

TRIGONOMETRY TEST

Grade 10

Mathematics

Marks: 50

Time: 1 hour

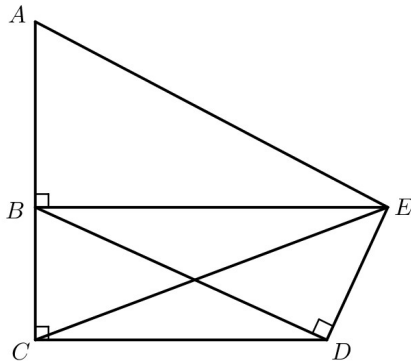
Name: _____ **MEMORANDUM** _____



QUESTION 1

S1301

Use the diagram below to complete the given ratios.



1.1 $\sin \hat{A} =$

$$\frac{BE}{AE} \quad \checkmark$$

(1)

1.2 $\cos \hat{BEC} =$

$$\frac{BE}{CE} \quad \checkmark$$

(1)

1.3 $\tan \hat{BDC} =$

$$\frac{BC}{CD} \quad \checkmark$$

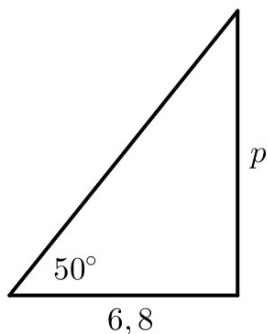
(1)

[3]

QUESTION 2

2.1 Calculate the value of p in the diagram below.

S1303

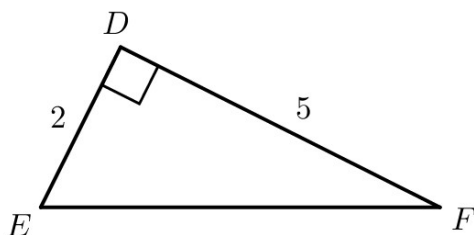


$$\begin{aligned} \tan 50 &= \frac{p}{6,8} \quad \checkmark \\ p &= 6,8 \tan 50 \quad \checkmark \\ &= 8,1 \quad \checkmark \end{aligned}$$

(3)

2.2 Calculate the size of \hat{E}

S1304



$$\begin{aligned} \tan \hat{E} &= \frac{5}{2} \quad \checkmark \\ \hat{E} &= \tan^{-1} \left(\frac{5}{2} \right) \quad \checkmark \\ &= 68,2 \quad \checkmark \end{aligned}$$

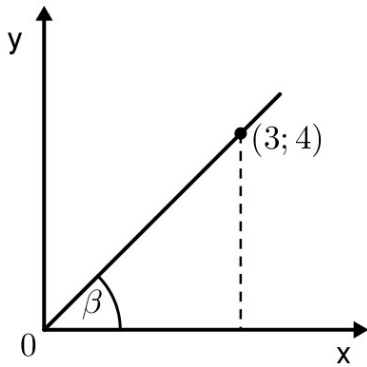
(3)

[6]

QUESTION 3

S1305 | S1309

Use the diagram below to complete the given ratios.



$$r^2 = 3^2 + 4^2$$

$$r = \sqrt{3^2 + 4^2}$$

$$= 5 \quad \checkmark$$

3.1 $\sin \beta = \frac{4}{5} \checkmark$

3.2 $\cos \beta = \frac{3}{5} \checkmark$

3.3 $\tan \beta = \frac{4}{3} \checkmark$

3.4 $\cot \beta = \frac{3}{4} \checkmark$

3.5 $\sec \beta = \frac{5}{3} \checkmark$

3.6 $\operatorname{cosec} \beta = \frac{5}{4} \checkmark$

(7)
[7]

QUESTION 4

4.1 Calculate the following correct to TWO DECIMAL PLACES.

S1302

$$\frac{\tan 74^\circ}{3} + \sin 25^\circ = 1,59 \checkmark$$

(1)

4.2 Determine the following WITHOUT THE USE OF A CALCULATOR.

S1308

$$\sqrt{2} \cos 45^\circ + \cos^2 60^\circ + 3 \tan 45^\circ$$

$$\sqrt{2} \left(\frac{1}{\sqrt{2}} \right) + \left(\frac{1}{2} \right)^2 + 3 \left(\frac{1}{1} \right)$$

$$= 1 + \frac{1}{4} + 3$$

$$= 4 \frac{1}{4} \checkmark$$

(4)
[5]

QUESTION 5

5.1 Solve for x :

S1307

$$4 \sin(2x - 10^\circ) - 1 = 1$$

$$4 \sin(2x - 10^\circ) = 2$$

$$\sin(2x - 10^\circ) = \frac{2}{4} \quad \checkmark$$

$$2x - 10^\circ = \sin^{-1}\left(\frac{2}{4}\right)$$

$$2x - 10^\circ = 30^\circ \quad \checkmark$$

$$2x = 40^\circ$$

$$x = 20^\circ \quad \checkmark$$

(3)

5.2 If $7 \tan A = -5$ and $A \in [180^\circ; 360^\circ]$, determine the following with the use of a sketch.

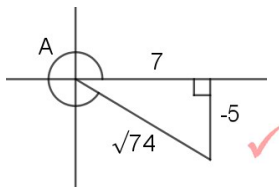
S1306

5.2.1 $\cos A$

5.2.2 $74 \sin^2 A - \frac{49}{\cos^2 A}$

5.2.1

$$\tan \hat{A} = \frac{-5}{7} \quad \checkmark$$



$$\begin{aligned} r^2 &= 7^2 + (-5)^2 \\ r &= \sqrt{7^2 + (-5)^2} \\ &= \sqrt{74} \quad \checkmark \end{aligned}$$

$$\cos \hat{A} = \frac{7}{\sqrt{74}} \quad \checkmark$$

5.2.2

$$74 \left(\frac{-5}{\sqrt{74}}\right)^2 - \frac{49}{\left(\frac{7}{\sqrt{74}}\right)^2} \quad \checkmark$$

$$= 25 - 74$$

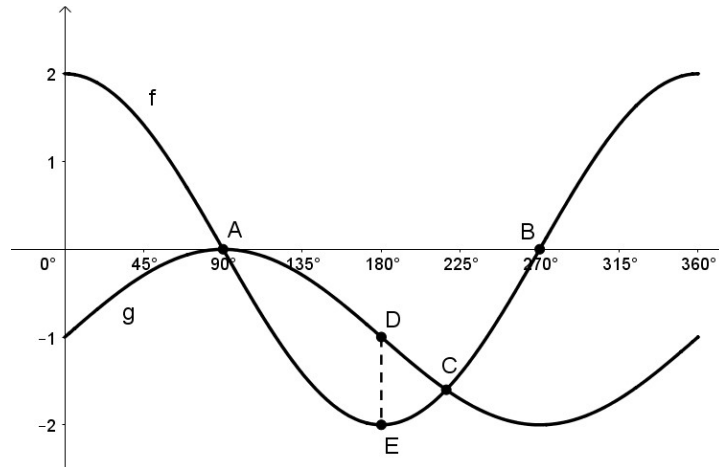
$$= -49 \quad \checkmark$$

(6)

[9]

QUESTION 6 (final exam 2021)

The graph of $f(x) = a \cos x$ and $g(x) = \sin x - 1$ for $x \in [0^\circ; 360^\circ]$



6.1 Write down the value of a

S1314 (1)

$a = 2$ ✓

6.2 Write down the period of f

S1313 (1)

360° ✓

6.3 Write down the range of g

S1313 (1)

$y \in [-2; 0]$ OR $-2 \leq y \leq 0$ ✓

6.4 What is the length of DE?

S1315 (1)

$DE = 1 \text{ unit}$ ✓

6.5 What is the minimum value of f ?

S1313 (1)

$\min = -2$ ✓

6.6 Give the coordinates of the solution to $f(x) = g(x)$ in the interval $0^\circ \leq x \leq 180^\circ$

S1315 (1)

$A(90^\circ; 0)$ ✓

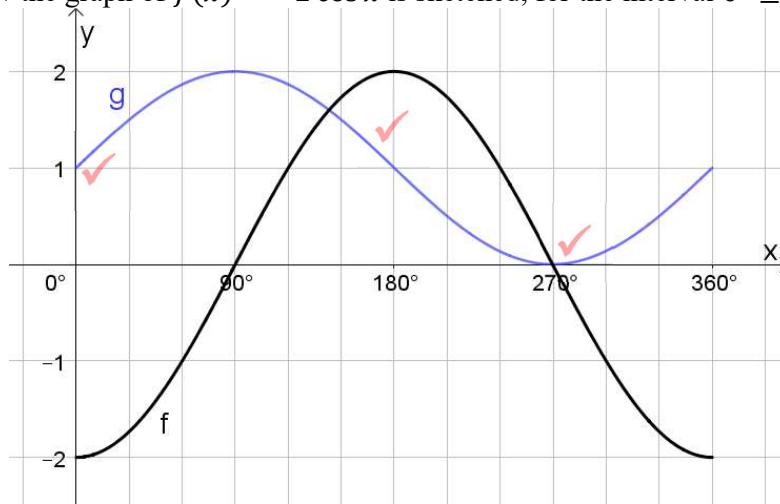
6.7 Calculate the value $g(200)$ correct to 3 decimal places.

S1313 (1)

$g(200) = \sin 200 - 1$
 $= -1,342$ ✓

QUESTION 7

In the diagram below the graph of $f(x) = -2 \cos x$ is sketched, for the interval $0^\circ \leq x \leq 360^\circ$



7.1 Write down the amplitude of f

S1313 (1)

Amplitude = -2 ✓

7.2 Write down the minimum value of $f(x) + 3$.

S1313 (1)

$y = 1$ ✓

7.3 On the same set of axes in the above diagram, sketch the graph of g , where $g(x) = \sin x + 1$ for the interval $0^\circ \leq x \leq 360^\circ$

S1314 (3)

(answer on the diagram above)

7.4 Use the graph to determine the following:

7.4.1 The value of $f(180^\circ) - g(180^\circ)$

S1315 (1)

1 ✓

7.4.2 The value(s) for x where $f(x) \cdot g(x) > 0$

S1315 (1)

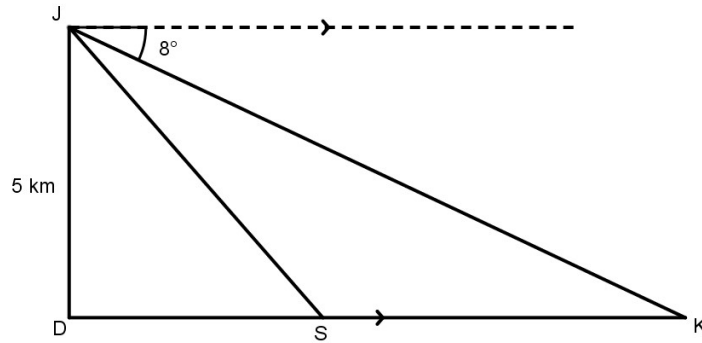
$90^\circ < x < 270^\circ$ OR $x \in (90^\circ; 270^\circ)$ ✓

QUESTION 8

S1310

S1311

An aeroplane at J is flying directly over a point D on the ground at a height of 5 km . It is heading to land at point K . The angle of depression from J to K is 8° . S is a point along the route from D to K .



- 8.1 Write down the size of \widehat{JKD} (1)

$$\widehat{JKD} = 8^\circ \quad \checkmark$$

- 8.2 Calculate the distance DK , correct to the nearest kilometre. (2)

$$\tan \widehat{JKD} = \frac{JD}{DK}$$

$$\tan 8 = \frac{5}{DK} \quad \checkmark$$

$$DK = \frac{5}{\tan 8}$$

$$= 35,58 \text{ km} \quad \checkmark$$

- 8.3 If the distance SK is 8 km , calculate the distance DS . (1)

$$DS = 35,58 - 8 = 27,58 \text{ km} \quad \checkmark$$

- 8.4 Calculate the angle of elevation from point S to J , correct to ONE decimal place (2)

$$\tan \widehat{JSD} = \frac{JD}{DS}$$

$$\tan \widehat{JSD} = \frac{5}{27,58} \quad \checkmark$$

$$\widehat{JSD} = \tan^{-1}\left(\frac{5}{27,58}\right)$$

$$= 10,28^\circ \quad \checkmark$$

[6]**Total: 50 Marks**