SUPPLEMENTARY PAGE

Question: _____

Question: _____

PERTH MODERN SCHOOL
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Independent Public School

Course: Methods **Year: 11**

Student Name: _____ Teacher Name: _____

Date: 09/09/22

Task Type: **Response**

Time Allowed: **40** **minutes**

Number of Questions: **8**

Materials Required: CAS calculator (ClassPad) and one double-sided A4 pages of notes (to be provided by the student)

Standard Items: Pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler and highlighters

Special Items: Drawing instruments, templates, notes on one unfolded sheet of A4 paper (both sides) and up to three calculators approved for use in the WACE examinations

Marks Available: **40** **marks**

Task Weighting: **10** **%**

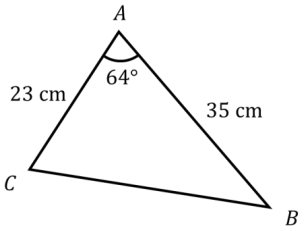
Formula Sheet Provided: Yes

Note: All questions worth more than 2 marks require working to obtain full marks.

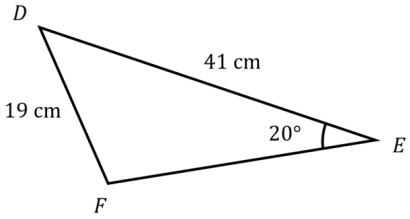
TEST 4: TRIGONOMETRY AND EXPONENTIALS

Question 1 [6 marks – 2, 2, 2] (1.2.4)

a) Determine BC, to 1 decimal place.



b) Determine $\angle DFE$, to the nearest degree.



c) Find the exact area of ΔGHI, given that $GI = 8$ m, $HI = 12$ m and $\angle GIH = 45°$.

a) The temperature T°C after t hours can be modelled using the equation $T = ab^t + k$. Using the information shown, determine the equation.

b) The safe drinking temperature is estimated to be about 57°C. How long does the tea need to cool for to be safe to drink, to the nearest minute?

End of Test

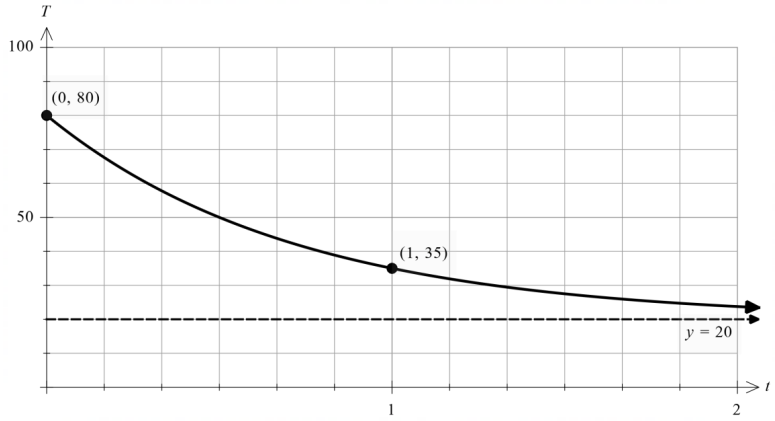
Question 7 [6 marks – 3, 3] (2.1.1-2.1.2, 2.1.7)

a) Simplify $(64a^6b^{15})^{\frac{1}{3}} \div (a^5bc^2)$, expressing your answer with positive indices.

b) Solve $16^x = 128$ for the exact value of x, showing all working.

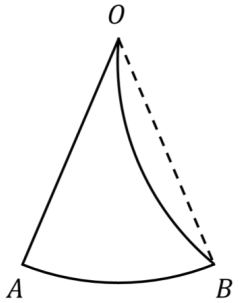
Question 8 [6 marks – 4, 2] (2.1.1-2.1.2, 2.1.7)

A cup of green tea is poured at $80°C$ and cools down towards room temperature at an exponential rate, as shown below.



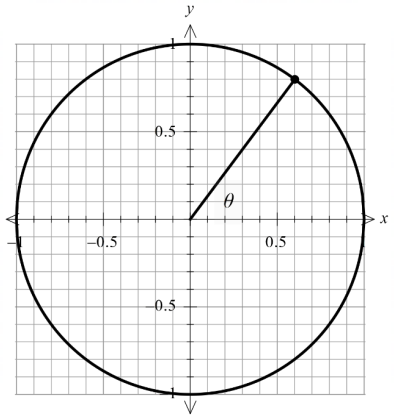
Question 2 [4 marks] (1.2.5-1.2.6)

For the shape below, arc AB has radius 11 cm, arc OB has radius 12 cm and $\angle AOB = 0.85$. Find the area of the shape to 1 decimal place.



Question 3 [4 marks – 2, 2] (1.2.7-1.2.8)

a) Consider the unit circle below.



i) Find $\cos(180° + \theta)$ to 1 decimal place.

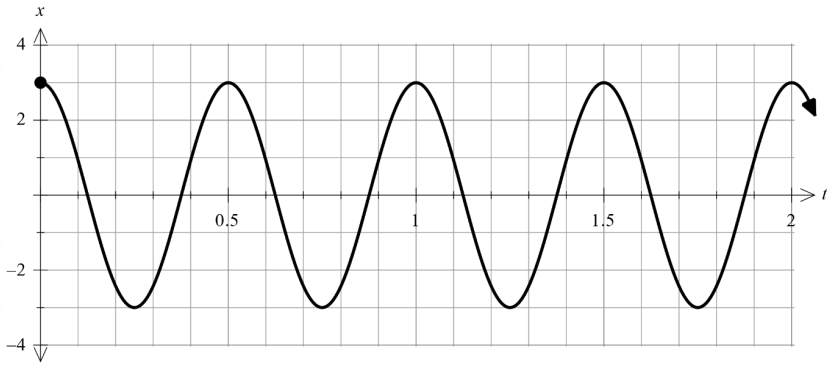
ii) Find $\sin(-\theta)$ to 1 decimal place.

b) Determine the exact values of the following:

i) $\sin 135°$ ii) $\tan 300°$

Question 4 [3 marks – 1, 2] (1.2.9-1.2.12, 1.2.15)

A pendulum oscillates such that its horizontal position x cm with respect to time t seconds is as shown in the graph below.



a) State the amplitude and period of the pendulum.

b) Given that $x(t) = a\cos(bt)$, state the equation of the pendulum's motion.

Question 5 [7 marks – 3, 4] (1.2.16, 1.2.14)

a) Given that $\sin a = b$, where a is a positive acute angle, determine the exact solutions of $\sin 2\theta = -b$ where $0 \leq \theta \leq 2\pi$.

Question 5 (continued)

b) If $\cos A = -\frac{12}{13}$ where $180° < A < 270°$ and $\sin B = \frac{15}{17}$ where B is obtuse, determine the exact value of $\cos(A - B)$.

Question 6 [4 marks] (1.2.9-1.2.12)

Graph $y = \sin\left(x - \frac{\pi}{6}\right) - \frac{1}{2}$ on the axes below, labelling the exact coordinates of all intercepts.