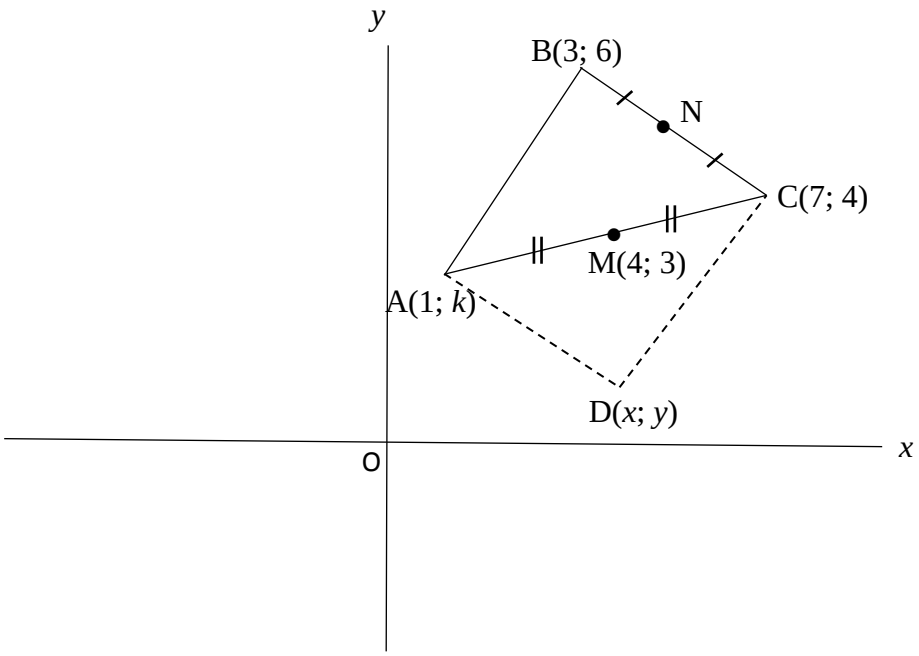
AMAJUBA DISTRICT MATHS

REVISION MATERIAL GR. 11 MATHEMATICS 2019
ANALYTICAL GEOMETRY

MARCH 2014 KZN

QUESTION THREE

In the figure below A(1; *k*), B(3; 6) and C(7; 4) are the vertices of a triangle ABC with M(4; 3) and N the midpoints of AC and BC respectively.



Use the figure above and answer the questions that follow:

3.1 Show that $k = 2$. (3)

3.2 Prove that MN = ½ AB (5)

3.3 If BA is produced to cut the *x*-axis at E, calculate the inclination of line BAE. (4)

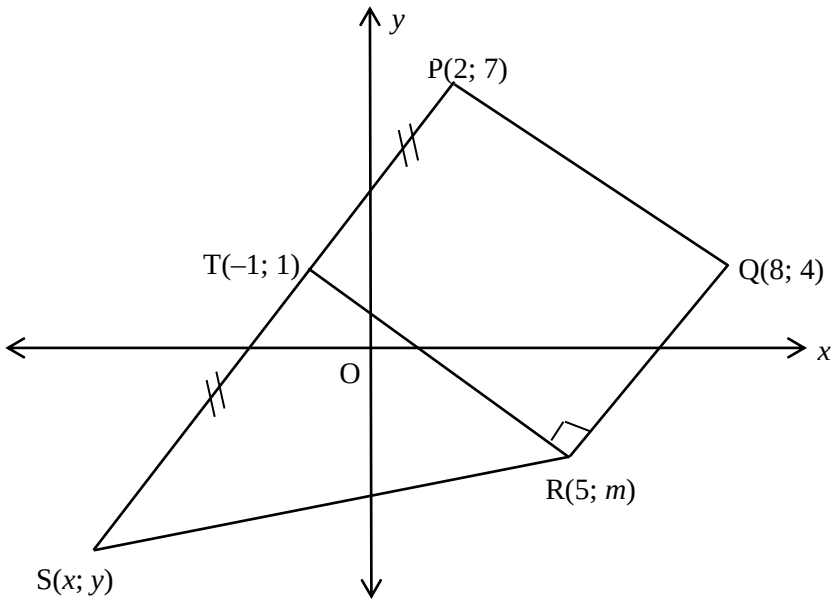
3.4 If D (*x*; *y*) is a point such that ABCD is a parallelogram, calculate the co-ordinates of D. (4)

3.5 Calculate the equation of the line through D perpendicular to AC. (4)

JUNE 2014 KZN

QUESTION ONE

P(2; 7), Q(8; 4), R(5; *m*) and S are the vertices of a quadrilateral and TR ⊥ QR.
T (–1; 1) is the midpoint of PS.



1.1 Determine the co-ordinates of S. (3)

1.2 If PS // QR, calculate the value of ***m.*** (3)

1.3 What type of quadrilateral is PQRS? (1)

1.4 Prove that ΔPQT is isosceles. (4)

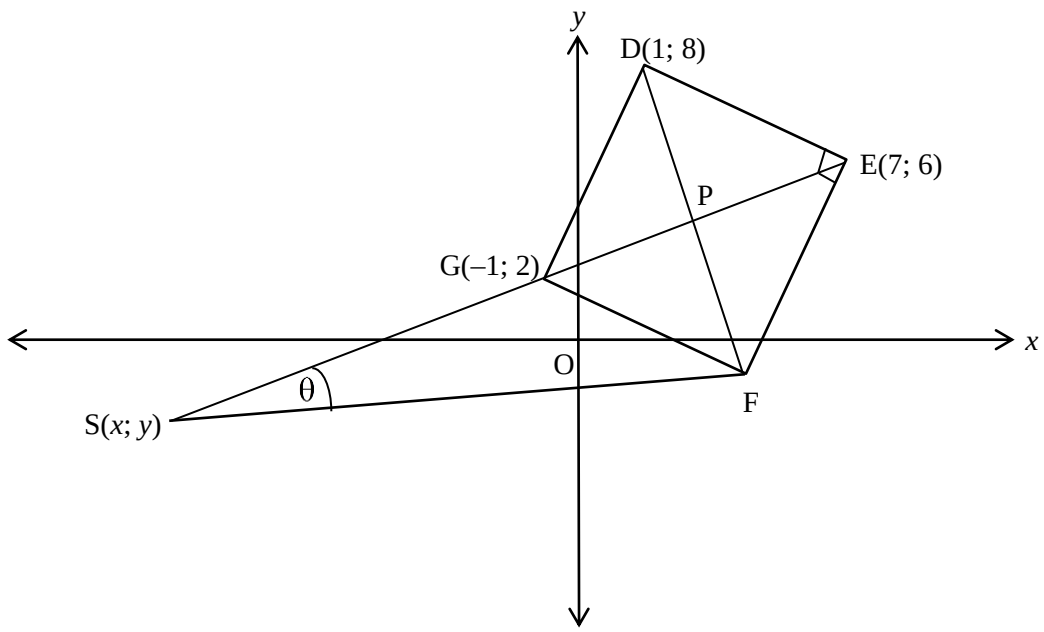
1.5 Calculate the area of quadrilateral PQRS. (5)
[16]

JUNE 2014

QUESTION TWO

In the figure the diagonals EG and DF of square DEFG intersect at P.

The co-ordinates of E(7; 6), G(–1; 2) and D(1; 8) is given.



2.1 Calculate the gradient of GE. (3)

2.2 Complete: The diagonals of a square …… (2)

2.3 Calculate the co-ordinates of P. (3)

2.4 Show that the equation of DF is given by $y + 2x - 10 = 0$ (5)

2.5 Determine the co-ordinates of F. (3)

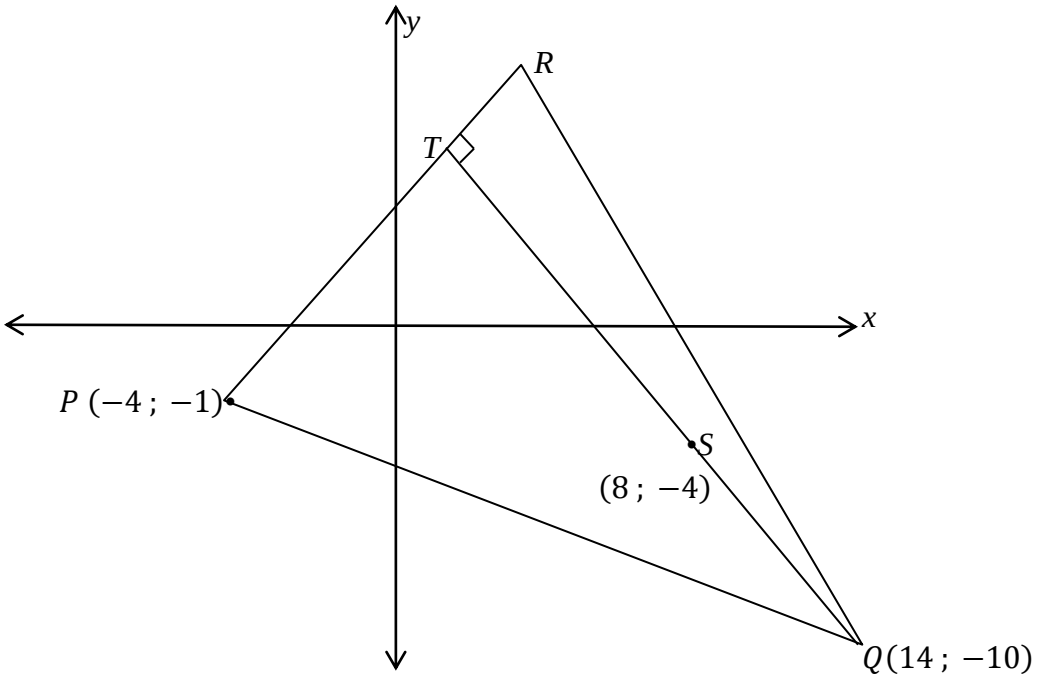
2.6 If EG is produced to S and SF is joined. The gradient of SF is $\frac{1}{4}$, calculate angle θ. (4)

2.7 If the square is reflected in the x-axis, determine the co-ordinates of P'. (2)

[22]

NOVEMBER 2014 *Grosvenor Girls' High*

Question 3.



In the diagram above, R , $P\,(-4\,;\,-1)$ and $Q\,(14\,;\,-10)$ are the vertices of a triangle. $QT \perp PR$. The point $S\,(8\,;\,-4)$ lies on QT. The equation of the line QR is $4x + 5y - 30 = 0$.

3.1 Calculate the gradient of QS. (2)

3.2 Hence write down the gradient of PR. (2)

3.3 Determine the equation of PR in the form $y = mx + c$. (2)

3.4 The point $G\,(p\,;\,-5)$ lies on PQ. Calculate the value of p. (3)

3.5 Calculate the co-ordinates of R. (5)

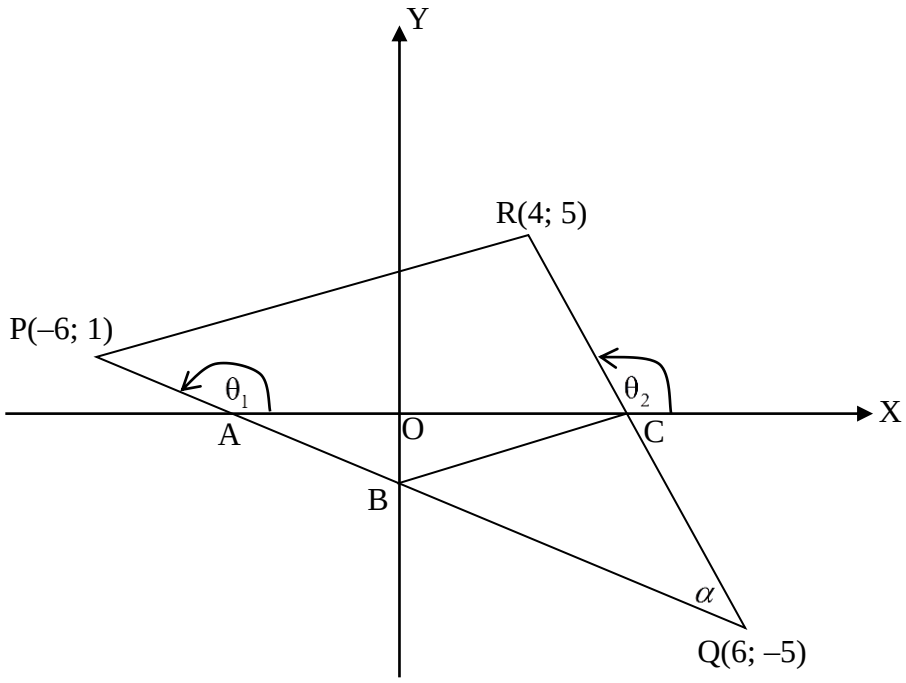
MARCH 2015 KZN
QUESTION FOUR

P(–6; 1), Q(6; –5) and R(4; 5) are the co-ordinates of Δ PQR .
C is the midpoint of QR. A, B and C are the intercepts of lines PQ and QR respectively.

$B\hat{Q}C = \alpha$

$P\hat{A}X = \theta_1$ and

$R\hat{C}X = \theta_2$



4.1 Calculate the co-ordinates of C, the midpoint of QR. (2)

4.2 Determine the gradient of PQ. (2)

4.3 Determine the equation of PQ. (3)

4.4 Calculate the distance PR. (leave your answer in simplified surd form). (3)

4.5 Hence, or otherwise, show that PR = 2.BC. (3)

4.6 Prove BC // PR. (3)

4.7 Calculate the size of $\boldsymbol{\alpha}$. (5)

4.8 Determine the equation of a line passing through P, and is perpendicular to PQ. (4)
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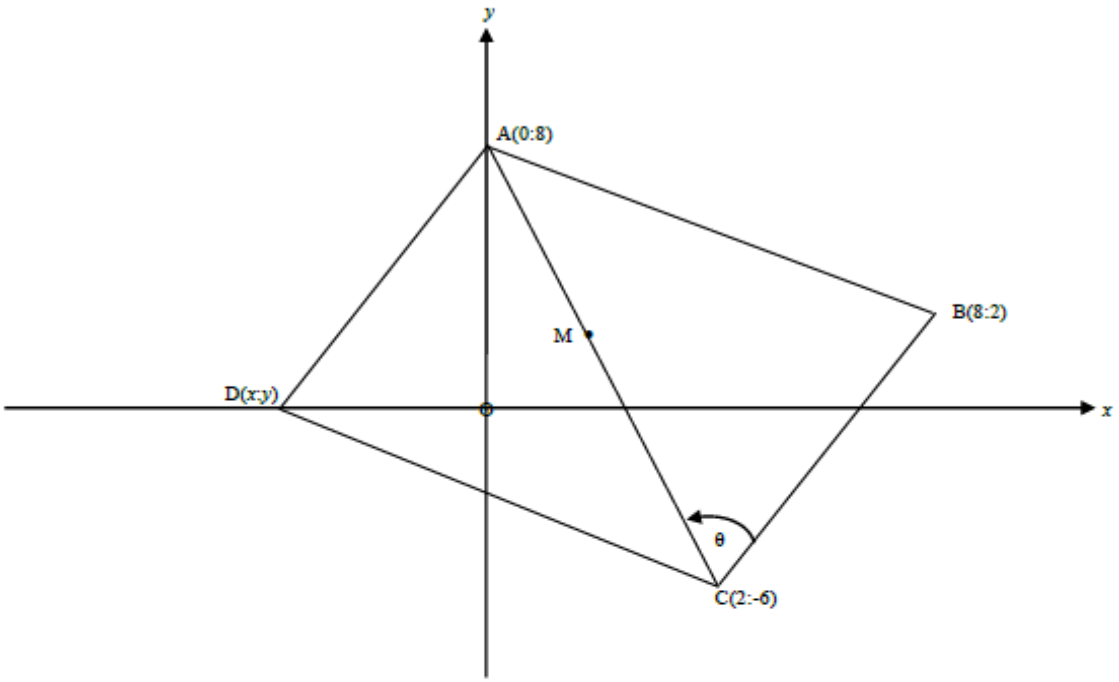
QUESTION ONE

1.1 In the diagram below A(0;8), B(8;2), C(2;-6) and D $(x\,;y)$ are the vertices of a parallelogram. M is the midpoint of AC. $A\hat{C}B = \theta$.



1.1.1 Calculate the lengths of AB and BC. (4)

1.1.2 Determine the coordinates of M. (3)

1.1.3 Prove that BM is perpendicular to AC. (4)

1.1.4 Prove that $A\hat{B}C = 90°$ (4)

1.1.5 What type of triangle is ΔABC? (2)

1.1.6 Determine the area of Δ ABC.

1.1.7 Determine the equation of BM in the form $y = mx + x$.

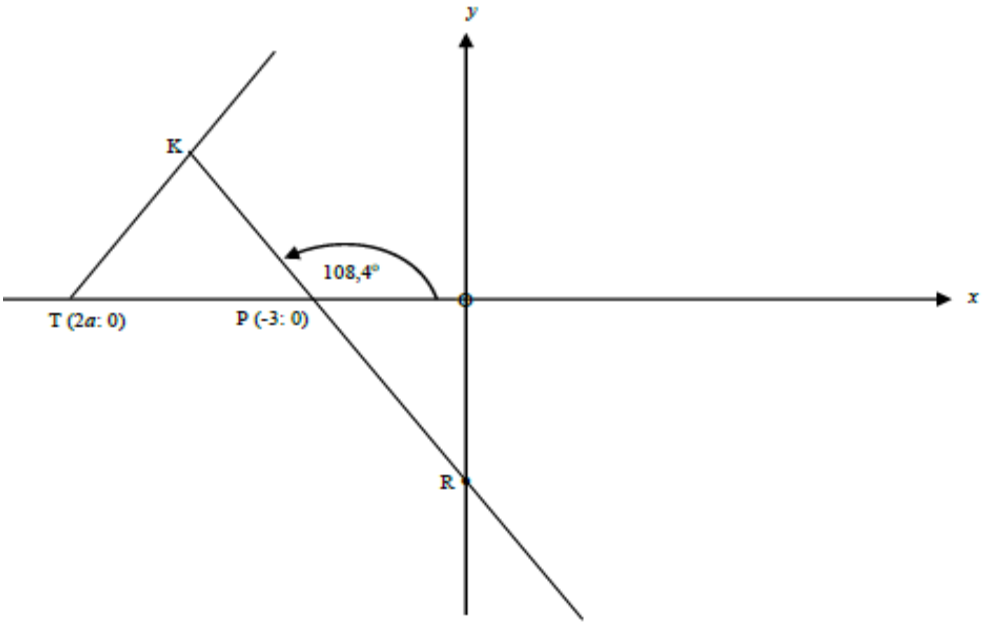
1.1.8 Calculate the size of angle θ . (4)

1.1.9 Determine the coordinates of D. (2)

1.2 Prove that the point (-4;11) lies on the line $3x + 4y = 32$ (3)

1.3 Given the points P(6;5); Q(3;2); R $(2m\,;\,m+4)$ and T $\left(\frac{5}{2}\,;\,\frac{1}{2}\right)$. Calculate the value of m if PQ is parallel to RT. (4)

1.4 In the diagram below P is a point (-3;0) and T is $(2a\ ;\ 0)$. The inclination of the line PR is 108,4° and R is the y-intercept of PR.



Calculate:

1.4.1 the gradient of PR, to the nearest integer value. (2)

1.4.2 the equation of PR in the form $y = mx + c$. (2)

1.4.3 the coordinates of R. (2)

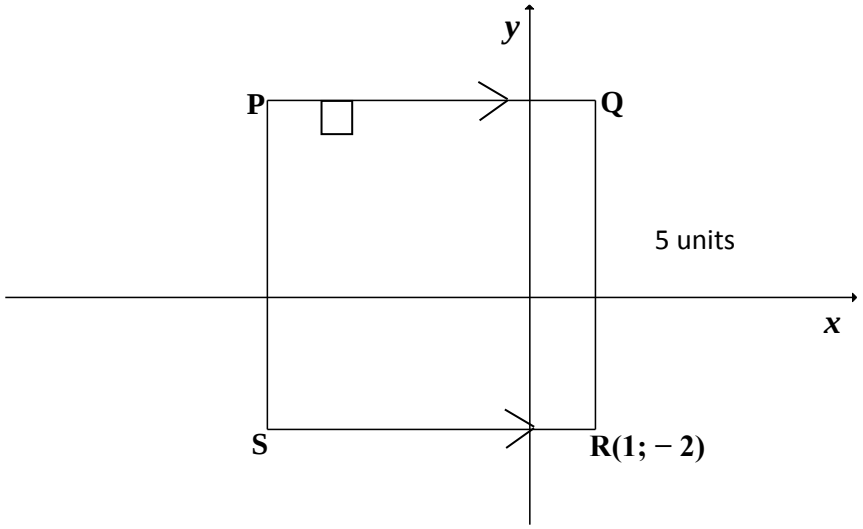
1.4.4 If $T(2a\ ;\ 0)$; $Q\ (a;b)$ and R lie on the same straight line.

Prove that $b = \frac{-9}{2}$ (4)

[45]

JUNE 2016 KZN
QUESTION 1

1.1 In the diagram below PQRS is a square with sides of 5 units. The coordinates of R is $(1; -2)$. PQ is parallel to the *x*-axis.



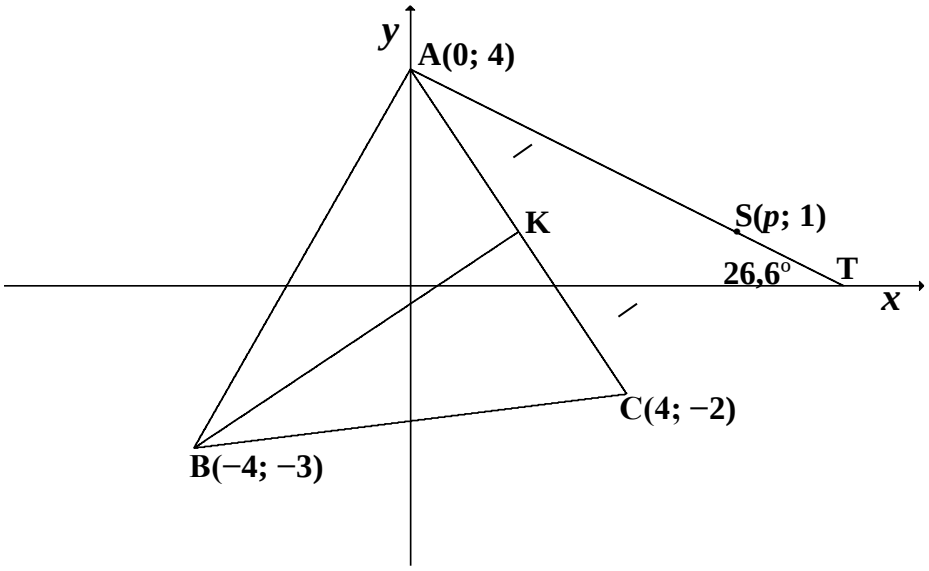
1.1.1 Write down the coordinates of Q. (1)

1.1.2 Write down the coordinates of S. (1)

1.1.3 Write down the equation of PQ. (1)

1.1.4 Write down the equation of QR. (1)

1.2 In the sketch below $A(0;4)$, $B(-4;-3)$ and $C(4;-2)$ are the vertices of ΔABC.
K is the midpoint of AC. AT is drawn with T a point on the *x*-axis, such that the acute angle between AT and the *x*-axis is equal to $26,6^\circ$. S(*p*; 1) is a point on AT.



1.2.1 Determine the coordinates of point K. (2)

1.2.2 Calculate the length of AC, correct to 2 decimal places. (2)

1.2.3 Calculate the gradients of BK and AC and then show that $B\hat{K}C = 90^\circ$. (5)

1.2.4 Determine the equation of line BK. (3)

1.2.5 Calculate the area of ΔABC, correct to 2 decimal places. (5)

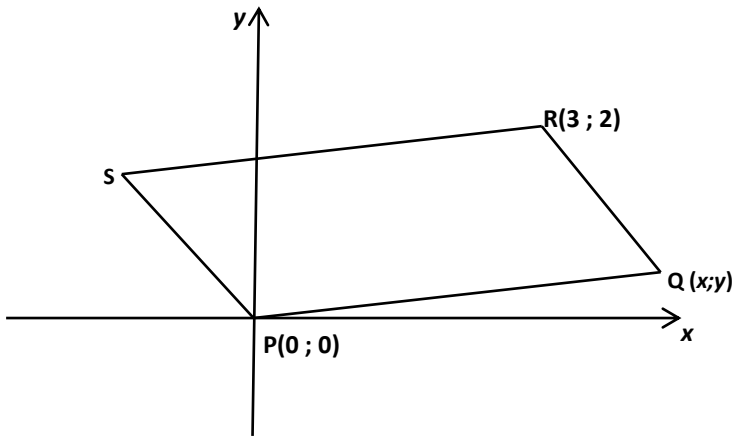
1.2.6 Calculate the value of *p*. (5)

[26]

QUESTION 2

2.1 PQRS is a parallelogram. The equation of PQ is $y = \frac{1}{4}x$.

The gradient of SP is equal to –1. R is the point (3; 2).



2.1.1 Write down the gradient of RQ. (1)

2.1.2 Determine the equation of RQ. (2)

2.1.3 Calculate the coordinates of point Q. (4)

2.1.4 Calculate the size of $\mathbf{S\hat{P}Q}$. (5)

2.2 Given A (6; 7), B (0; – 1) and C (4; *p*).

Calculate

2.2.1 The length of **AB**. (2)

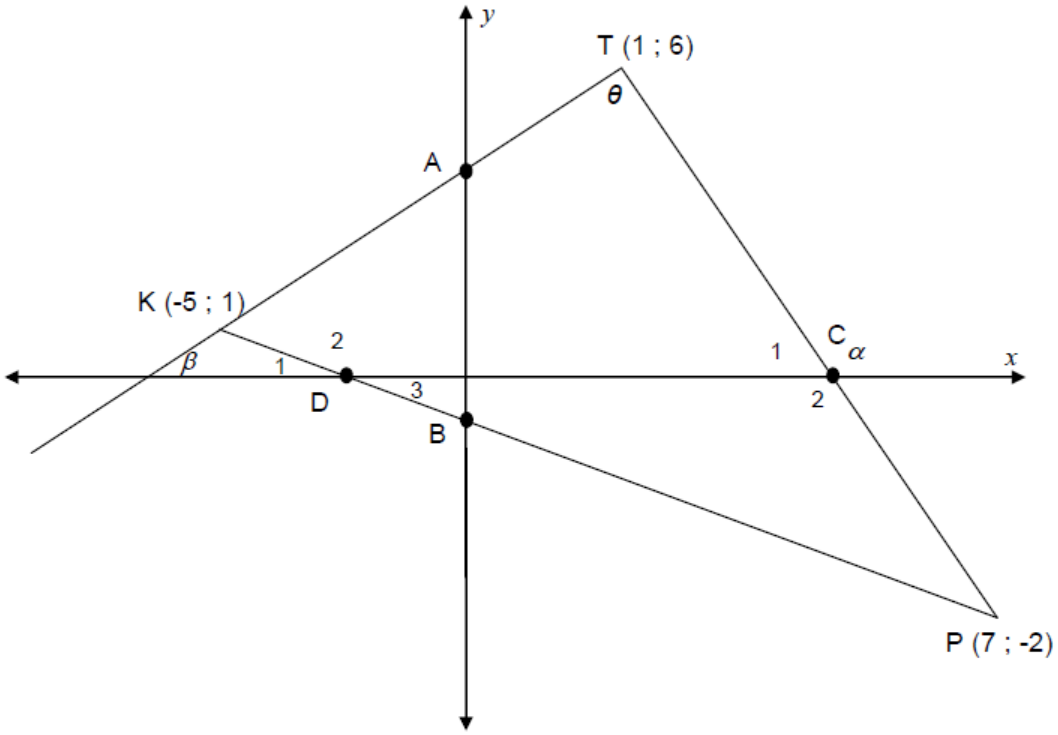
2.2.2 The value of ***p*** if **AB = 2 BC**, $p < 0$ (5)

[19]

GAUTENG JUNE 2016

QUESTION 1

In the diagram below, K(-5 ; 1) , P(7 ; -2) and T(1 ; 6) are the vertices of ΔKTP. A and B are points on the *y*-axis and C and D are points on the *x*-axis.



1.1 Calculate the length of KT. (Leave the answer in simplest surd form.) (3)

1.2 Determine the equation of line KP in the form $y = mx + c$. (3)

1.3 Calculate the length of AB. (4)

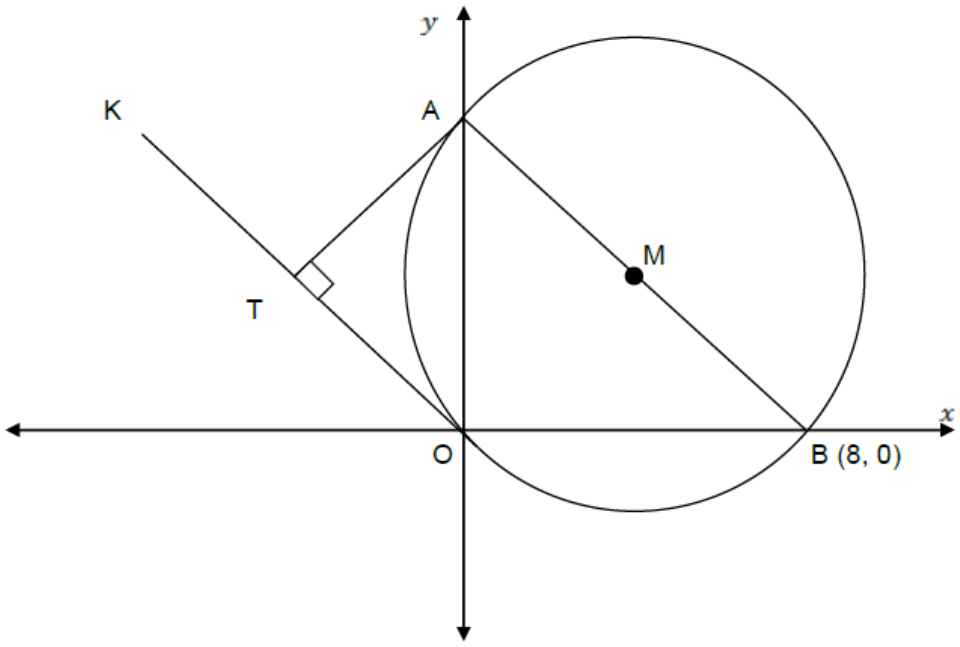
1.4 Calculate the size of $K\hat{T}P$. (6)

[16]

GAUTENG JUNE 2016

QUESTION 2

In the diagram below, the circle with centre M passes through the origin. AB is the diameter of the circle with B(8 ; 0).



2.1 Calculate the x-co-ordinate of Point M. (4)

2.2 Calculate the co-ordinates of Point A, the other y-intercept of the circle with centre M(4 ; 2). (3)

2.3 Determine the equation of the line OK which is parallel to AB. (3)

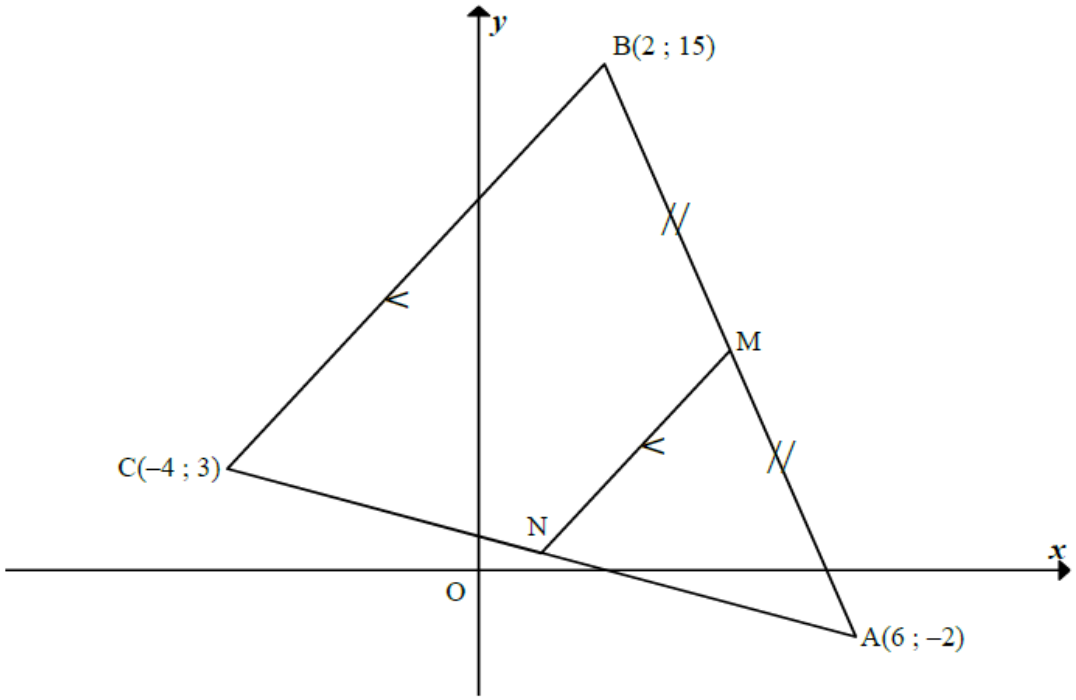
2.4 Determine the x-co-ordinate of T which lies on line OK, such that AT is the shortest distance from A to line OK. (4)

[14]

NOVEMBER 2016

QUESTION 3

In the diagram, A(6 ; – 2), B(2 ; 15) and C(– 4 ; 3) are the vertices of ΔABC.
M is the midpoint of AB. N is a point on CA such that MN || BC.



3.1 Determine the coordinates of M, the midpoint of AB. (2)

3.2 Determine the gradient of line MN. (3)

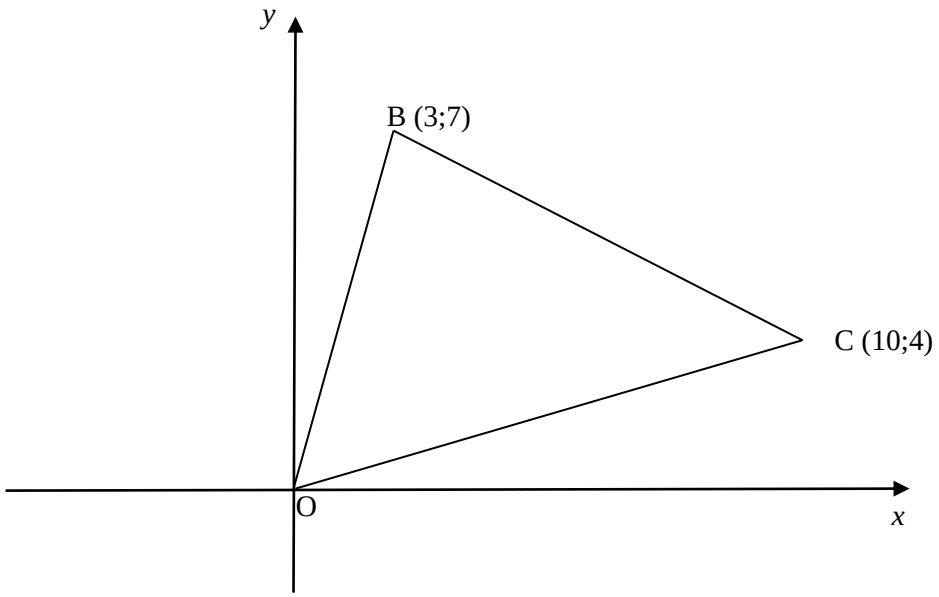
3.3 Hence, or otherwise, determine the equation of line MN, in the form $y = mx + c$. (2)

3.4 Calculate, with reasons, the coordinates of point N. (4)

3.5 If ABCD (in that order) is a parallelogram, determine the coordinates of point D. (4)
[15]

JUNE 2017 KZN
QUESTION 1

In the diagram below, BCO is a triangle. The coordinates of B and C are B (3;7) and C(5;6) .



1.1 Calculate the lengths of BO and BC (Leave your answer in surd form) (4)

1.2 Determine the gradients of BO and BC. (4)

1.3 Prove that $O\hat{B}C = 90^0$ (2)

1.4 Calculate the area of ΔBCO (2)

1.5 Calculate the coordinates of D, the midpoint of BC. (2)

1.6 Find the equation of a line in the form $ax + by + c = 0$ passing through the point (5; 2),

1.6.1 parallel to BO (5)

1.6.2 perpendicular to CO. (5)

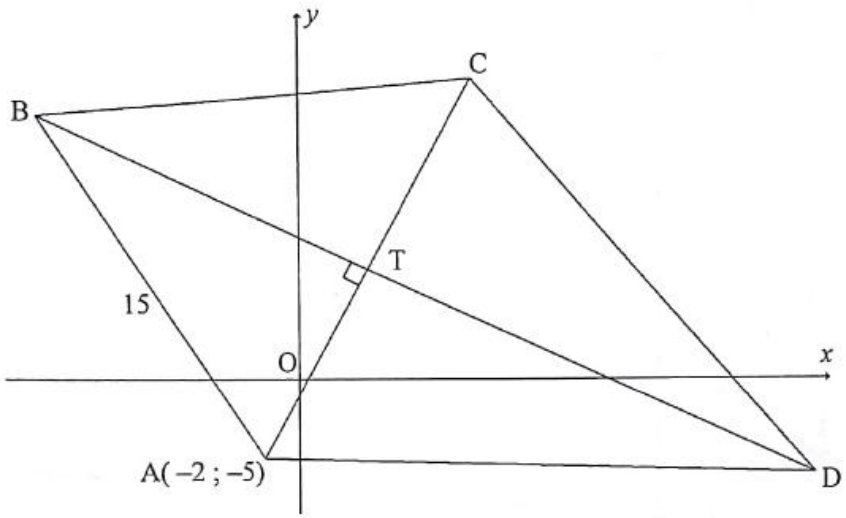
1.7 Hence, show that point D lies on the line in 1.6.1 (2)

[26]

NOVEMBER 2017 DBE

QUESTION 3

A(–2 ; –5), B, C and D are the vertices of quadrilateral ABCD such that diagonal AC is perpendicular to diagonal BD at T.
The equation of BTD is given by $2y+x=18$ and AB = 15 units.



3.1 Determine the gradient of line AC. (2)

3.2 Determine the equation of AC in the form $y=mx+c$. (2)

3.3 If the equation of AC is $y=2x-1$, calculate the coordinates of T. (3)

3.4 If ABCD is a kite with AB = BC:

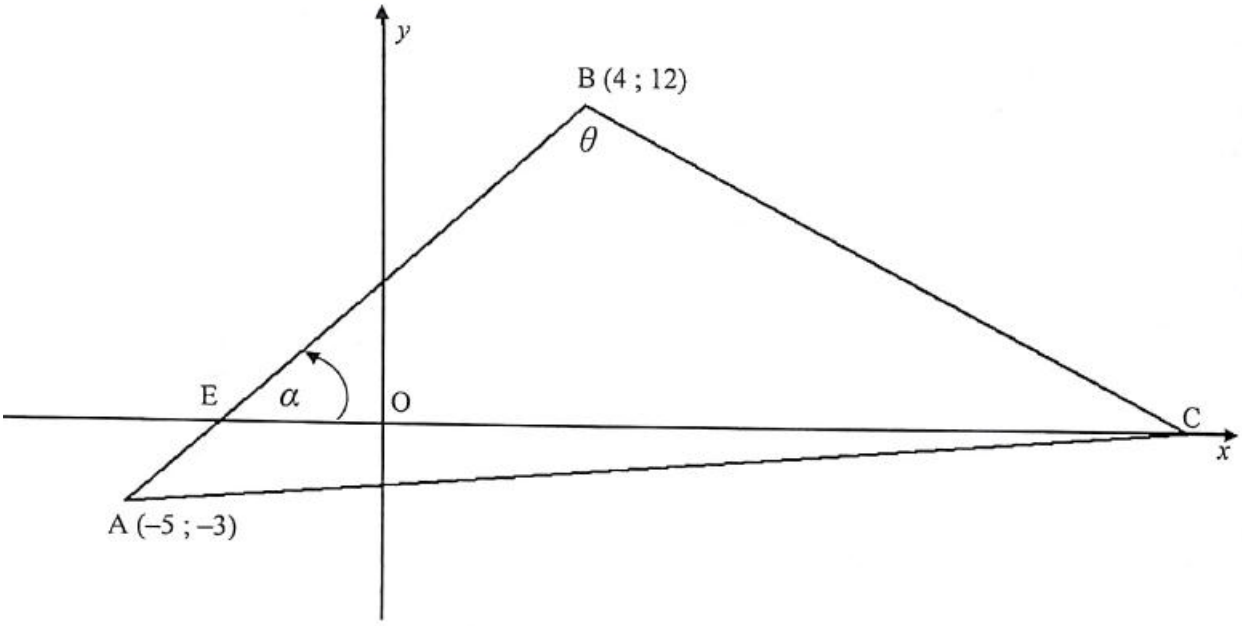
3.4.1 Determine the coordinates of C (2)

3.4.2 Calculate the length of BT (4)

3.4.3 Write down the length of the radius of the circle passing through points B, C and T (2)
[15]

QUESTION 4

C, a point on the x-axis, $A(-5\,;\,-3)$ and $B(4\,;\,12)$ are the vertices of a triangle.
AB intersects the x-axis at E.
$A\hat{B}C=\theta$ and $B\hat{E}C=\alpha$.



4.1 Calculate the gradient of AB. (2)

4.2 Determine the coordinates of point E. (3)

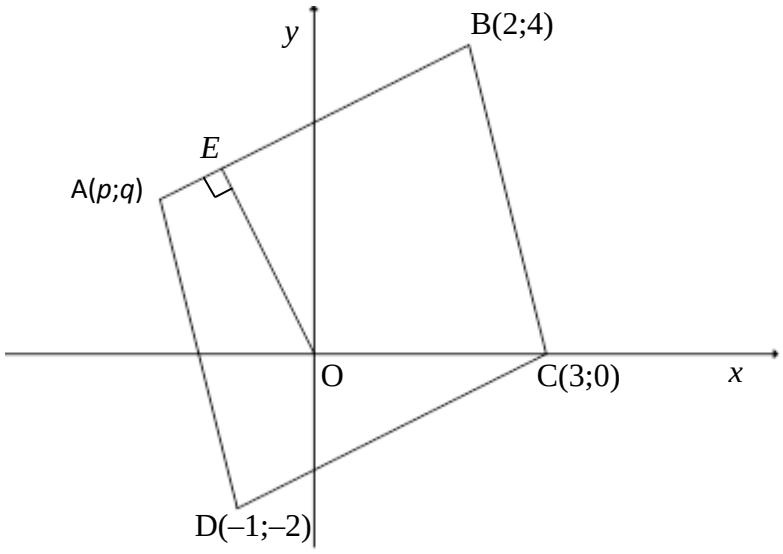
4.3 Determine the size of α. Round off to the nearest whole number. (2)

4.4 If $\theta=76°$, determine the equation of the line through A parallel to BC. (5)

[12]

MARCH KZN 2018
QUESTION 4

4.1 A(p;q), B(2;4), C(3;0) and D(–1; –2) are the vertices of parallelogram ABCD. O is the origin and OE is perpendicular to AB.



4.1.1 Calculate the length of DC. (leave your answer in surd form) (2)

4.1.2 Hence, write down the length of AB. (1)

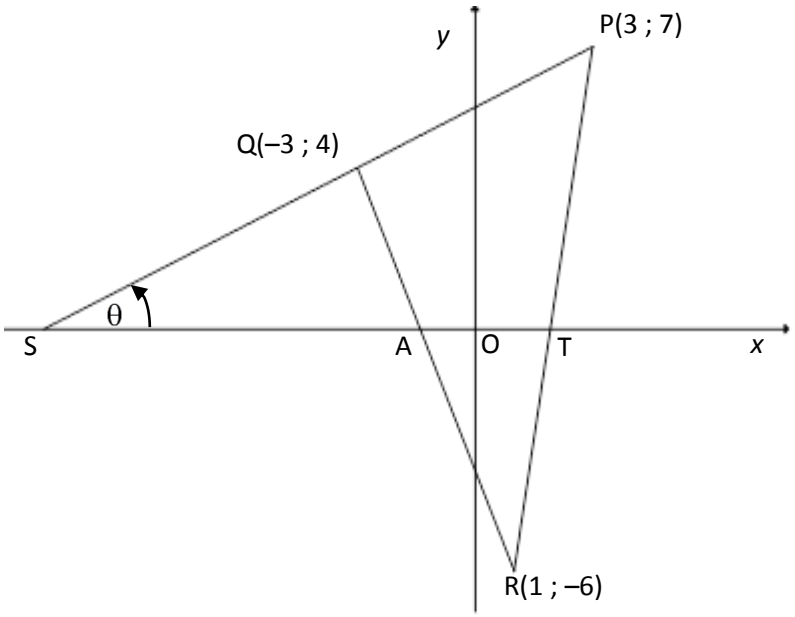
4.1.3 Calculate the values of p and q. (2)

4.1.4 Determine the equation of OE. (4)

4.1.5 Calculate the coordinates of E. (4)

MARCH KZN 2018

4.2 In the diagram P (3 ; 7), Q (–3 ; 4) and R (1 ; –6) are the vertices of a triangle. PQ is produced to cut the *x*-axis at S. PR cuts the *x*-axis at T. QR cuts the *x*-axis at A.



4.2.1 Calculate θ the angle of inclination of the line PS. (3)

4.2.2 Calculate the size of $R\hat{Q}S$. (4)

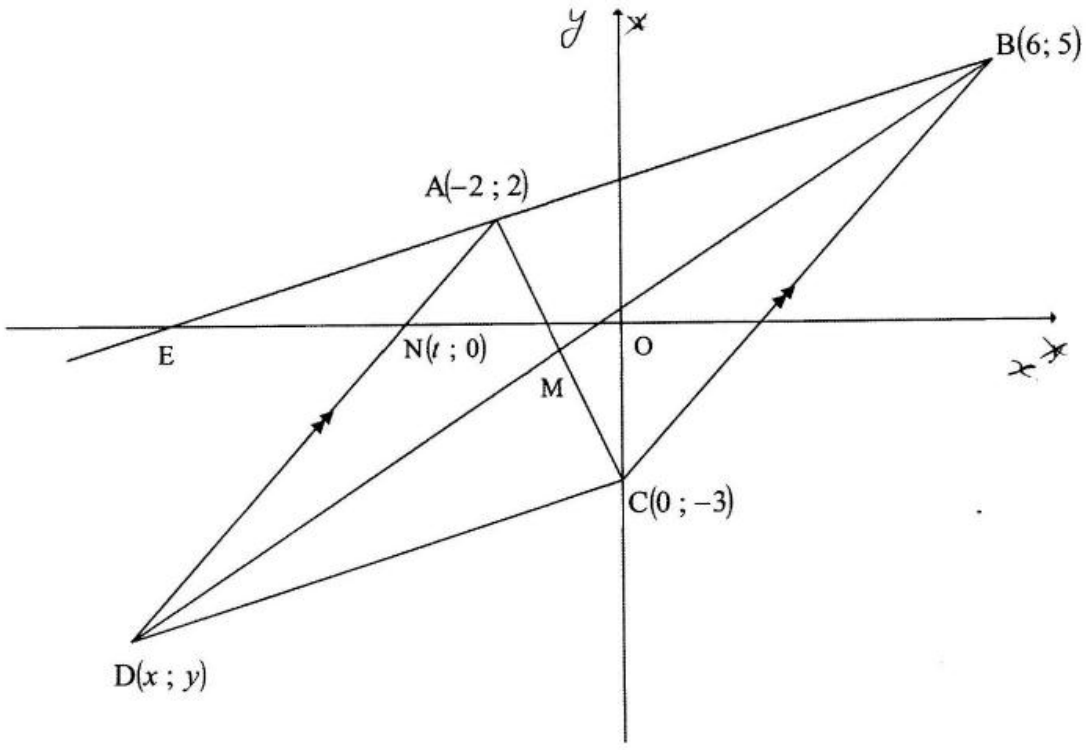
4.2.3 N is the point (3 ; –11). Are the points N, R and Q collinear? Justify your answer by means of calculations. (4)

[24]

NOVEMBER 2018 DBE

QUESTION 3

In the diagram, A(–2 ; 2), B(6 ; 5), C(0 ; –3) and D(x ; y) are the vertices of a quadrilateral having AD || BC. BA produced has an x-intercept at E. BD and AC intersect at M. N(t ; 0) is a point on AD.



3.1 Calculate the gradient of BC. (2)

3.2 Determine the equation of AD. (3)

3.3 Determine the value of t. (2)

3.4 Calculate the length of AN. (2)

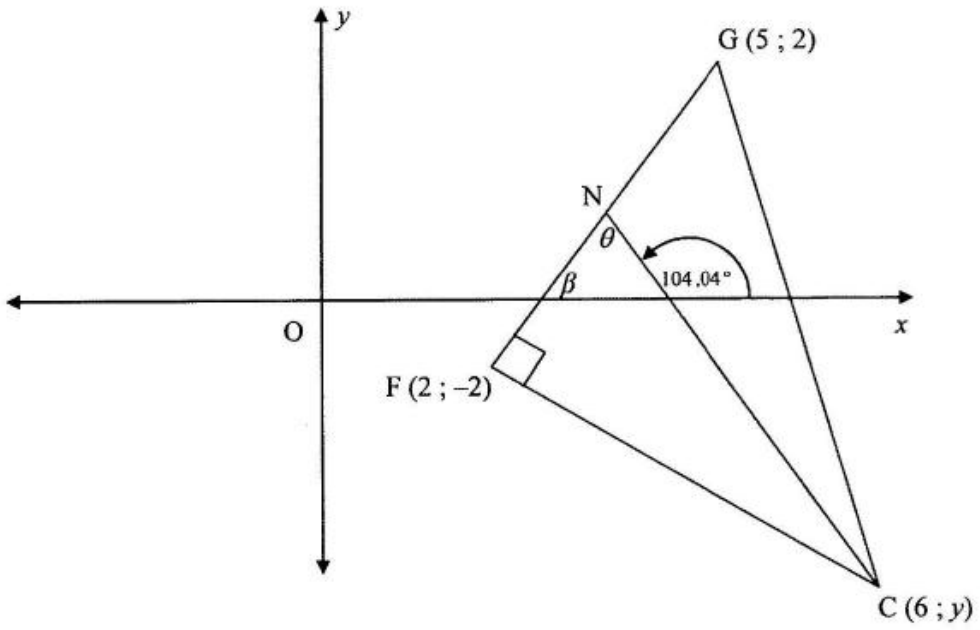
3.5 If DC is defined by $y=\frac{3}{8}x-3$, determine the coordinates of D. (4)

3.6 Prove that ABCD is a parallelogram. (3)

3.7 Calculate the coordinates of M. (3)
[19]

QUESTION 4

In the diagram, F(2 ; –2), G(5 ; 2) and C(6 ; y) are the vertices of ΔFGC. FG $\perp$ FC.
N is a point on FG such that the inclination of NC is 104,04°.
The angle of inclination of FG is β and $\hat{FNC} = \theta$.



4.1 Calculate the gradient of FG. (2)

4.2 Calculate the value of y. (3)

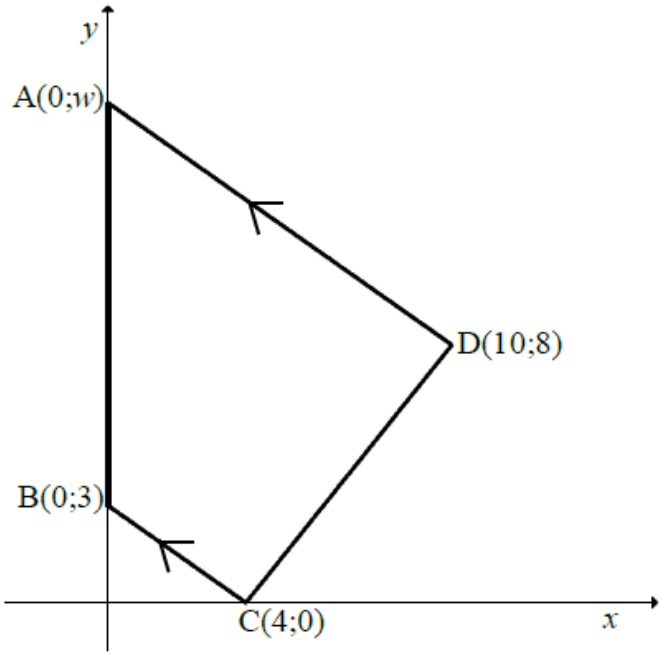
4.3 Calculate the size of θ. (3)

4.4 Calculate the length of NC. (4)
[12]

JUNE 2018 KZN

QUESTION 1

A(0 ; w), B(0 ; 3), C(4 ; 0) and D(10 ; 8) are the vertices of a quadrilateral in the Cartesian plane. AD is parallel to BC.



1.1

1.1.1 Calculate the gradient of CD. (2)

1.1.2 Hence, determine the angle of inclination of CD. (2)

1.2 Prove that $B\hat{C}D = 90^\circ$. (3)

1.3

1.3.1 Write down the gradient of AD. (1)

1.3.2 Hence, or otherwise, calculate the value of w. (3)

1.4 If it is given that $w = 15\frac{1}{2}$, calculate the length of AD. (3)

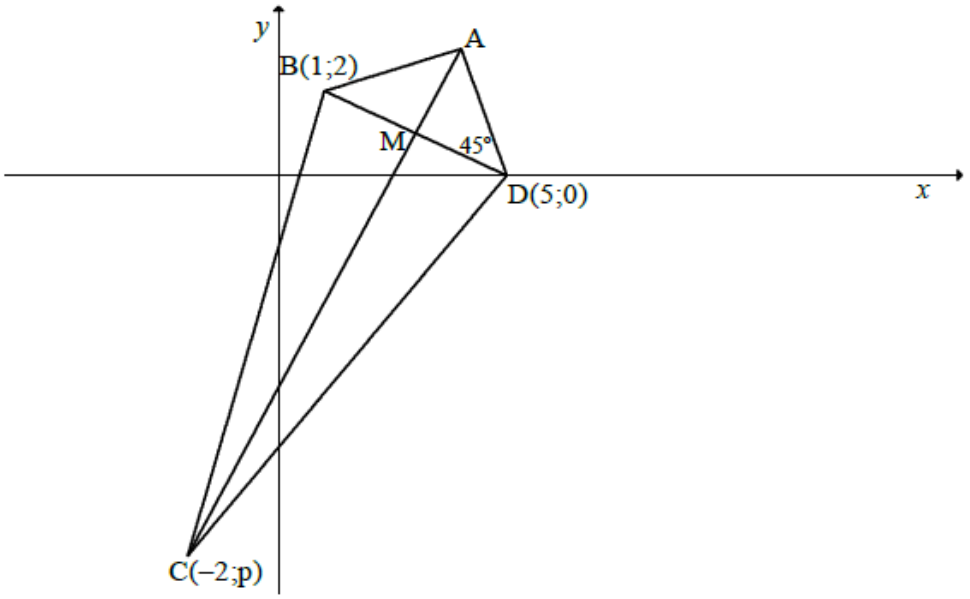
1.5 Calculate the area of quadrilateral ABCD. (6)

[20]

JUNE 2018 KZN

QUESTION 2

A, B(1 ; 2), C(–2 ; p) and D(5 ; 0) are the vertices of a KITE.
M is the point of intersection of the diagonals of the kite.
$A\hat{D}B = 45^{\circ}$.



2.1 Determine the coordinates of M. (4)

2.2 Calculate the value of p. (6)

2.3 If $p = -9$, determine the equation of AC. (5)

2.4 Determine the angle of inclination of AD. (5)

2.5 Determine the coordinates of A. (6)
[26]