

GRADE 12 AND 12 G.C.E MATHEMATICS (4024)

REVISION OF ALGEBRA, QUADRATIC EQUATIONS AND CIRCLE THEOREMS

SYLLABUS D ECZ QUESTIONS

MATHEMATICS MADE EASY

ON THE MOUNTAINS OF TRUTH, YOU CAN NEVER CLIMB IN VAIN.

NEVER GIVE UP, NEVER SURRENDER, AND RISE UP AGAINST THE ODDS.

ST. JUSTIN

EVERY PATH SERVES A PURPOSE

THE FOUNDATION IS THE DETERMINER.

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JM/2020

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ALGEBRAIC EXPRESSIONS

2019 p1 Q1 gce

1.a) Simplify $4 - 2(b - a) - 1$

2019 P2 Q1a gce

2.a) simplify $\frac{10x^3y^2}{35x^5y^4} \div \frac{2x^2y^2}{7x^4y^2}$

2019 P2 Q8c

c) Simplify $\frac{2x^2-18}{x+3}$

2018 P1Q10b int

3. a) Expand and simplify $(c + 3)^2$.

2018 P2 Q5a int

4. a) Simplify $\frac{b-a}{a^2-b^2}$

2018 P2 Q7b int

c) Express $\frac{3}{x+1} - \frac{2}{x-1}$ as a single fraction in its lowest terms

2018 P1Q1 gce

5. a) Simplify $4(x + 2y) - (3x - 8y)$.

2018 P2 Q2a gce

6. a) simplify $\frac{7st^3}{15u^3v^2} \times \frac{5u^3v}{28s^3t^2}$

2017 P1 Q1 int

7. a) simplify $3x - (y - 2x) - 3y$.

2017 P2 Q5b int

8.a) simplify $\frac{14x^3}{9y^2} \div \frac{7x^4}{18y^3}$

2017 p2 Q10b int

c) express $\frac{1}{x-4} - \frac{2}{5x-1}$ as a single fraction in its lowest terms

2017 P1 Q1gce

9. a) simplify $2a - 7b - 2(a - 3b)$.

2017 p2 Q2a gce

2019 p1 Q3 gce

b) Factorise completely $32x^2 - 50$

2019 P2 Q3a

b) Express $\frac{6}{n-3} - \frac{5}{n-2}$ as a single fraction
In its simplest form

2018 P1 Q2 int

b) Factorise completely $18 - 2x^2$

2018 P2 8c int

b) Simplify $\frac{12dn^3}{15cd^3} \div \frac{9c^2n}{10c^2d^2}$

2018 P1 Q4 gce

b) Factorise completely $5x^2 - 5$.

2018 P2 Q12a gce

b) express $\frac{3}{2x-5} - \frac{4}{x-3}$ as a single
Fraction in its lowest terms

2017 P1 Q4 int

b) Factorise $ax^2y - 4ay^3$

2017 p2 Q7c int

b) simplify $\frac{2x^2-8}{x+2}$

2017 P1 Q2 gce

b) factorise completely $\frac{x^2}{4y^2} - \frac{1}{9}$

2017 P2 Q10 c

10. a) simplify $\frac{m^2-1}{m^2-m}$.

b) simplify $\frac{p^2q^3}{4} \times \frac{8}{pq} \div 2p^2q$.

2017 P2 Q4a

c) Express $\frac{3}{5x-2} - \frac{2}{x+3}$ as a single fraction in its simplest form

2016 p1 q2 int

11. a) simplify $3(a+5) - a(a-2)$.

2016 P2 Q5a int

b) simplify $\frac{x-1}{x^2-1}$

2016 P2 Q10c int

12. a) simplify $\frac{17k^2}{20a^2} \div \frac{51k^2}{5a}$.

2016 P2 Q12b int

b) express $\frac{2}{2x-1} - \frac{1}{3x+1}$ as a single fraction in its simplest form

2016 p2 Q1 gce

13. a) factorise completely $4x^2 - 16y^2$

2016 p2 Q2a gce

b) express $\frac{4}{3r-2} - \frac{3}{r+5}$ as a single fraction in its simplest form

2016 p2 Q2b

c) Simplify $\frac{3a}{5c^2} \times \frac{10c^3}{a^2}$.

14. a) simplify $7m - 2(3n - m) - 9n$

b) factorise completely $2x^2 - x - 15$

15.a) factorise completely $5px - 5py + 3qx - 3qy$. b) simplify $\frac{2y^2-3y-5}{y^2-1}$

c) express $\frac{4}{x-2} - \frac{2}{x+3}$ as a single fraction in its simplest form.

16. a) simplify $\frac{h^2-k^2}{h+k}$

b) factorise completely $2x^2 - 3x + 2cx - 3c$

c) express $\frac{2}{b-2} - \frac{3}{1-2b}$ as a single fraction in its simplest form.

17. a) simplify $7a + 2b - 4(3a - b)$.

b) factorise completely $5x^2 - x - 4$

18. a) simplify $5(2y - 3) - 2(5 - 2y)$.

b) express $\frac{5}{2y-1} - \frac{6}{3y-1}$ as a single fraction in its simplest form

c) factorise completely $3ap - 8bq - 4aq + 6bp$.

19. a) simplify $2x - 9 + 3x^2 - 2 - 4x$

b) factorise completely $3y^2 - 12$

c) express $\frac{2a}{x-1} - \frac{a}{x-2}$ as a single fraction in its simplest form.

- 20.a) simplify $\frac{x+2}{x^2-4}$
b) express $\frac{4}{2x-1} - \frac{3}{x-1}$ as a single fraction in its simplest form
21. a) factorise completely $x^2y + 2x^2 - 9y - 18$.
b) factorise completely $3x^2 - 3$
c) express $\frac{x+2}{3} - \frac{2x-3}{4}$ as a single fraction in its simplest form.
d) simplify $3x - 4y - 2(x - 4y) - 2y$.
22. a) factorise completely $5 - 20x^2$
b) express $\frac{2}{1-3x} + \frac{4}{5+x}$ as a single fraction in its simplest form
c) simplify $\frac{3y^2-5y-12}{y^2-9}$
23. a) simplify $\frac{a-2}{a^2-4}$
b) express as a single fraction $\frac{5}{2x-1} - \frac{7}{3x-2}$.
c) factorise $mn - km - hn + hk$
24. a) simplify $\frac{8\pi r^2 - 2\pi r^4}{4\pi r + 2\pi r^2}$
b) express $\frac{x-1}{3} - \frac{2x-3}{5}$ as a simplified single fraction.
c) factorise completely $3x - 12x^3$

QUADRATIC EQUATIONS

2019 P1 Q9b gce

1. a) solve the equation $2x^2 + 5x - 3 = 0$

2019 P2 Q5a gce

- b) solve the equation $13 - 9x - 5x^2 = 0$, giving your answers correct to 2 decimal places

2018 P1 Q13a int

2. a) solve the equation $2x^2 = 8$

2018 P2 Q2a int

- b) solve the equation $3x^2 - x - 5 = 0$, giving your answers correct to 2 decimal places.

2018 P1 Q19b gce

3. a) solve the equation $(2x - 1)^2 = 25$.

2018 P1 Q1b gce

- b) solve the equation $x^2 - 4x - 2 = 0$, giving your answer correct to 2 decimal places

2017 P1 Q22a int

4. a) if $y = (1 - 2x)(1 + x) - 2$, find the values of x for which $y = -2$

2017 P2 Q4a int

- b) solve the equation $2x^2 = 6x + 3$, giving your answers correct to 2 decimal places.

2017 P2 Q 1b gce

5. solve the equation $3z^2 = 7z - 1$, giving your answers correct to 2 decimal places.

2016 p1 Q22a int

6. a) solve the equation $x^2 = 3x$.

2016 P2 Q1b int

- b) solve the equation $x^2 + 2x = 7$, giving your answers correct to 2 decimal places.

2016 P2 Q3b gce

7. a) solve the equation $x^2 + 2x = 5$, giving your answers correct to 2 decimal places

2016 P2 Q4a specimen

- b) solve the equation $3x^2 + 5x + 2 = 0$, giving your answers correct to 2 decimal places

2015 P1 Q14a int

8. a) solve the equation $2y^2 = 13y$.

2015 P2 Q2a int

- b) solve the equation $2y^2 + 6y - 1 = 0$, giving your answers correct to 2 decimal places

2015 P2 Q2b gce

- c) solve the equation $m^2 - m - 5 = 0$, giving your answers correct to 2 decimal places

9. solve the equation $2(x - 2)^2 = 18$. (2014 p1)

10. solve the following equations correct to 2 decimal places

a) $1 - 2m - 5m^2 = 0$ (2014 p2)

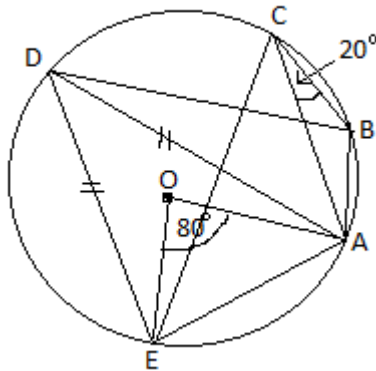
b) $x^2 + 6x = -2$ (2013 p2)

- | | |
|----------------------------|-----------|
| c) $2x^2 + 5x - 8 = 0$ | (2012 p2) |
| d) $(2x - 1)(3x - 2) = 3$ | (2011 p2) |
| e) $7 - 5x - x^2 = 0$ | (2010 p2) |
| f) $x^2 + x - 1 = 0$ | (2009 p2) |
| g) $5x^2 - 2x - 1 = 0$ | |
| h) $2x^2 - 3x - 1 = 0$ | |
| i) $x^2 + 4x - 10 = 0$ | |
| j) $1 - 5p - 2p^2 = 0$ | |
| k) $3x^2 - x - 1 = 0$ | |
| l) $3y^2 + 5y - 15 = 0$ | |
| m) $2x^2 + 5x - 1 = 0$ | |
| n) $3x^2 - x + 2 = 2x + 3$ | |

CIRCLE THEOREMS

2019 P1 Q16 GCE

1. In the diagram below, **A, B, C, D** and **E** are points on the circumference of the circle with centre **O**. **DE=AD**, $\angle ACB = 20^\circ$ and $\angle AOE = 80^\circ$.

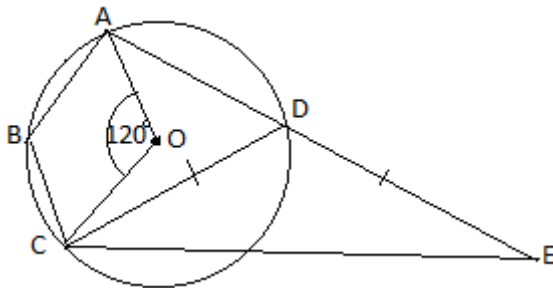


Find

- $\angle ADE$
- $\angle DAE$
- $\angle BAD$

2018 P1 Q18 int

2. In the diagram below, **O** is the centre of the circle. **A, B, C** and **D** are points on the circumference. **AD** produced meets the line from **C** at **E** such that **CD=DE** and angle $\angle AOC = 120^\circ$

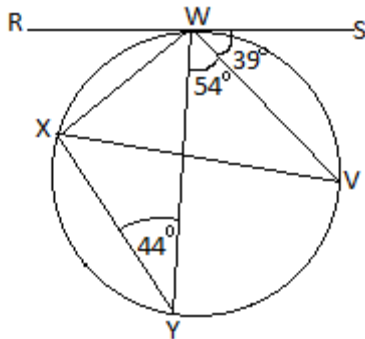


Calculate angle

- a) $\angle ADC$,
- b) $\angle ABC$,
- c) $\angle DEC$.

2018 P1 Q13 gce

3. The diagram below shows a circle with a tangent RWS . The points V , W , X and Y are on the circle such that $\angle XYW = 44^\circ$, $\angle VWY = 54^\circ$ and $\angle SWV = 39^\circ$.

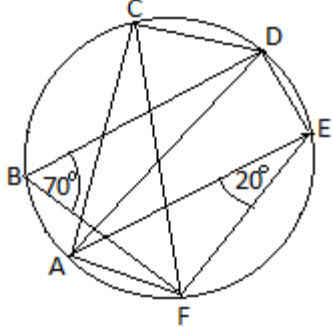


Calculate

- a) $\angle RWX$,
- b) $\angle X\hat{V}W$,
- c) $\angle Y\hat{X}W$.

2017 P1 Q17 INT

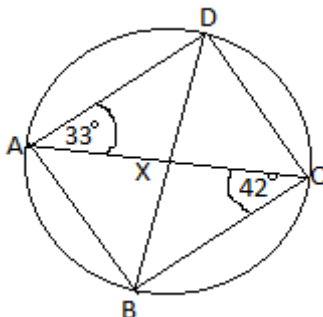
4. In the diagram below, A , B , C , D , E and F are points on the circumference of a circle. $\angle FBD = 70^\circ$ and $\angle AEF = 20^\circ$.



- a) Explain why AD is the diameter.
- b) Find
 - i) $\angle A\hat{C}F$
 - ii) $\angle D\hat{E}F$

2017 P1 Q12 gce

5. In the diagram below, points A , B , C and D are on a circle. BD is the diameter of the circle. $\angle ACB = 42^\circ$, $\angle CAD = 33^\circ$ and the lines AC and BD intersect at X

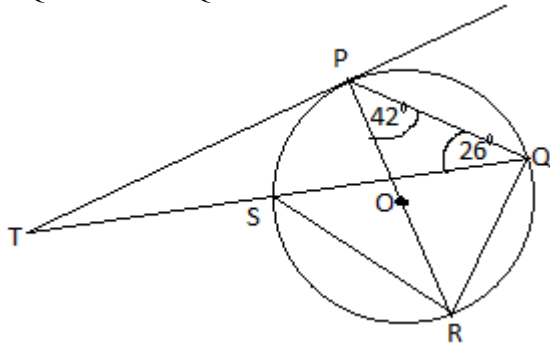


Find

- a) $\angle CBD$,
- b) $\angle A\hat{C}D$,
- c) $\angle A\hat{X}B$.

2016 P1 Q19 INT

6. In the diagram below, **PR** is a diameter of a circle with centre **O**. **Q** and **S** are points on the circumference. The tangent to the circle at the point **P** meets **QS** produced at **T**, $\angle PQS = 26^\circ$ and $\angle QPR = 42^\circ$.

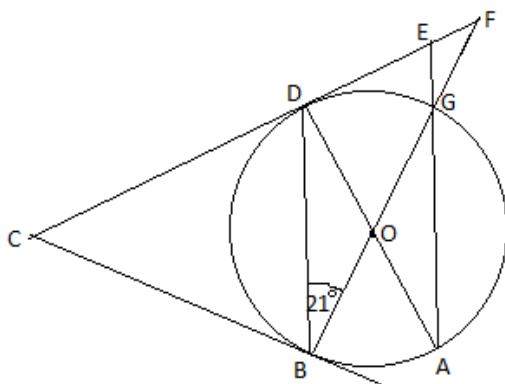


Calculate

- $\angle PRS$,
- $\angle PRQ$,
- $\angle PTQ$.

2016 P2 Q3A GCE

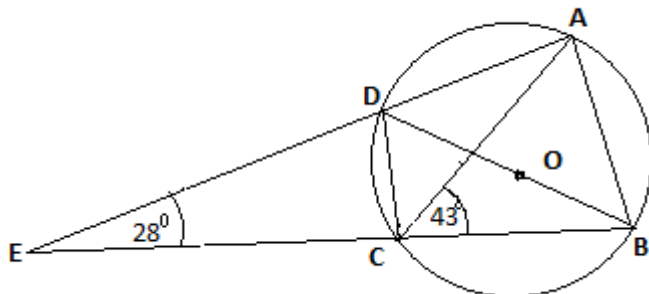
7. In the diagram below, **ABDG** is a circle with centre **O**



Given that $\angle GBD = 21^\circ$, **BC** and **CE** are Tangent to the circle at **B** and **D** respectively, calculate

- $\angle GOD$,
- $\angle GFE$,
- $\angle GED$,
- $\angle BCD$.

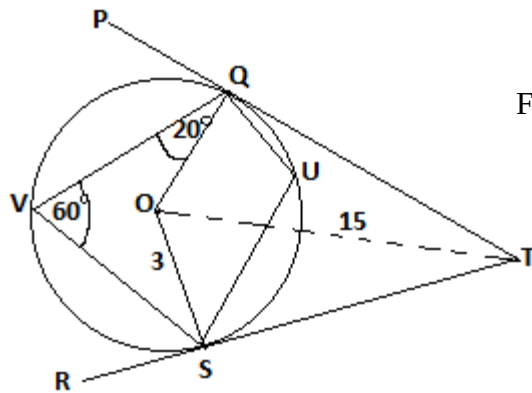
8. In the diagram below, **A**, **B**, **C** and **D** are points on the circumference of a circle with centre **O**. **ADE** and **BCE** are straight lines. Angle $\angle CED = 28^\circ$ and angle $\angle BCA = 43^\circ$.



Find

- $\angle CDE$
- $\angle CDB$
- $\angle DAC$

9. In the diagram below, a circle with centre **O** passes through the points **Q**, **U**, **S** and **V**. **TP** and **TR** are tangents to the circle at the points **Q** and **S** respectively. Angle $\angle VQO = 20^\circ$ and angle $\angle QVS = 60^\circ$.



Find i) $\angle Q\hat{U}S$

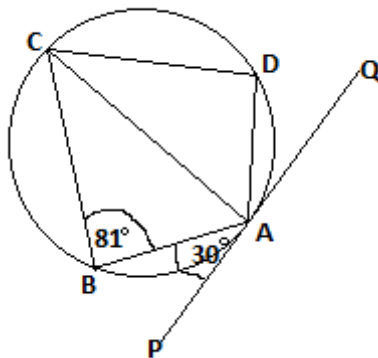
ii) $\angle V\hat{Q}P$

iii) $\angle P\hat{T}R$

Iv) reflex $\angle S\hat{O}Q$

V) the length **ST**, given that $OS = 3\text{cm}$ and $OT = 15\text{cm}$

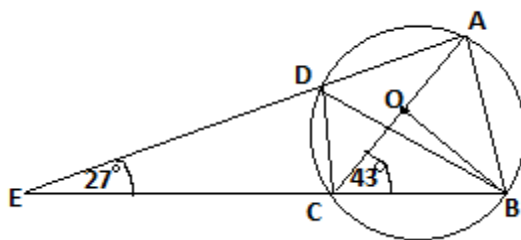
10. In the diagram below, **PAQ** is a tangent to the circle at point **A**. **AC** bisects $\angle BCD$. $\angle ABC = 81^\circ$ and $\angle PAB = 30^\circ$



Calculate;

- $\angle ACB$,
- $\angle ADC$,
- $\angle DAQ$,
- $\angle CAQ$.

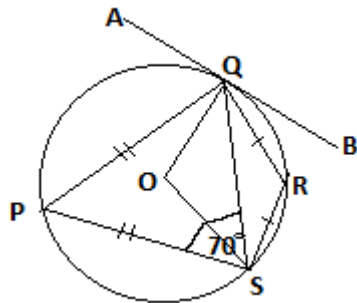
11. In the diagram below, **O** is the centre of the circle **ABCD**. **AC** is the diameter, **AD** and **BC** are produced to meet at **E**, $\angle CED = 27^\circ$ and $\angle ACB = 43^\circ$.



Find

- $\angle A\hat{D}B$,
- $\angle C\hat{A}D$,
- $\angle D\hat{C}E$.

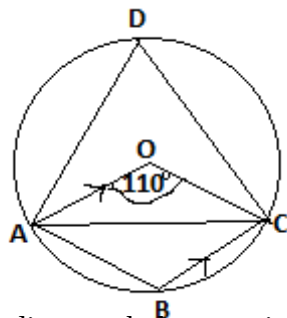
12. In the diagram below, **P, Q, R** and **S** are points on the circumference of the circle with centre **O**. **AQB** is a tangent to the circle at **Q**.



Given that **PS=PQ**, **QR=RS** and $\widehat{PSQ}=70^\circ$, calculate

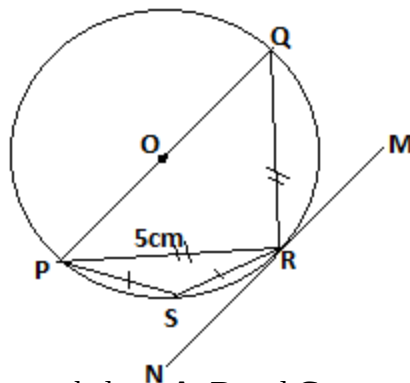
- $\widehat{QPS}$,
- $\widehat{QRS}$,
- $\widehat{AQP}$,
- $\widehat{SOQ}$.

13. A circle centre **O** passes through the points **A, B, C** and **D** as shown in the diagram below. Angle $\widehat{AOC}=110^\circ$ and **AO** is parallel to **BC**.



- Find
- $\widehat{OCA}$
 - $\widehat{ACB}$
 - $\widehat{ABC}$

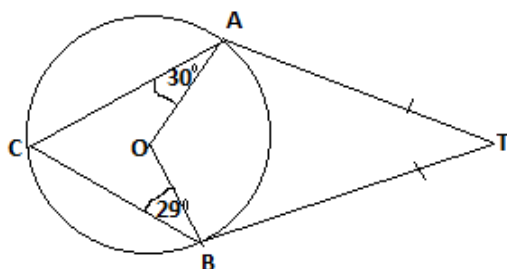
14. In the diagram below, a circle with centre **O** passes through the points **P, Q, R** and **S**. **MRN** is a tangent to the circle at **R**. **PR=RQ**, **PS=SR** and **PR=5cm**.



Find

- $\widehat{PRQ}$
- $\widehat{RSP}$
- $\widehat{QRM}$
- $\widehat{SRN}$
- The length of **PQ** correct to 3 decimal places.

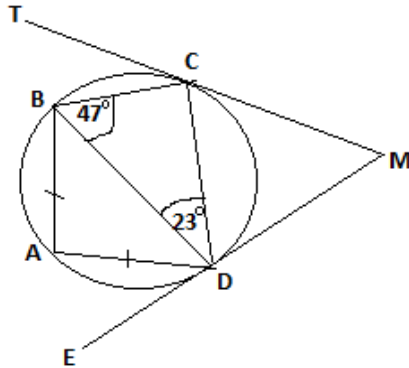
15. In the diagram below, **A, B** and **C** are points on the circumference of a circle with centre **O**. **AT** and **TB** are tangents to the circle, $\widehat{CAO}=30^\circ$ and $\widehat{CBO}=29^\circ$.



Calculate

- $\widehat{ACB}$
- $\widehat{ATB}$

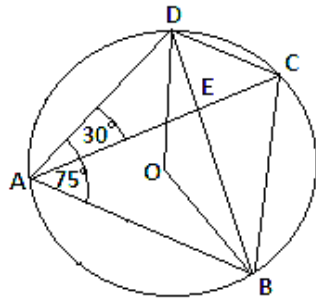
16. In the diagram below, **A**, **B**, **C** and **D** are points on the circumference of a circle. **TCM** and **MDE** are tangents to the circle at **C** and **D** respectively.



Given that $\overline{AB} = \overline{AD}$, $\angle CBD = 47^\circ$ and $\angle BDC = 23^\circ$, calculate

- $\angle BCT$,
- $\angle BAD$,
- $\angle ABD$,
- $\angle DMC$.

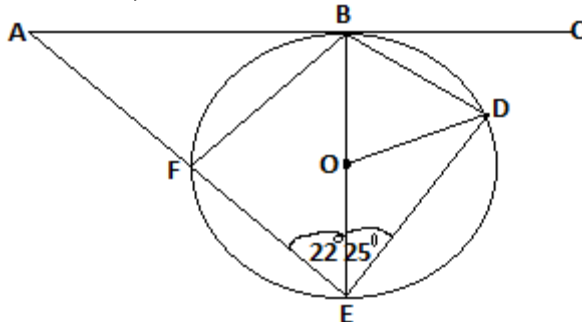
17. In the diagram below, the diagonals of the cyclic quadrilateral **ABCD** meet at **E**, **O** is the centre of the circle.



Given that $\angle DAB = 75^\circ$ and $\angle DAC = 30^\circ$, calculate

- $\angle BAC$,
- $\angle BCD$,
- $\angle OBD$,
- $\angle OBC$.

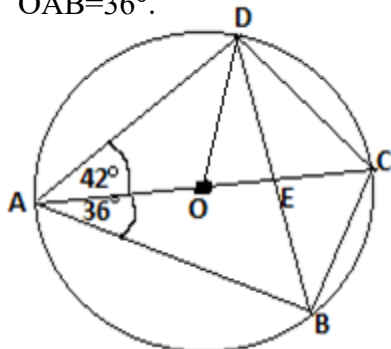
18. In the diagram below, **ABC** is a tangent and **O** is the centre of the circle. **BE** is the diameter, $\angle DEO = 25^\circ$ and $\angle FEO = 22^\circ$.



Calculate

- $\angle BOD$
- $\angle CBD$
- $\angle DBF$

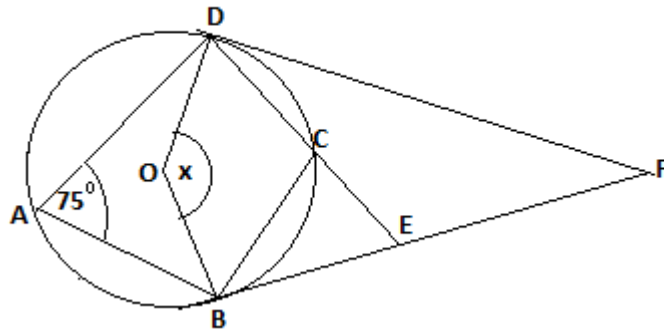
19. In the diagram below, **ABCD** is a circle, with centre **O**. given that $\angle OAD = 42^\circ$ and $\angle OAB = 36^\circ$.



Calculate

- $\angle AOD$
- $\angle ABC$
- $\angle ODB$

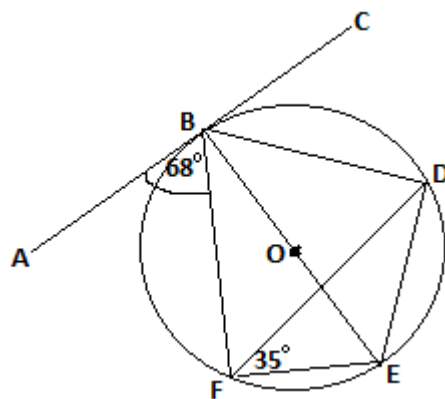
20. The diagram below, **A**, **B**, **C** and **D** are points on the circumference of a circle. Line **DC** produced meets **BF** at **E**. the points **O** is the centre, **DF** and **BF** are tangents to the circle.



Given that $\hat{BAD} = 75^\circ$, find

- Angle x
- $\hat{BCE}$
- $\hat{ODF}$
- $\hat{BFD}$

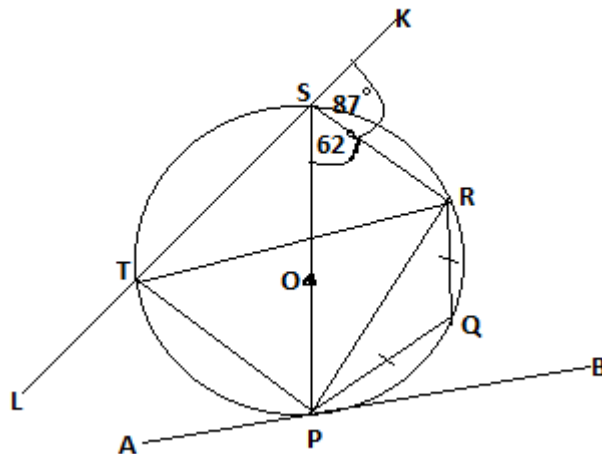
21. In the diagram below, **ABC** is a tangent to the circle centre **O** and **BE** is the diameter. $\hat{ABF} = 68^\circ$ and $\hat{DFE} = 35^\circ$.



Calculate

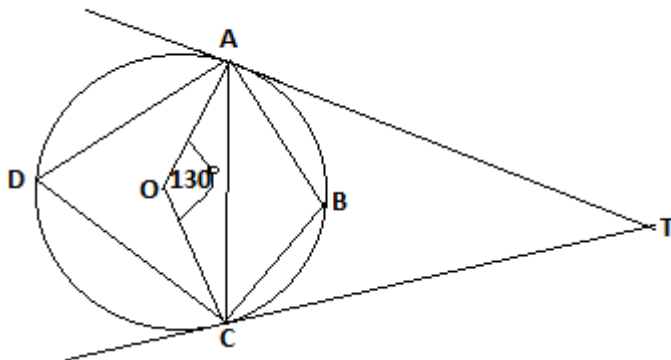
- $\hat{BFD}$
- $\hat{DBC}$
- $\hat{FED}$
- $\hat{FDB}$

22. In the diagram below **O** is the centre of the circle with diameter **PS**. **P**, **Q**, **R**, **S** and **T** are points on the circle. **APB** is a tangent to the circle. Given that $\hat{PSR} = 62^\circ$, $\hat{KSR} = 87^\circ$, **PQ**=**QR** and **LTSK** is a straight line.



- Explain why $\hat{LTP}$ is 90°
- Find the following angles
 - $\hat{RTS}$
 - $\hat{BPR}$
 - $\hat{SPT}$
 - $\hat{PRQ}$

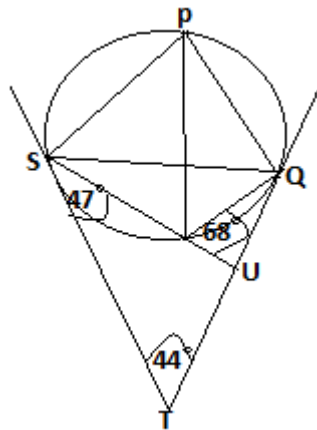
23. The diagram below, **AT** and **CT** are tangents to the circle **ABCD**. The centre of the circle is at **O**. angle $\text{AOC} = 130^\circ$.



Calculate

- i) $\hat{ADC}$
- ii) $\hat{OAC}$
- iii) $\hat{ABC}$
- iv) $\hat{ATC}$

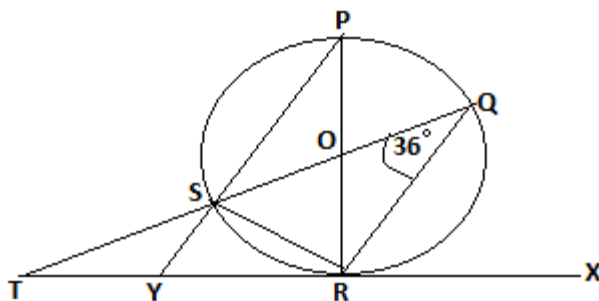
24. In the diagram, **TQ** and **TS** are tangents to the circle through **P**, **Q**, **R** and **S**. **SR** produced meets **TQ** at **U**. given that $\hat{QRU} = 68^\circ$, $\hat{STU} = 44^\circ$ and $\hat{RST} = 47^\circ$.



Calculate,

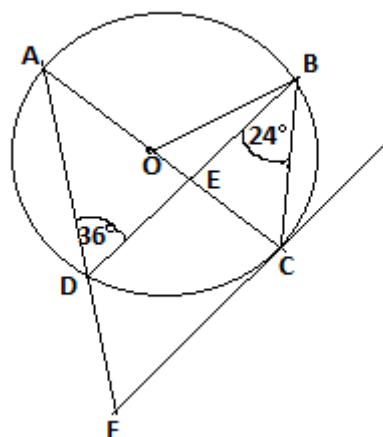
- i. $\hat{QSU}$
- ii. $\hat{QPS}$
- iii. $\hat{RPS}$
- iv. $\hat{RUQ}$

25. In the diagram, **P**, **Q**, **R** and **S** are points on the circle, centre **O**, **PR** and **QS** meet at **O**. **PY** and **QT** are straight lines. **TX** is a tangent to the circle at **R**.



- i) Given that $\hat{SQR} = 36^\circ$, find the size of
 - a) $\hat{SOR}$
 - b) $\hat{QRX}$
 - c) $\hat{STY}$
- ii) Name one triangle similar to $\triangle SRY$

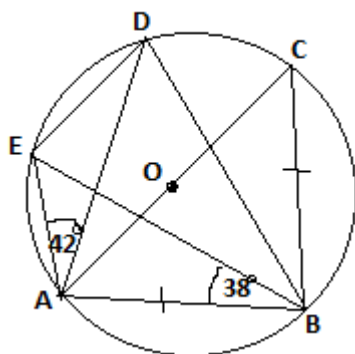
26. In the diagram **A**, **B**, **C** and **D** are points on the circle, centre **O**. **AC** and **BD** intersect at **E** and the tangent to the circle meets **AD** produced at **F**. given that $\hat{AOB} = 36^\circ$ and $\hat{DBC} = 24^\circ$.



Find

- i) $\hat{AOB}$
- ii) $\hat{AED}$
- iii) $\hat{AFC}$
- iv) $\hat{OBD}$

27. In the diagram, **AC** is the diameter of the circle with centre **O**. $AB = BC$, $\hat{ABE} = 38^\circ$ and $\hat{DAE} = 24^\circ$.



Find the size of

- i) $\hat{ADE}$
- ii) $\hat{DAC}$
- iii) $\hat{AED}$

ANSWERS

ALGEBRAIC EXPRESSIONS

1. a) $2a - 2b + 3$ b) $2(4x + 5)(4x - 5)$
2. a) $\frac{1}{y^2}$ b) $\frac{n+3}{(n-3)(n-2)}$ c) $2x - 6$
3. a) $c^2 + 6c + 9$ b) $2(3 + x)(3 - x)$
4. a) $\frac{-1}{a+b}$ b) $\frac{8n^2}{9c}$ c) $\frac{x-5}{(x+1)(x-1)}$
5. a) $x + 16y$ b) $5(x + 1)(x - 1)$
6. a) $\frac{t}{12s^2v}$ b) $\frac{11-5x}{(2x-5)(x-3)}$
7. a) $5x - 4y$ b) $ay(x + 2y)(x - 2y)$
8. a) $\frac{4y}{x}$ b) $2x - 4$ c) $\frac{3x+7}{(x-4)(5x-1)}$
9. a) $-b$ b) $\left(\frac{x}{2y} - \frac{1}{3}\right)\left(\frac{x}{2y} - \frac{1}{3}\right)$
10. a) $\frac{m+1}{m}$ b) $\frac{q}{p}$ c) $\frac{13-7x}{(5x-2)(x+3)}$
11. a) $5a + 15 - a^2$ b) $\frac{1}{x+1}$
12. a) $\frac{1}{12a}$ b) $\frac{4x+3}{(2x-1)(3x+1)}$
13. a) $4(x + 2y)(x - 2y)$ b) $\frac{26-5r}{(3r-2)(r+5)}$ c) $\frac{6c}{a}$
14. a) $9m - 15n$ b) $(2x + 5)(x - 3)$
15. a) $(x - y)(5p + 3q)$ b) $\frac{2y-5}{y-1}$ c) $\frac{2x+16}{(x-2)(x+3)}$
16. a) $h - k$ b) $(2x - 3)(x + c)$ c) $\frac{8-7b}{(b-2)(1-2b)}$
17. a) $6b - 5a$ b) $(5x + 4)(x - 1)$
18. a) $14y - 25$ b) $\frac{3y+1}{(2y-1)(3y-1)}$ c) $(a + 2b)(3p - 4q)$
19. a) $3x^2 - 2x - 11$ b) $3(y + 2)(y - 2)$ c) $\frac{ax-3a}{(x-1)(x-2)}$
20. a) $\frac{1}{x-2}$ b) $\frac{-2x-1}{(2x-1)(x-1)}$
21. a) $(y + 2)(x + 3)(x - 3)$ b) $3(x + 1)(x - 1)$ c) $\frac{17-2x}{12}$ d) $x + 2y$

22. a) $5(1 + 2x)(1 - 2x)$ b) $\frac{14-6x}{(1-2x)(5+x)}$ c) $\frac{3y+4}{y+3}$
23. a) $\frac{1}{a+2}$ b) $\frac{x-3}{(2x-1)(3x-2)}$ c) $(n-k)(m-h)$
24. a) $2r - r^2$ b) $\frac{4-x}{15}$ c) $3x(1 + 2x)(1 - 2x)$

QUADRATIC EQUATIONS

1. a) $x = -3$ or $x = \frac{1}{2}$ b) $x = 0.95$ or $x = -2.75$
2. a) $x = 2$ or $x = -2$ b) $x = 1.47$ or $x = -1.14$
3. a) $x = 3$ or $x = -2$ b) $x = 4.45$ or $x = -0.45$
4. a) $x = \frac{1}{2}$ or $x = -1$ b) $x = 3.44$ or $x = -0.44$
5. $z = 2.18$ or $z = 0.15$
6. a) $x = 0$ or $x = 3$ b) $x = 1.83$ or $x = -3.83$
7. a) $x = 1.45$ or $x = -3.45$ b) $x = -0.64$ or $x = -1$
8. a) $y = 0$ or $y = 6.5$ b) $y = 0.16$ or $y = -3.16$
9. $x = 5$ or $x = -1$
10. a) $m = 0.29$ or $m = -0.69$ b) $x = -0.35$ or $x = -5.65$
- c) $x = 1.11$ or $x = -3.61$ d) $x = 1.30$ or $x = -0.13$
- e. $x = 1.14$ or $x = -6.14$ f) $x = 0.62$ or $x = -1.62$
- g) $x = 0.69$ or $x = -0.29$ h) $x = 1.78$ or $x = -0.28$
- i) $x = 1.74$ or $x = -5.74$ j) $p = 0.19$ or $p = -2.69$
- k) $x = 0.77$ or $x = -0.43$ l) $y = 1.55$ or $y = -3.23$
- m) $x = 0.19$ or $x = -2.69$ n) $x = 1.26$ or $x = -0.26$

CIRCLE THEOREMS

1. a) $\hat{ADE} = 40^\circ$ b) $\hat{DAE} = 70^\circ$ c) $\hat{BAD} = 50^\circ$
2. a) $\hat{ADC} = 60^\circ$ b) $\hat{ABC} = 120^\circ$ c) $\hat{DEC} = 30^\circ$
3. a) $\hat{RWX} = 44^\circ$ b) $\hat{XVW} = 44^\circ$ c) $\hat{YXW} = 93^\circ$
4. a) Angles in the semi-circle are right angles ($\angle ACD = 90^\circ$). AD is a diameter.
 b. i) $\hat{ACF} = 20^\circ$ ii) $\hat{DEF} = 110^\circ$
5. a) $\hat{CBO} = 33^\circ$ b) $\hat{ACD} = 48^\circ$ c) $\hat{AXB} = 75^\circ$
6. a) $\hat{PRS} = 26^\circ$ b) $\hat{PRQ} = 48^\circ$ c) $\hat{PTQ} = 22^\circ$
7. i) $\hat{GOD} = 42^\circ$ ii) $\hat{GFE} = 48^\circ$ iii) $\hat{GED} = 69^\circ$ iv) $\hat{BCD} = 42^\circ$
8. i) $\hat{CDE} = 62^\circ$ ii) $\hat{CDB} = 75^\circ$ iii) $\hat{DAC} = 15^\circ$
9. i) $\hat{QUS} = 120^\circ$ ii) $\hat{VQP} = 70^\circ$ iii) $\hat{PTR} = 60^\circ$ iii) $\hat{SOQ} = 240^\circ$ iv) $ST = 14.5$
10. i) $\hat{ACB} = 30^\circ$ ii) 99° iii) $\hat{DAQ} = 30^\circ$ iv) $\hat{CAQ} = 81^\circ$
11. i) $\hat{ADB} = 43^\circ$ ii) $\hat{CAD} = 16^\circ$ iii) $\hat{DCE} = 63^\circ$
12. i) $\hat{QPS} = 40^\circ$ ii) $\hat{QRS} = 140^\circ$ iii) $\hat{AQP} = 70^\circ$ iv) $\hat{SOQ} = 80^\circ$
13. i) $\hat{OCA} = 35^\circ$ ii) $\hat{ACB} = 35^\circ$ iii) $\hat{ABC} = 125^\circ$
14. i) $\hat{PRQ} = 90^\circ$ ii) $\hat{RSP} = 135^\circ$ iii) $\hat{QRM} = 45^\circ$ iv) $\hat{SRN} = 22.5$ v) $PQ = 7.07$
15. i) $\hat{ACB} = 59^\circ$ ii) $\hat{ATB} = 62^\circ$
16. i) $\hat{BCT} = 23^\circ$ ii) $\hat{BAD} = 70^\circ$ iii) $\hat{ABD} = 55^\circ$ iv) $\hat{DMC} = 86^\circ$
17. i) $\hat{BAC} = 45^\circ$ ii) $\hat{BCD} = 105^\circ$ iii) $\hat{OBD} = 15^\circ$ iv) $\hat{OBC} = 45^\circ$
18. i) $\hat{BOD} = 50^\circ$ ii) $\hat{CBD} = 25^\circ$ iii) $\hat{DBF} = 133^\circ$
19. i) 96° ii) $\hat{ABC} = 90^\circ$ $\hat{ODB} = 12^\circ$
20. i) $x = 130^\circ$ ii) $\hat{BCE} = 75^\circ$ iii) $\hat{ODF} = 90^\circ$ iv) $\hat{BFD} = 30^\circ$
21. i) $\hat{BFD} = 55^\circ$ ii) $\hat{DBC} = 55^\circ$ $\hat{FED} = 123^\circ$ $\hat{FDB} = 68^\circ$
22. a) $\hat{RTS} = 28^\circ$ b) $\hat{BPR} = 62^\circ$ c) $\hat{SPT} = 59^\circ$ d) $\hat{PRQ} = 31^\circ$
23. i) $\hat{ADC} = 65^\circ$ ii) $\hat{OAC} = 25^\circ$ iii) $\hat{ABC} = 115^\circ$ iv) $\hat{ATC} = 50^\circ$
24. i) $\hat{QSU} = 21^\circ$ ii) $\hat{RPS} = 47^\circ$ iii) $\hat{QPS} = 68^\circ$ iv) $\hat{RUQ} = 91^\circ$
25. i. a) $\hat{SOR} = 72^\circ$ b) $\hat{QRX} = 54^\circ$ c) $\hat{STY} = 18^\circ$

ii) Triangle SPR or triangle RQS

26. i) $\angle AOB = 72^\circ$ ii) $\angle AED = 120^\circ$ iii) $\angle AFC = 66^\circ$ iv) $\angle OBD = 12^\circ$
27. i) $\angle ADE = 38^\circ$ ii) $\angle DAC = 10^\circ$ iii) $\angle AED = 100^\circ$

Only what is destined to happen, happens....

Mr. Mununga. J