TRIGONOMETRY:

November 2019

QUESTION 5

5.1 Simplify the following expression to ONE trigonometric term:

$$\frac{\sin x}{\cos x.\tan x}+\sin(180°+x)\cos(90°-x) \qquad (5)$$

5.2 **Without using a calculator**, determine the value of: $\frac{\sin^2 35°-\cos^2 35°}{4\sin 10°\cos 10°}$ (4)

5.3 Given: $\cos 26° = m$

Without using a calculator, determine $2\sin^2 77°$ in terms of m. (4)

5.4 Consider: $f(x)=\sin(x+25°)\cos 15°-\cos(x+25°)\sin 15°$

5.4.1 Determine the general solution of $f(x)=\tan 165°$ (6)

5.4.2 Determine the value(s) of x in the interval $x \in [0°;360°]$ for which $f(x)$ will have a minimum value. (3)

[22]

May-June 2019

QUESTION 5

5.1 **Without using a calculator,** write the following expressions in terms of $\sin 11°$:

5.1.1 $\sin 191°$ (1)

5.1.2 $\cos 22°$ (1)

5.2 Simplify $\cos(x-180°)+\sqrt{2}\sin(x+45°)$ to a single trigonometric ratio. (5)

5.3 Given: $\sin \text{P}+\sin \text{Q}=\frac{7}{5}$ and $\hat{\text{P}}+\hat{\text{Q}}=90°$

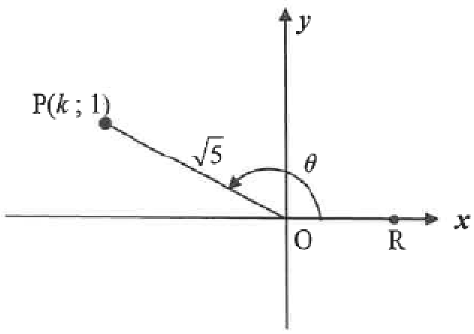
Without using a calculator, determine the value of $\sin 2\text{P}$. (5)

[12]

November 2018

QUESTION 5

5.1 In the diagram, P(k ; 1) is a point in the 2[nd] quadrant and is $\sqrt{5}$ units from the origin. R is a point on the positive x-axis and obtuse $\hat{ROP} = \theta$.



5.1.1 Calculate the value of k. (2)

5.1.2 **Without using a calculator**, calculate the value of:

(a) $\tan\theta$ (1)

(b) $\cos(180° + \theta)$ (2)

(c) $\sin(\theta + 60°)$ in the form $\dfrac{a+b}{\sqrt{20}}$ (5)

5.1.3 **Use a calculator** to calculate the value of $\tan(2\theta - 40°)$ correct to ONE decimal place. (3)

5.2 Prove the following identity: $\dfrac{\cos x + \sin x}{\cos x - \sin x} - \dfrac{\cos x - \sin x}{\cos x + \sin x} = 2\tan 2x$ (5)

5.3 Evaluate, **without using a calculator**: $\sum_{A=38°}^{52°} \cos^2 A$ (5)

[23]

June 2018

QUESTION 5

5.1 In ΔMNP, $\hat{N} = 90°$ and $\sin M = \frac{15}{17}$.

Determine, **without using a calculator**:

5.1.1 $\tan M$ (3)

5.1.2 The length of NP if MP = 51 (2)

5.2 Simplify to a single term: $\cos(x - 360°).\sin(90° + x) + \cos^2(-x) - 1$ (4)

5.3 Consider: $\sin(2x + 40°)\cos(x + 30°) - \cos(2x + 40°)\sin(x + 30°)$

5.3.1 Write as a single trigonometric term in its simplest form. (2)

5.3.2 Determine the general solution of the following equation:

$\sin(2x + 40°)\cos(x + 30°) - \cos(2x + 40°)\sin(x + 30°) = \cos(2x - 20°)$ (7)

[18]

March 2018

QUESTION 5

5.1 If $\cos 2\theta = -\frac{5}{6}$, where $2\theta \in [180°; 270°]$, calculate, **without using a calculator**, the values in simplest form of:

5.1.1 $\sin 2\theta$ (4)

5.1.2 $\sin^2 \theta$ (3)

5.2 Simplify $\sin(180° - x).\cos(-x) + \cos(90° + x).\cos(x - 180°)$ to a single trigonometric ratio. (6)

5.3 Determine the value of $\sin 3x.\cos y + \cos 3x.\sin y$ if $3x + y = 270°$. (2)

5.4 Given: $2\cos x = 3\tan x$

5.4.1 Show that the equation can be rewritten as $2\sin^2 x + 3\sin x - 2 = 0$. (3)

5.4.2 Determine the general solution of x if $2\cos x = 3\tan x$. (5)

5.4.3 Hence, determine two values of y, $144° \leq y \leq 216°$, that are solutions of $2\cos 5y = 3\tan 5y$. (4)

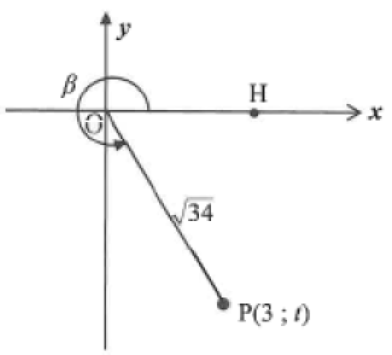
November 2017:

QUESTION 5

5.1 Given: $\dfrac{\sin(A-360°).\cos(90°+A)}{\cos(90°-A).\tan(-A)}$

Simplify the expression to a single trigonometric ratio. (6)

5.2 In the diagram, P(3 ; t) is a point in the Cartesian plane. OP $=\sqrt{34}$ and $H\hat{O}P=\beta$ is a reflex angle.



Without using a calculator, determine the value of:

5.2.1 t (2)

5.2.2 $\tan\beta$ (1)

5.2.3 $\cos 2\beta$ (4)

5.3 Prove:

5.3.1 $\sin(A+B)-\sin(A-B)=2\cos A.\sin B$ (2)

5.3.2 **Without using a calculator,** that $\sin 77°-\sin 43°=\sin 17°$ (4)

[19]