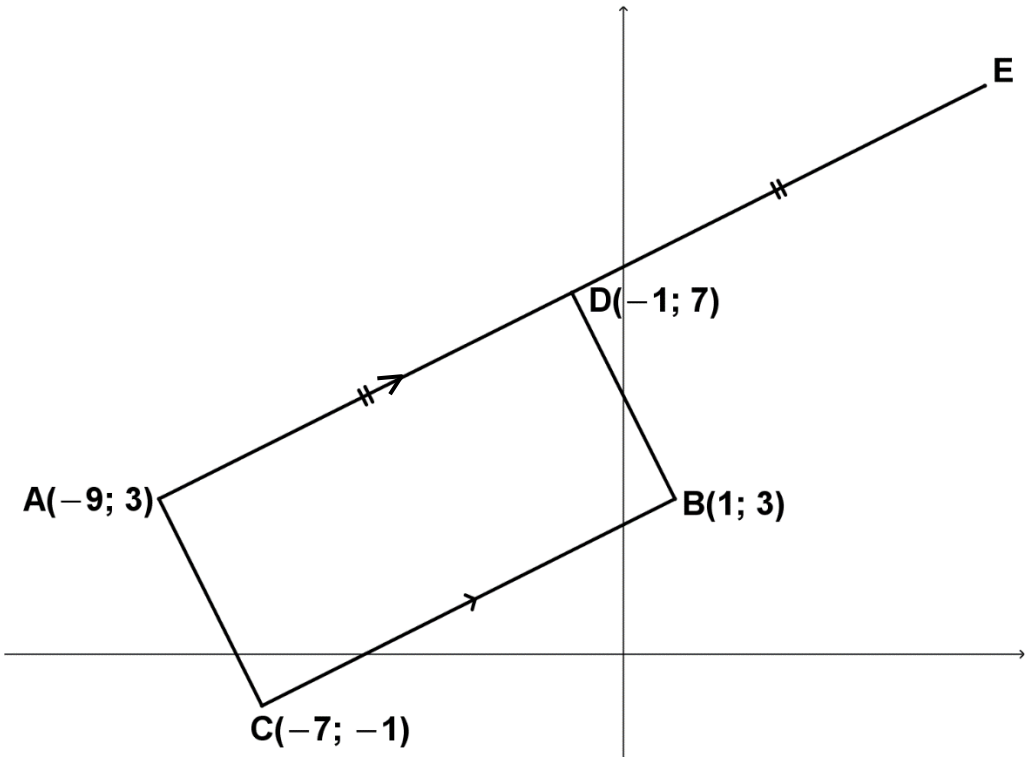
Grade 10 - Trig and Geometry (Paper 2)
September (Term 3 Exam)
Total: 75
Time: 90min

Instructions

1. This paper consists of **6 Questions**. Answer ALL the questions
2. If necessary, answers should be rounded off to TWO decimal places, unless stated otherwise
3. It is in your own interest to write LEGIBLY and to present your work neatly
4. Write the name of your SUBJECT TEACHER on your answer script.

QUESTION 1

Given quadrilateral ADBC with vertices A(–9; 3), D(–1; 7), B(1;3) and C(–7; –1). ADE is a straight line with D the midpoint of AE. BC II AE.



1.1 Calculate the lengths of BC and DE. (6)

1.2 Calculate the coordinates of E. (2)

1.3 Calculate the gradient of BC. (3)

1.4 Determine the gradient of AD. (2)

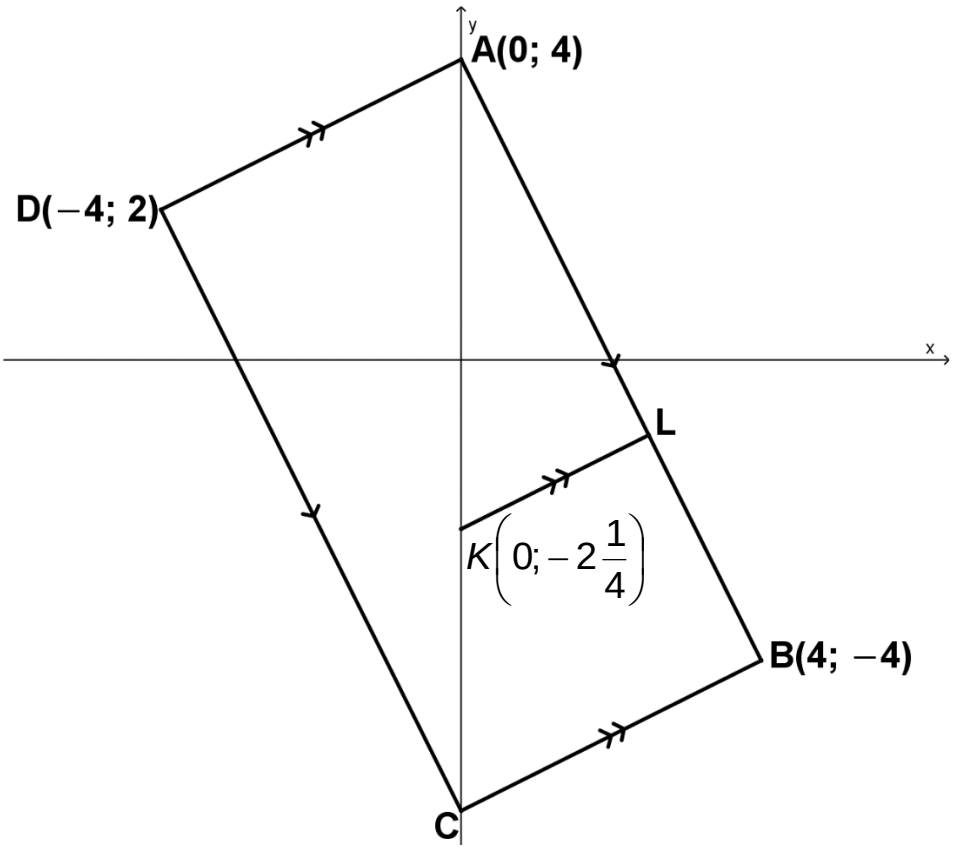
1.5 Hence, what type of figure is ADBC? Give a reason. (2)

[15]

Question 2

In the diagram, C is a point on the y-axis such that A(0; 4), B(4; –4), C and D(–4; 2) are the vertices of parallelogram ABCD.

K is the point $\left(0; -2\frac{1}{4}\right)$ and L is a point on AB such that KL || CB.



2.1 Determine the length of the diagonal DB. (3)

2.2 Determine the coordinates of M, the midpoint of DB. (3)

2.3 Determine the gradient of AD. (3)

2.4 Prove that AD $\perp$ AB. (3)

2.5 Give a reason why parallelogram ABCD is a rectangle. (1)

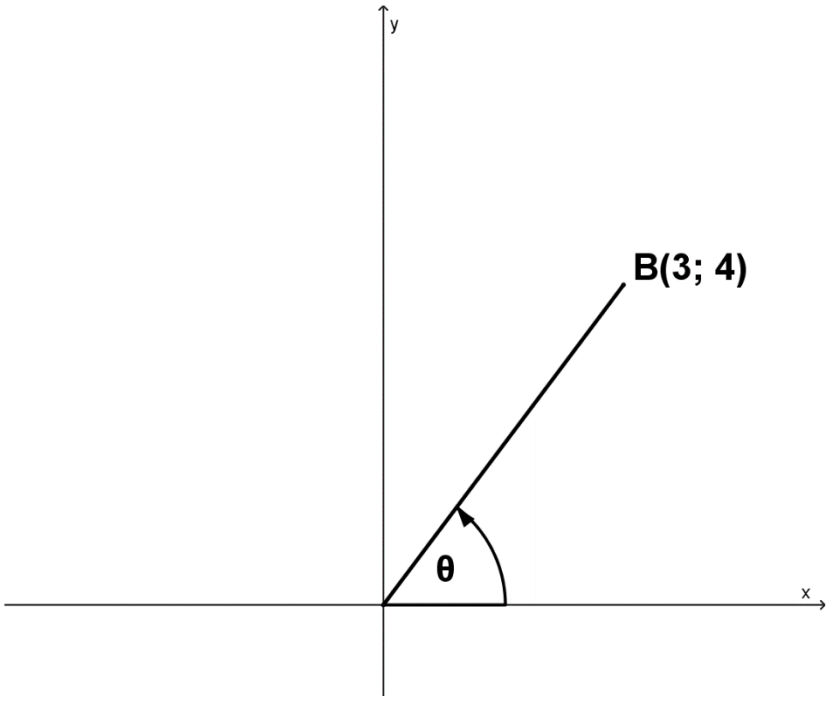
2.6 Determine the equation of the line KL in the form y = mx + c. (2)

2.7 Determine the coordinates of C. (2)

[17]

Question 3

3.1 OB is rotated through an angle θ to the point B(3; 4).



Calculate the:

3.1.1 length of OB. (2)

3.1.2 value of $\sin^2\theta + \cos^2\theta$, without using a calculator. (3)

3.2 If $5\sin x - 4 = 0$ and $x \leq 90^o$, determine with the aid of a sketch:

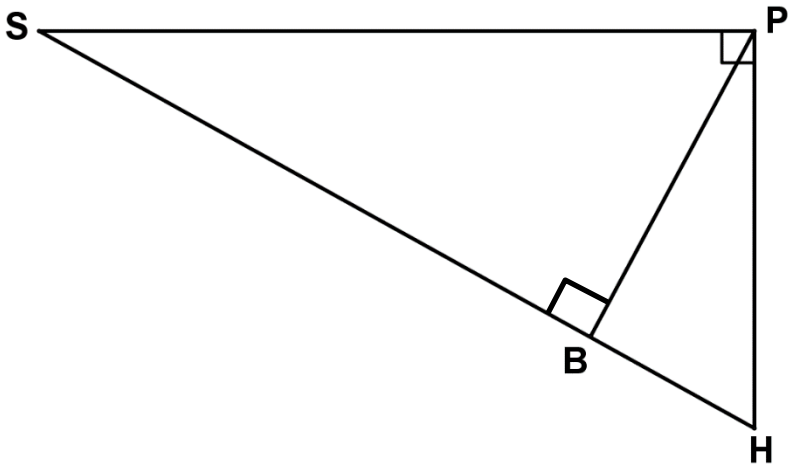
3.2.1 the value of $1 + \tan^2 x$ (5)

3.2.2 Hence, show that $1 + \tan^2 x = \sec^2 x$ (2)

[12]

Question 4

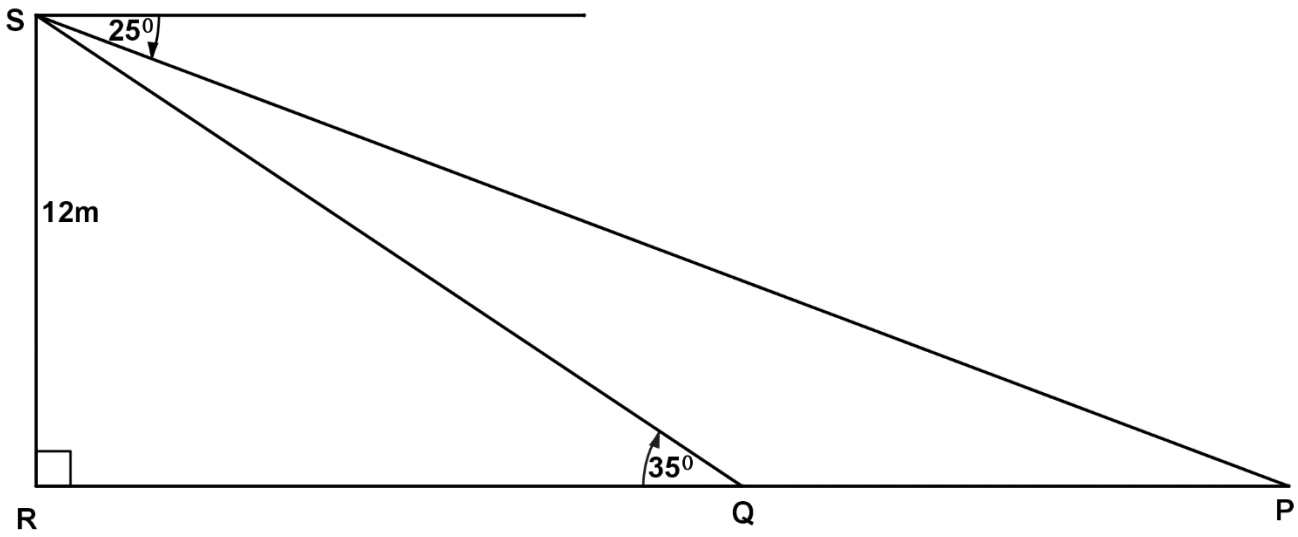
4.1 In the diagram, PB $\perp$ SH. and SP $\perp$ PH. Write down two ratios for each of the following:



4.1.1 sin H (2)

4.1.2 cos S (2)

4.2 SR is a flagpole and the angle of elevation of the top of the pole, S, from the person standing at the point Q is 35^{o}. From S, the angle of depression to the point P is 25^{o}. The flagpole is 12m high. Calculate the lengths of:



4.2.1 RQ (3)

4.2.2 QP (4)

[11]

Question 5

Solve for x:

5.1 $\tan x = 2{,}22$ for $x \in [0^o; 90^o]$ (2)

5.2 $2\cos(x + 10^o) = 0{,}846$ for $(x + 10^o) \in [0^o; 90^o]$ (4)

5.3 $4\sec x - 3 = 5$ for $x \in [0^o; 90^o]$ (4)

[10]

Question 6

Given:

$g(x) = \cos x - 1$ and $f(x) = 2\sin x$ where $x \in [0^o; 360^o]$

6.1 Sketch the graphs of *f* and *g* on the DIAGRAM SHEET provided, indicating the x-intercepts and the turning points. (6)

6.2 Write down the range of *g*. (2)

6.3 Describe how you will transform *f* to h if $h(x) = -2\sin x$. (2)

[10]

TOTAL [75]

DIAGRAM SHEET 1 **Name: ……**

Question 6.1