbb{R} - \{5\}$ (b) $\mathbb{R} - \{-5, 5, -7\}$ (c) $\mathbb{R}$ (d) $\mathbb{R} - \{-5, 5\}$

**2 (a) Simplify:** $n(x) = \frac{x}{x-2} \div \frac{x+3}{x^2-x-2}$ ,showing the domain of $n$

**(b)** Solve the following two equations in $\mathbb{R} \times \mathbb{R}$: $2x = 1 - y$ , $x + 2y = 5$

**3 (a)** If A and B are two events of a random experiment and P(A) = 0.7 , P(A ∩ B) = 0.3,
**find:** P(A – B)

**(b) Simplify:** $n(x) = \frac{x^2+x}{x^2-1} - \frac{x+5}{x^2+4x-5}$ ,showing the domain of $n$

**4 (a) Find** in $\mathbb{R}$ the solution set of the following equation by using the general formula:

$x^2 - 4x + 1 = 0$ approximating the result to two decimal places.

**(b)** If $n_1(x) = \frac{2x}{2x+6}$ , $n_2(x) = \frac{x^2+3x}{x^2+6x+9}$ , **prove that:** $n_1 = n_2$:

**5 (a)** If $n(x) = \frac{x-2}{x+1}$

**Find:** (1) the domain of $n^{-1}$ (2) $n^{-1}(3)$

(3) If $n^{-1}(x) = 2$ , **find** the value of $x$.

**(b) Find** in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations: $x - y = 1$ , $x^2 - y^2 = 25$

# Al-Adwaa Model 2

## 1 Choose the correct answer:

**(1)** The set of zeroes of the function $f: f(x) = x(x^2 - 1)$ is .....

(a) $\{0\}$ (b) $\{0, -1\}$ (c) $\{0,1, -1\}$ (d) $\{0,1\}$

**(2)** The set of zeroes of the function $f: f(x) = \frac{x^2 - 9}{x - 2}$ is .....

(a) $\mathbb{R} - \{2\}$ (b) $\{-3, 3\}$ (c) $\{2\}$ (d) $\{3, -3, 2\}$

**(3)** If $n(x) = \frac{x - 2}{x + 5}$, then the domain of $n^{-1}$ is .....

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{2\}$ (c) $\mathbb{R} - \{2, -5\}$ (d) $\mathbb{R} - \{-5\}$

**(4)** The common domain of the two fractions $\frac{2}{x^2 - 1}$ and $\frac{5x}{x^2 - x}$ is .....

(a) $\mathbb{R} - \{1\}$ (b) $\mathbb{R} - \{0, 1\}$ (c) $\mathbb{R} - \{0,1, -1\}$ (d) $\mathbb{R} - \{1, -1\}$

**(5)** The S.S. of the two equations: $x - y = 0$, $x^2 + y^2 = 18$ in $\mathbb{R} \times \mathbb{R}$ is .....

(a) $\{(3, 3)\}$ (b) $\{(-3, -3)\}$ (c) $\{(3, -3), (-3, 3)\}$ (d) $\{(3, 3), (-3, -3)\}$

**(6)** The set of zeroes of the function $f: f(x) = x^2 - 25$ is .....

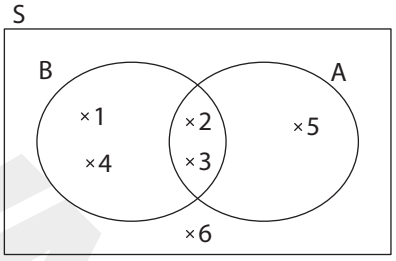
(a) $\{5\}$ (b) $\{-5\}$ (c) $\{-5, 5\}$ (d) $\emptyset$

**2** **(a)** If A and B are two events of a random experiment, then **find**:

(1) P (A ∩ B)

(2) P (A – B)

(3) The probability of non-occurrence of event A




**(b) Simplify:** $n(x) = \frac{x - 3}{x^2 - 7x + 12} - \frac{4}{x^2 - 4x}$, showing the domain of $n$.

**3** **(a) Find** in $\mathbb{R}$ the solution set of the following equation by using the general rule:

$3x^2 - 5x - 4 = 0$ approximating the result to the nearest two decimal places.

**(b)** If the domain of the algebraic fraction $n$: $n(x) = \frac{x + 2}{x^2 + ax + b}$ is $\mathbb{R} - \{2, 3\}$.

**Find** the value of a and b.

**4** **(a)** If $n(x) = \frac{x^2 - 3x}{(x - 3)(x^2 + 2)}$, then find $n^{-1}(x)$ in the simplest form, showing the domain of $n^{-1}$

**(b) Find** in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations: $x + y = 7$, $x^2 + y^2 = 25$

**5** **(a) Simplify:** $n(x) = \frac{x^2 + 3x}{x^2 - 9} \div \frac{2x}{x + 3}$, showing the domain of $n$

**(b)** Solve the following two equations in $\mathbb{R} \times \mathbb{R}$: $x + 3y = 7$, $5x - y = 3$

# Al-Adwaa Model 3

## 1 Choose the correct answer:

**(1)** If the S.S. of the two equations: $x + 2y = 5$ and $2x + k\,y = 3$ in $\mathbb{R} \times \mathbb{R}$ equals Ø, then k = .....

(a) 2 (b) –2 (c) 4 (d) –4

**(2)** Two positive numbers their sum is 9 and their product is 8, then the two numbers are .....

(a) 2,7 (b) 3,6 (c) 4 ,5 (d) 1,8

**(3)** If A is an event in the sample space of the random experiment, then P ($A^{`}$) = .....

(a) 1 (b) –1 (c) 1 – P (A) (d) P (A)–1

**(4)** If A and B are two events in a sample space for a random experiment $A \subset B$, then P (A ∩ B) = .....

(a) P (B) (b) P (A) (c) zero (d) ∅

**(5)** The solution set of the two equations: $x - y = 3$, $x + y = 7$ in $\mathbb{R} \times \mathbb{R}$ is .....

(a) {(6, 3)} (b) {(4 ,3)} (c) {(5, 2)} (d) {(3, 7)}

**(6)** If {3} is the solution set of the equation: $x^2 + mx = 3$, then m = .....

(a) –1 (b) –2 (c) 2 (d) 1

## 2 (a) Find in $\mathbb{R}$ the solution set of the following equation by using the general rule:

$x^2 - 2x - 6 = 0$ approximating the result to one decimal places.

**(b)** A rectangle with a length more than its width by 4 cm if the perimeter of the rectangle is 28 cm, **find** the area of the rectangle.

## 3 (a) If the set of zeroes of the function $f : f(x) = ax^2 + x + b$ is $\{0, 1\}$

**find** the values of each two constants a and b.

**(b) Find** in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations: $y - x = 3$ , $x^2 + y^2 - xy = 13$

## 4 (a) Simplify: $n(x) = \frac{x^3 - 8}{x^2 + x - 6} \times \frac{x + 3}{x^2 + 2x + 4}$ ,showing the domain of $n$

**(b)** Solve the following two equations in $\mathbb{R} \times \mathbb{R}$: $2x - y = 3$ , $x + 2y = 4$

## 5 (a) If A and B are two events of a random experiment and P(A) = 0.3 , P(B) = 0.6 , P(A ∩ B) = 0.2

**Find:** (1) P(A ∪ B) (2) P (A – B)

**(b) Simplify:** $n(x) = \frac{x^2 + 2x}{x^2 - 4} + \frac{x + 3}{x^2 - 5x + 6}$ ,showing the domain of $n$, then **find** $n(-2)$ if it is possible.

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# Mathematics

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### الصف الثالث الإعدادى

الفصل الدراسى الثانى

2021

# Al-Adwaa Model 1

## Geometry

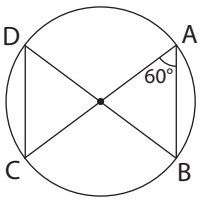
### 1 Choose the correct answer:

**(1)** ..... is a line segment with one endpoint at the centre of the circle and the other endpoint on the circle.

(a) Diameter (b) Radius (c) Chord (d) Axis of symmetry

**(2) In the opposite figure:**

If m (∠ BAC) = 30°, then m (∠ BDC) = .....




(a) 15° (b) 60°

(c) 30° (d) 90°

**(3)** The length of the arc opposite to a central angle of measure 30° in a circle of circumference 36 cm = ..... cm

(a) 18 (b) 9 (c) 4.5 (d) 3

**(4)** M and N are two circles of radii lengths 9 cm, and 4 cm respectively MN = 5 cm, then the two circles are .....

(a) touching externally (b) intersecting

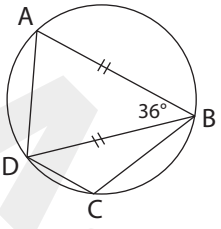
(c) touching internally (d) distant

**(5)** The quadrilateral is cyclic if there is an exterior angle at any of its vertices ..... the measure of the interior angle at the opposite vertex.

(a) greater than (b) complements (c) supplements (d) equal to

**(6) In the opposite figure:**

If AB = BD and m (∠ ABD) = 36°, then m (∠ C) = .....




(a) 140° (b) 54°

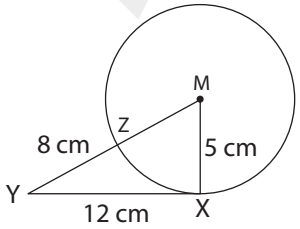
(c) 70° (d) 108°

### 2 (a) In the opposite figure:

M is a circle with radius length 5 cm

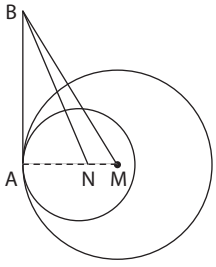
XY = 12 cm, $\overline{MY}$ ∩ circle M = {Z} and ZY = 8 cm.

**Prove that:** $\overline{XY}$ is a tangent to circle M at X.




**(b)** M and N are two circles with radii lengths of 10 cm and 6 cm respectively and they are touching internally at A, $\overline{AB}$ is a common tangent for both at A.

If the area of the triangle BMN = 24 cm$^2$. **Find** the length of $\overline{AB}$ .

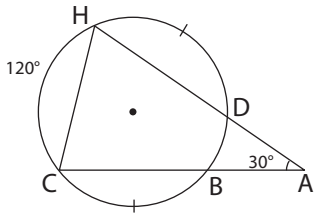


**3** **(a) In the opposite figure:**

m (∠ A) = 30°, m ($\overset{\frown}{HC}$) = 120°, m ($\overset{\frown}{BC}$) = m ($\overset{\frown}{DH}$)

(1) **Find:** m ($\overset{\frown}{BD}$) the minor)

(2) **Prove that:** AB = AD




**(b) In the opposite figure:**

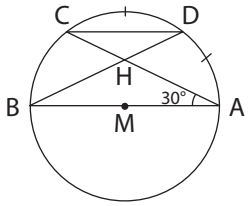
$\overline{AB}$ is a diameter in the circle M

, C ∈ the circle M, m (∠ CAB) = 30°

, D is midpoint of $\overset{\frown}{AC}$ , $\overline{DB} \cap \overline{AC} = \{H\}$

(1) **Find:** m (∠ BDC) and m ($\overset{\frown}{AD}$)

(2) **Prove that:** $\overline{AB}$ // $\overline{DC}$

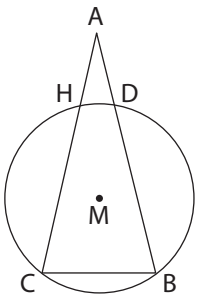



**4** **(a) In the opposite figure:**

ABC is a triangle in which AB = AC , $\overline{BC}$ is a chord

in the circle M , if $\overline{AB}$ and $\overline{AC}$ cut the circle at D and H respectively.

**Prove that:** m ($\overset{\frown}{DB}$) = m ($\overset{\frown}{HC}$)

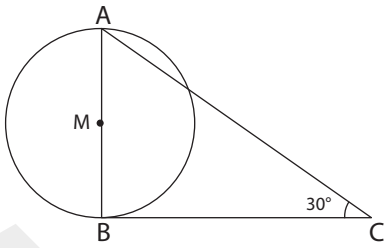



**(b) In the opposite figure:**

A circle M of circumference 44 cm, $\overline{AB}$ is a diameter,

$\overline{BC}$ is a tangent at B and m (∠ ACB) = 30°

**Find** the length of $\overline{BC}$ $\left(\pi = \frac{22}{7}\right)$

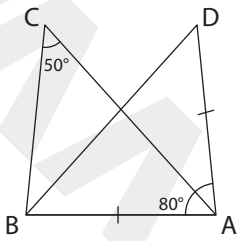



**5** **(a) In the opposite figure:**

AB = AD , m (∠ DAB) = 80° , m ( ∠ C) = 50°

**Prove that:** The points A, B, C and D

have a circle passing through them.




**(b)** Mention two cases of the cyclic quadrilateral.

# Al-Adwaa Model 2

## 1 Choose the correct answer:

**(1)** If M is a circle, its diameter length is 6 cm, and A is a point on the circle, then .....

(a) MA > 6 cm (b) MA = 6 cm (c) MA = 3 cm (d) MA < 3 cm

**(2)** The type of the inscribed angle which is opposite to an arc greater than a semicircle is ..... angle.

(a) an acute (b) an obtuse (c) a right. (d) a straight

**(3)** $\overline{AB}$ and $\overline{CD}$ are two chords in a circle, AB = 5 cm and CD = 3 cm, then the chord which is nearer to the centre of the circle is .....

(a) $\overline{AB}$ (b) $\overline{CD}$

(c) both are equal (d) cannot be determined

**(4)** We can identify the circle if we are given .....

(a) three collinear points (b) two points

(c) three non-collinear points (d) one point

**(5)** If the measure of an angle of tangency = 70°, then the measure of the central angle subtended by the same arc equals .....

(a) 35° (b) 70° (c) 140° (d) 105°

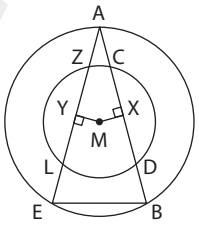
**(6)** The measure of the inscribed angle which is drawn in $\frac{1}{6}$ of a circle equals .....

(a) 240° (b) 120° (c) 60° (d) 30°

## 2 (a) Two concentric circles M, $\overline{AB}$ is a chord in the larger circle

$\overline{AE}$ is a chord in the larger circle and intersects the smaller circle at Z and L, $\overline{MX} \perp \overline{AB}$ and $\overline{MY} \perp \overline{AE}$

If m (∠ ABE) = m (∠ AEB) , then **prove that:** CD = ZL.

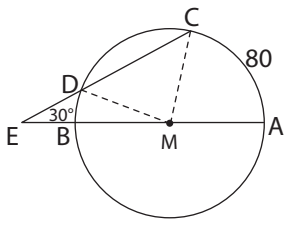



**(b) In the opposite figure:**

$\overline{AB}$ is a diameter in the circle M, $\overrightarrow{AB} \cap \overrightarrow{CD} = \{E\}$ ,

m (∠ AEC) = 30° ,m ($\overset{\frown}{AC}$) = 80°

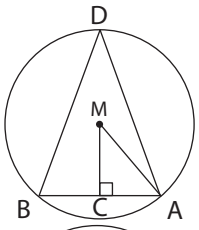
**Find:** m ($\overset{\frown}{CD}$)



**3** **(a) In the opposite figure:**

$\overline{AB}$ is a chord of circle M, $\overline{MC} \perp \overline{AB}$ .

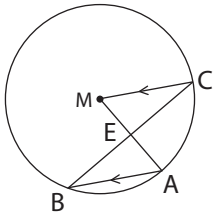
**Prove that:** m (∠ AMC) = m (∠ ADB)




**(b) In the opposite figure:**

$\overline{AB}$ is a chord in circle M, $\overline{CM}$ // $\overline{AB}$ , $\overline{BC} \cap \overline{AM} = \{E\}$ ,

**Prove that:** BE > AE.

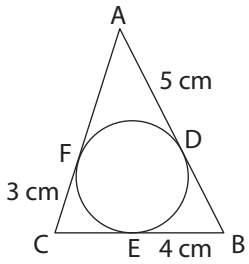



**4** **(a) In the opposite figure:**

A circle is drawn touching the sides of a triangle ABC

, $\overline{AB}$ , $\overline{BC}$ , $\overline{AC}$ at D, E, F, AD = 5 cm, BE = 4 cm, CF = 3 cm

**Find** the perimeter of Δ ABC

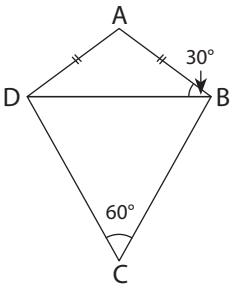



**(b) In the opposite figure:**

ABCD is a quadrilateral in which AB = AD,

m (∠ ABD) = 30°, m (∠ C) = 60°

**Prove that:** ABCD is a cyclic quadrilateral.




**5** **(a) In the opposite figure:**

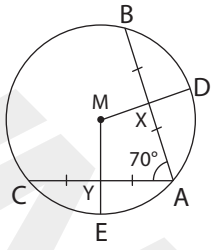
$\overline{AB}$ and $\overline{AC}$ are two chords equal in length at the circle M

, X is the midpoint of $\overline{AB}$

, Y is the midpoint of $\overline{AC}$, m (∠ A) = 70°

(1) **Find:** m (∠ DME)

(2) **Prove that:** XD = YE




**(b) In the opposite figure:**

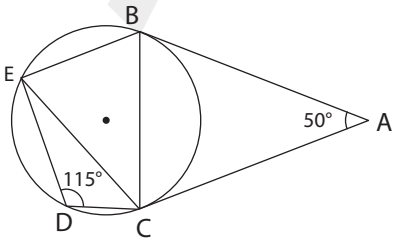
$\overline{AB}$ and $\overline{AC}$ are two tangent-segments

to the circle at B and C

, m (∠ A) = 50° , m (∠ D) = 115°

**Prove that:**

(1) $\overrightarrow{BC}$ bisects ∠ ABE (2) CB = CE



# Al-Adwaa Model 3

## 1 Choose the correct answer:

**(1)** If the chords of a circle are equal in length, then they are ..... the centre.

(a) passing through (b) equidistant from

(c) intersecting at (d) perpendicular to

**(2)** The central angle whose measure is 90° subtended by an arc of length = ..... the circumference of the circle.

(a) $\frac{1}{4}$ (b) $\frac{1}{6}$ (c) $\frac{1}{3}$ (d) $\frac{1}{2}$

**(3)** The length of the arc that is opposite to a right inscribed angle in a circle whose circumference is 44 cm equals ..... cm.

(a) 22 (b) 11 (c) $\frac{22}{7}$ (d) $\frac{44}{7}$

**(4)** Any straight line passing through the centre of the circle is called ..... of it.

(a) diameter (b) radius (c) chord (d) axis of symmetry

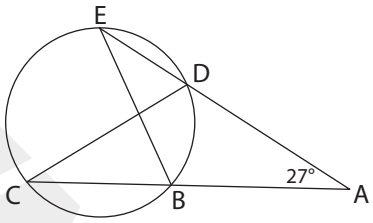
**(5)** The number of common tangents of two non-congruent concentric circles is .....

(a) 1 (b) 2 (c) 4 (d) zero

**(6) In the opposite figure:**

$\overrightarrow{AD}$ intersects the circle at D and E, $\overrightarrow{AB}$ intersects it at B and C.

If m (∠ A) = 27°, AB = BE, then m (∠ CDE) = .....



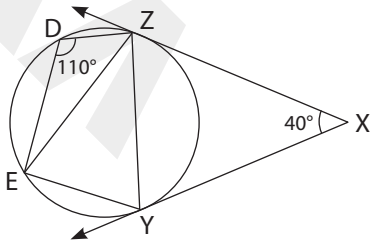

(a) 13.5° (b) 54°

(c) 27° (d) 36°

## 2 (a) In the opposite figure:

$\overrightarrow{XY}$ and $\overrightarrow{XZ}$ are two tangents to the circle at the two point Y and Z, m (∠ X) = 40° , m (∠ D) = 110°

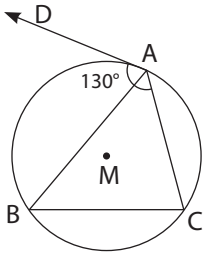
**Prove that:** m (∠ ZYE) = m (∠ ZEY)




**(b) In the opposite figure:**

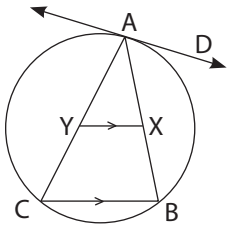
$\overrightarrow{AD}$ is the tangent to the circle M at A , m (∠ DAC) = 130°

**Find with proof:** m (∠ B)



**3** **(a)** ABC is a triangle inscribed in a circle,

$\overleftrightarrow{AD}$ is a tangent to the circle at A, $X \in \overline{AB}$, $Y \in AC$ where $\overline{XY} \,//\, \overline{BC}$

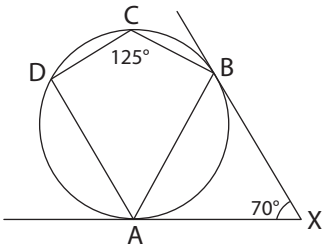



**Prove that:**

$\overline{AD}$ is a tangent to the circle passing through the points A, X and Y .

**(b)** $\overline{XA}$ and $\overline{XB}$ are two tangents to the circle at A and B

$m(\angle AXB) = 70°$, $m(\angle DCB) = 125°$

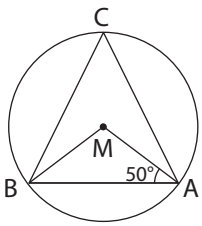



**Prove that:**

First: $\overrightarrow{AB}$ bisects $\angle DAX$ .

Second: $\overline{AD} \,//\, \overline{XB}$.

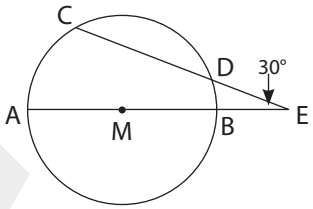
**4** **(a)** M is a circle , $m(\angle MAB) = 50°$ , find $m(\angle C)$.




**(b) In the opposite figure:**

$\overline{AB}$ is a diameter in the circle M, $\overrightarrow{AB} \cap \overrightarrow{CD} = \{E\}$,

$m(\angle E) = 30°$ , $m(\overset{\frown}{AC}) = 80°$ , find $m(\overset{\frown}{BD})$



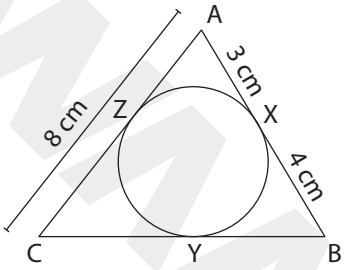

**5** **(a) In the opposite figure:**

An inscribed circle of triangle ABC

touches its sides at X , Y and Z.

If AX = 3cm , XB = 4 cm , AC = 8 cm,

**find** the length of $\overline{BC}$.




**(b) In the figure opposite:**

M and N are two intersecting circles

where circle M ∩ circle N equal {A , B}

$\overrightarrow{YC} \cap \overrightarrow{BA} = \{C\}$

If E is the midpoint of $\overline{XY}$,

$m(\angle EMN) = 130°$, **find** $m(\angle C)$.