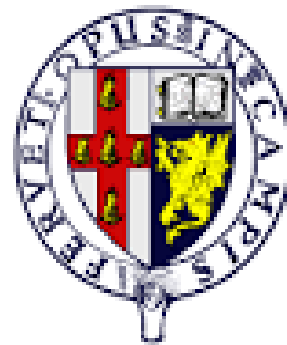


JAMAICA COLLEGE

C.S.E.C. MATHEMATICS MARATHON (PART TWO)

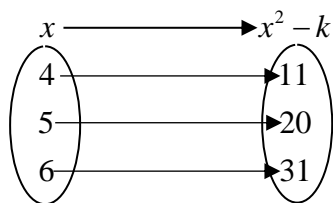
SUNDAY MAY 05, 2024

TEACHER: RICARDO BARKER



TRY THIS (January 2011)

1. The arrow diagram shown below represents the relation $f : x \rightarrow x^2 - k$, where $x \in \{3, 4, 5, 6, 7, 8, 9, 10\}$



Calculate the value of

- (a) k (2 marks)
- (b) $f(3)$ (2 marks)
- (c) x when $f(x) = 95$ (2 marks)

TRY THIS (May 2022)

2. The functions f and g are defined as follows:

$$f(x) = 5x + 7 \text{ and } g(x) = 3x - 1.$$

For the functions given above, determine

- (a) $g\left(\frac{1}{3}\right)$ (1 mark)
- (b) $f^{-1}(-3)$ (2 marks)

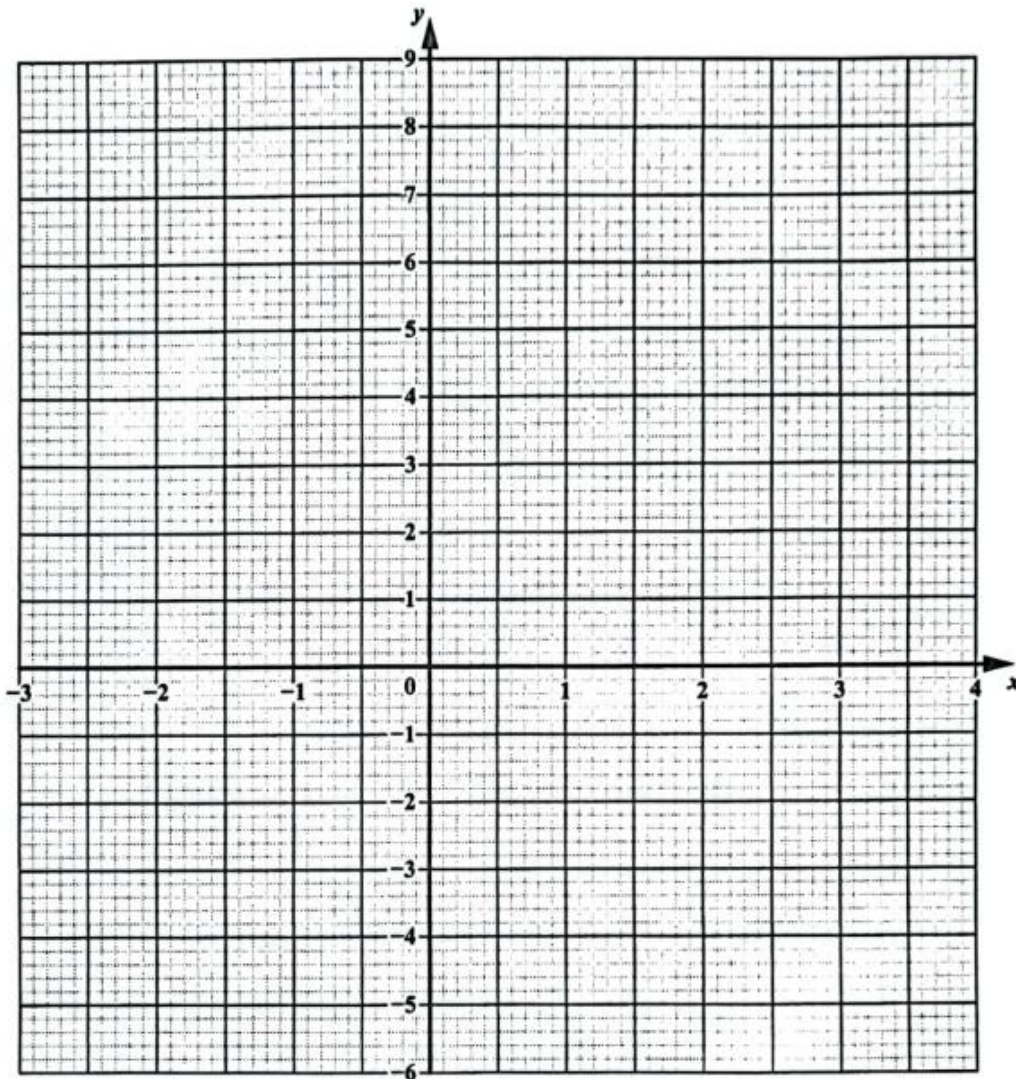
TRY THIS (May 2023)

3. (a) Complete the table for the function $y = -x^2 + x + 7$.

x	-3	-2	-1	0	1	2	3	4
y		1		7		5		-5

(2 marks)

(b) On the grid below, draw the graph of $y = -x^2 + x + 7$ for $-3 \leq x \leq 4$.



(3 marks)

(c) Write down the coordinates of the maximum/minimum point of the graph

(..... ,)

(1 mark)

(d) Write down the equation of the axis of symmetry of the graph

(1 mark)

(e) Use your graph to find the solutions of the equation $-x^2 + x + 7 = 0$

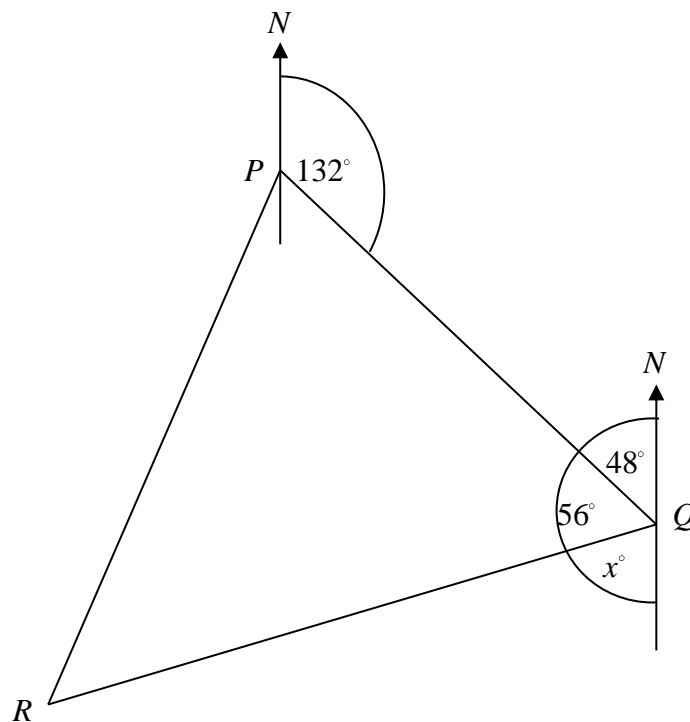
$x = \dots\dots\dots$ or $x = \dots\dots\dots$

(2 marks)

- (f) (i) On the grid above, draw a line through the points $(-3, -1)$ and $(0, 8)$ (1 mark)
- (ii) Determine the equation of this line in the form $y = mx + c$ (2 marks)

TRY THIS (May 2011)

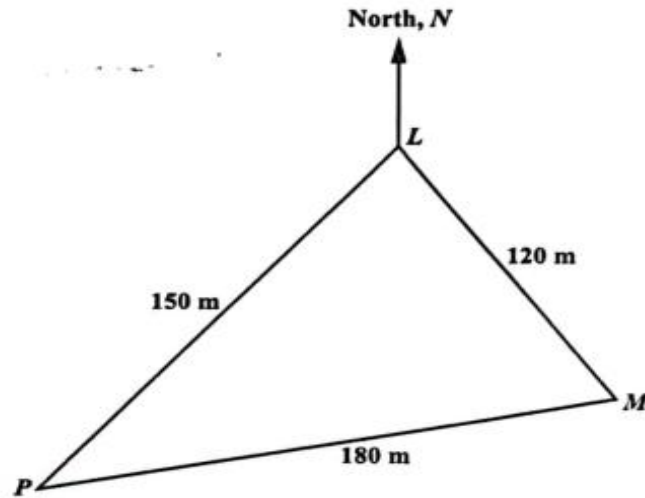
4. The diagram below, not drawn to scale, shows the route of an aeroplane flying from Portcity (P) to Queenstown (Q) and then to Riversdale (R). The bearing of Q from P is 132° and the angle PQR is 56° .



- (a) Calculate the value of x , as shown in the diagram (1 mark)
- (b) The distance from Portcity (P) to Queenstown (Q) is 220 kilometres and the distance from Queenstown to Riversdale (R) is 360 kilometres. Calculate the distance RP (3 marks)
- (c) Determine the bearing of R from P (3 marks)

TRY THIS (May 2023)

5. The diagram below shows a triangular field, LMP , on horizontal ground.



(a) Calculate the value of Angle MLP (3 marks)

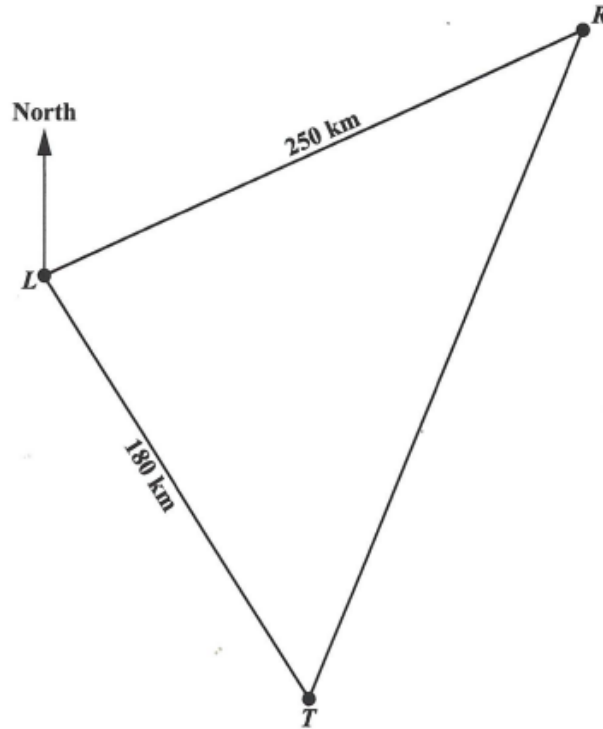
(b) The bearing of P from L is 210°

i) Find the bearing of M from L (1 mark)

ii) Calculate the value of Angle NLP and hence, find the bearing of L from P (2 marks)

TRY THIS (May 2022)

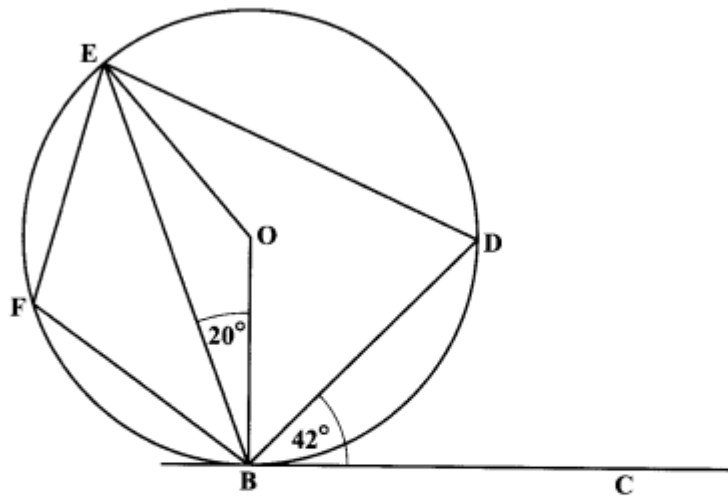
6. From a port, L , ship R is 250 kilometres on a bearing of 065° . Ship T is 180 kilometres from L on a bearing of 148° . This information is illustrated in the diagram below.



- (a) Complete the diagram above by inserting the value of angle RLT (1 mark)
- (b) Calculate RT , the distance between the two ships (2 marks)
- (c) Determine the bearing of T from R (3 marks)

TRY THIS #7 (May 2014)

The diagram below, **not drawn to scale**, shows a circle, centre O . The line BC is a tangent to the circle at B . Angle $CBD = 42^\circ$ and angle $OBE = 20^\circ$.

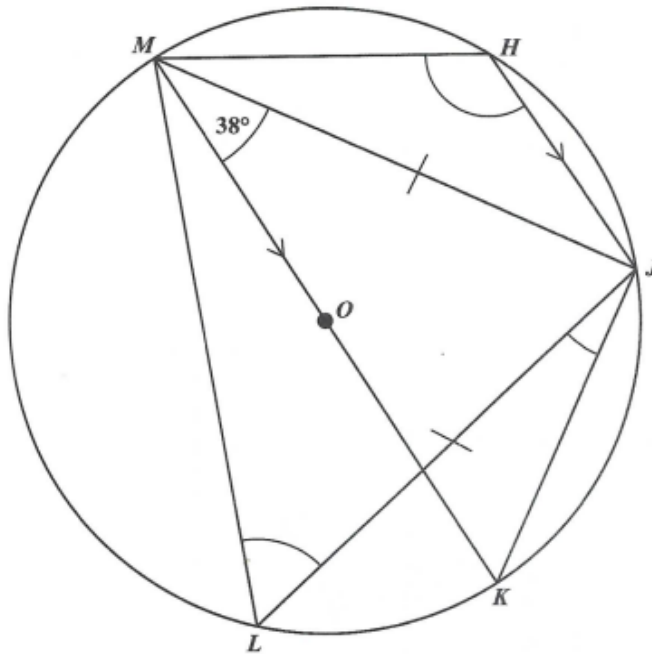


Calculate, giving a reason for EACH step of your answer, the measure of:

- (i) $\angle BOE$ **(2 marks)**
- (ii) $\angle OED$ **(2 marks)**
- (iii) $\angle BFE$ **(3 marks)**

TRY THIS #8 (May 2022)

H, J, K, L and M are points on the circumference of a circle with centre O . MK is a diameter of the circle and it is parallel to HJ . $MJ = JL$ and angle $JMK = 38^\circ$.



(i) Explain, giving a reason, why angle

a) $HJM = 38^\circ$ (1 mark)

b) $MJK = 90^\circ$. (1 mark)

(ii) Determine the value of EACH of the following angles. Show detailed working where appropriate.

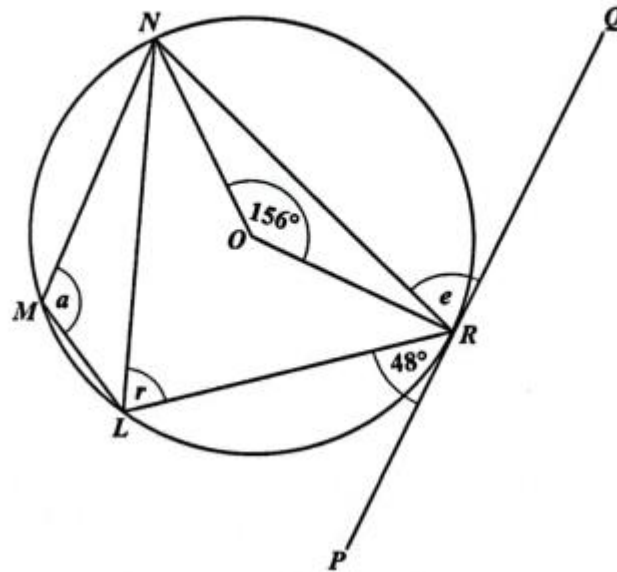
a) Angle MLJ (2 marks)

b) Angle LJK (1 mark)

c) Angle JHM (1 mark)

TRY THIS #9 (May 2023)

L, M, N and R are points on the circumference of a circle, with centre O . PQ is a tangent to the circle at R . Angle $PRL = 48^\circ$ and Angle $RON = 156^\circ$.



Find the value of EACH of the following angles, giving reasons for EACH of your answers. Show ALL working where appropriate.

- (i) Angle r (2 marks)
- (ii) Angle e (2 marks)
- (iii) Angle a (2 marks)

END OF PRACTICE QUESTIONS

****WORKED SOLUTIONS WILL BE PROVIDED!!!**

ALL THE BEST ON MONDAY MAY 13