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Education

Western Cape Education Department

Examination Preparation Learning Resource 2016

TRIGONOMETRY General

$$\sin A = \frac{\text{opposite side}}{\text{hypotenuse}}$$

$$\cos A = \frac{\text{adjacent side}}{\text{hypotenuse}}$$

$$\tan A = \frac{\text{opposite side}}{\text{adjacent side}}$$

$$\cot A = \frac{\text{adjacent side}}{\text{opposite side}} = \frac{1}{\tan A}$$

$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$ $\sin(A - B) = \sin A \cos B - \cos A \sin B$ $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$ $\cos(A - B) = \cos A \cos B + \sin A \sin B$	$\tan(A \pm B) = \frac{\sin(A \pm B)}{\cos(A \pm B)}$ $\tan(A - B) = \frac{\sin(A - B)}{\cos(A - B)}$
$\sin A + \sin B = 2 \sin\left(\frac{A+B}{2}\right) \cos\left(\frac{A-B}{2}\right)$ $\sin A - \sin B = 2 \cos\left(\frac{A+B}{2}\right) \sin\left(\frac{A-B}{2}\right)$ $\sin A \cos B = \frac{1}{2} [\sin(A+B) + \sin(A-B)]$ $\cos A \sin B = \frac{1}{2} [\sin(A+B) - \sin(A-B)]$ $\cos A \cos B = \frac{1}{2} [\cos(A+B) + \cos(A-B)]$ $\sin A \sin B = \frac{1}{2} [\cos(A-B) - \cos(A+B)]$	$\cos A + \cos B = 2 \cos\left(\frac{A+B}{2}\right) \cos\left(\frac{A-B}{2}\right)$ $\cos A - \cos B = -2 \sin\left(\frac{A+B}{2}\right) \sin\left(\frac{A-B}{2}\right)$ $\sin A \cos B = \frac{1}{2} [\sin(A+B) + \sin(A-B)]$ $\cos A \sin B = \frac{1}{2} [\sin(A+B) - \sin(A-B)]$ $\cos A \cos B = \frac{1}{2} [\cos(A+B) + \cos(A-B)]$ $\sin A \sin B = \frac{1}{2} [\cos(A-B) - \cos(A+B)]$

MATHEMATICS Grade 12

Trigonometric Identities $\sin^2 \theta + \cos^2 \theta = 1$ $\sec^2 \theta = \frac{1}{\cos^2 \theta}$ $\csc^2 \theta = \frac{1}{\sin^2 \theta}$ $\tan^2 \theta + 1 = \sec^2 \theta$ $1 + \cot^2 \theta = \csc^2 \theta$	Pythagorean Identities $\sin^2 \theta + \cos^2 \theta = 1$ $\sec^2 \theta - \tan^2 \theta = 1$ $\csc^2 \theta - \cot^2 \theta = 1$
Double Angle Identities $\sin 2\theta = 2 \sin \theta \cos \theta$ $\cos 2\theta = \cos^2 \theta - \sin^2 \theta$ $\tan 2\theta = \frac{2 \tan \theta}{1 - \tan^2 \theta}$	Half Angle Identities $\sin \frac{\theta}{2} = \pm \sqrt{\frac{1 - \cos \theta}{2}}$ $\cos \frac{\theta}{2} = \pm \sqrt{\frac{1 + \cos \theta}{2}}$ $\tan \frac{\theta}{2} = \frac{\sin \theta}{1 + \cos \theta} = \frac{1 - \cos \theta}{\sin \theta}$

Reciprocal Identities $\csc \theta = \frac{1}{\sin \theta}$ $\sec \theta = \frac{1}{\cos \theta}$ $\cot \theta = \frac{1}{\tan \theta}$	Double-Angle Identities $\sin 2\theta = 2 \sin \theta \cos \theta$ $\cos 2\theta = \cos^2 \theta - \sin^2 \theta$ $\tan 2\theta = \frac{2 \tan \theta}{1 - \tan^2 \theta}$
Pythagorean Identities $\sin^2 \theta + \cos^2 \theta = 1$ $\sec^2 \theta - \tan^2 \theta = 1$ $\csc^2 \theta - \cot^2 \theta = 1$	Half-Angle Identities $\sin \frac{\theta}{2} = \pm \sqrt{\frac{1 - \cos \theta}{2}}$ $\cos \frac{\theta}{2} = \pm \sqrt{\frac{1 + \cos \theta}{2}}$ $\tan \frac{\theta}{2} = \frac{\sin \theta}{1 + \cos \theta} = \frac{1 - \cos \theta}{\sin \theta}$

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DBE/November 2016

QUESTION 5

5.1 Given: $\sin 16^\circ = p$

Determine the following in terms of p , **without using a calculator**.

5.1.1 $\sin 196^\circ$ (2)

5.1.2 $\cos 16^\circ$ (2)

5.2 Given: $\cos(A - B) = \cos A \cos B + \sin A \sin B$

Use the formula for $\cos(A - B)$ to derive a formula for $\sin(A + B)$ (3)

5.3 Simplify $\frac{\sqrt{1 - \cos^2 2A}}{\cos(-A) \cdot \cos(90^\circ + A)}$ completely, given that $0^\circ < A < 90^\circ$. (5)

5.4 Given: $\cos 2B = \frac{3}{5}$ and $0^\circ \leq B \leq 90^\circ$

Determine, **without using a calculator**, the value of EACH of the following in its simplest form:

5.4.1 $\cos B$ (3)

5.4.2 $\sin B$ (2)

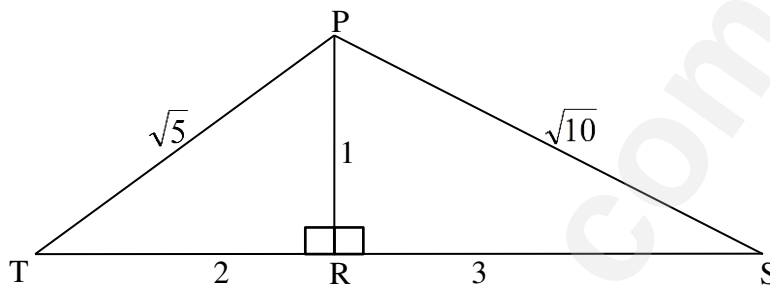
5.4.3 $\cos(B + 45^\circ)$ (4)

[21]

QUESTION 5

DBE/2016

- 5.1 In the diagram $PR \perp TS$ in obtuse triangle PTS .
 $PT = \sqrt{5}$; $TR = 2$; $PR = 1$; $PS = \sqrt{10}$ and $RS = 3$



- 5.1.1 Write down the value of:

- (a) $\sin \hat{T}$ (1)
 (b) $\cos \hat{S}$ (1)

- 5.1.2 Calculate, WITHOUT using a calculator, the value of $\cos(\hat{T} + \hat{S})$ (5)

- 5.2 Determine the value of:

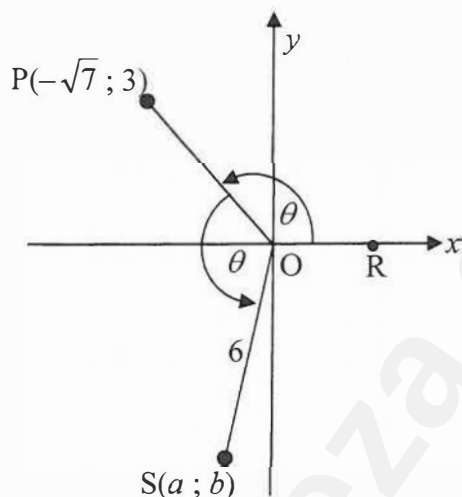
$$\frac{1}{\cos(360^\circ - \theta) \cdot \sin(90^\circ - \theta)} - \tan^2(180^\circ + \theta) \quad (6)$$

- 5.3 If $\sin x - \cos x = \frac{3}{4}$, calculate the value of $\sin 2x$ WITHOUT using a calculator. (5)
[18]

DBE/Feb.–Mar. 2016

QUESTION 5

- 5.1 $P(-\sqrt{7}; 3)$ and $S(a; b)$ are points on the Cartesian plane, as shown in the diagram below. $\hat{POR} = \hat{POS} = \theta$ and $OS = 6$.



Determine, WITHOUT using a calculator, the value of:

- 5.1.1 $\tan \theta$ (1)
- 5.1.2 $\sin(-\theta)$ (3)
- 5.1.3 a (4)
- 5.2 5.2.1 Simplify $\frac{4 \sin x \cos x}{2 \sin^2 x - 1}$ to a single trigonometric ratio. (3)
- 5.2.2 Hence, calculate the value of $\frac{4 \sin 15^\circ \cos 15^\circ}{2 \sin^2 15^\circ - 1}$ WITHOUT using a calculator. (Leave your answer in simplest surd form.) (2)

[13]

QUESTION 5

DBE/November 2015

- 5.1 Given that $\sin 23^\circ = \sqrt{k}$, determine, in its simplest form, the value of each of the following in terms of k , WITHOUT using a calculator:

5.1.1 $\sin 203^\circ$ (2)

5.1.2 $\cos 23^\circ$ (3)

5.1.3 $\tan(-23^\circ)$ (2)

- 5.2 Simplify the following expression to a single trigonometric function:

$$\frac{4 \cos(-x) \cdot \cos(90^\circ + x)}{\sin(30^\circ - x) \cdot \cos x + \cos(30^\circ - x) \cdot \sin x} \quad (6)$$

- 5.3 Determine the general solution of $\cos 2x - 7 \cos x - 3 = 0$. (6)

- 5.4 Given that $\sin \theta = \frac{1}{3}$, calculate the numerical value of $\sin 3\theta$, WITHOUT using a calculator. (5)

[24]

DBE/2015

QUESTION 5

5.1 Given that $\cos \beta = -\frac{1}{\sqrt{5}}$, where $180^\circ < \beta < 360^\circ$.

Determine, with the aid of a sketch and without using a calculator, the value of $\sin \beta$. (5)

5.2 Determine the value of the following expression:

$$\frac{\tan(180^\circ - x) \cdot \sin(x - 90^\circ)}{4 \sin(360^\circ + x)} \quad (6)$$

5.3 If $\sin A = p$ and $\cos A = q$:

5.3.1 Write $\tan A$ in terms of p and q (1)

5.3.2 Simplify $p^4 - q^4$ to a single trigonometric ratio (4)

5.4 Consider the identity: $\frac{\cos \theta}{\sin \theta} - \frac{\cos 2\theta}{\sin \theta \cdot \cos \theta} = \tan \theta$

5.4.1 Prove the identity. (5)

5.4.2 For which value(s) of θ in the interval $0^\circ < \theta < 180^\circ$ will the identity be undefined? (2)

5.5 Determine the general solution of $2 \sin 2x + 3 \sin x = 0$ (6)
[29]

DBE/Feb.–Mar. 2015

QUESTION 5

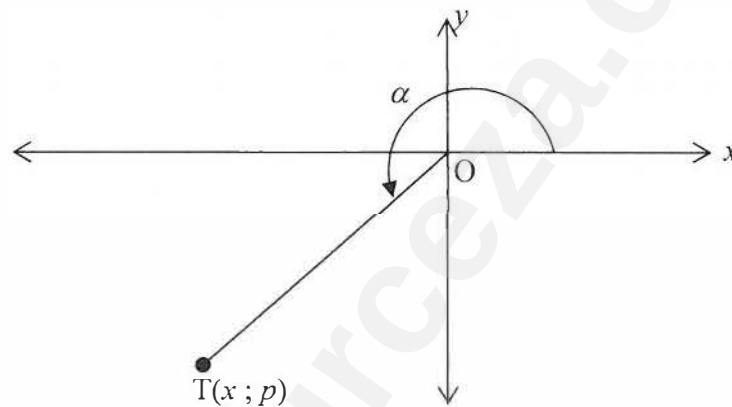
5.1 If $x = 3 \sin \theta$ and $y = 3 \cos \theta$, determine the value of $x^2 + y^2$. (3)

5.2 Simplify to a single term:

$$\sin(540^\circ - x) \cdot \sin(-x) - \cos(180^\circ - x) \cdot \sin(90^\circ + x) \quad (6)$$

5.3 In the diagram below, $T(x; p)$ is a point in the third quadrant and it is given that

$$\sin \alpha = \frac{p}{\sqrt{1+p^2}}.$$



5.3.1 Show that $x = -1$. (3)

5.3.2 Write $\cos(180^\circ + \alpha)$ in terms of p in its simplest form. (2)

5.3.3 Show that $\cos 2\alpha$ can be written as $\frac{1-p^2}{1+p^2}$. (3)

5.4 5.4.1 For which value(s) of x will $\frac{2 \tan x - \sin 2x}{2 \sin^2 x}$ be undefined in the interval $0^\circ \leq x \leq 180^\circ$? (3)

5.4.2 Prove the identity: $\frac{2 \tan x - \sin 2x}{2 \sin^2 x} = \tan x$ (6)
[26]

DBE/November 2014

QUESTION 6

- 6.1 Prove the identity: $\cos^2(180^\circ + x) + \tan(x - 180^\circ)\sin(720^\circ - x)\cos x = \cos 2x$ (5)
- 6.2 Use $\cos(\alpha + \beta) = \cos \alpha \cos \beta - \sin \alpha \sin \beta$ to derive the formula for $\sin(\alpha - \beta)$. (3)
- 6.3 If $\sin 76^\circ = x$ and $\cos 76^\circ = y$, show that $x^2 - y^2 = \sin 62^\circ$. (4)
- [12]

NSS – Graad 12 Model – Memorandum

DBE/2014

QUESTION 5

- 5.1 Given that $\sin \alpha = -\frac{4}{5}$ and $90^\circ < \alpha < 270^\circ$.
WITHOUT using a calculator, determine the value of each of the following in its simplest form:
- 5.1.1 $\sin(-\alpha)$ (2)
- 5.1.2 $\cos \alpha$ (2)
- 5.1.3 $\sin(\alpha - 45^\circ)$ (3)
- 5.2 Consider the identity: $\frac{8\sin(180^\circ - x)\cos(x - 360^\circ)}{\sin^2 x - \sin^2(90^\circ + x)} = -4\tan 2x$
- 5.2.1 Prove the identity. (6)
- 5.2.2 For which value(s) of x in the interval $0^\circ < x < 180^\circ$ will the identity be undefined? (2)
- 5.3 Determine the general solution of $\cos 2\theta + 4\sin^2 \theta - 5\sin \theta - 4 = 0$. (7)
- [22]



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TRIGONOMETRY Graphs

Function	Definition	Periodic Function	Graph
$\sin$	$\sin \theta = \frac{y}{r}$	$\sin(\theta + 2\pi) = \sin \theta$	
$\cos$	$\cos \theta = \frac{x}{r}$	$\cos(\theta + 2\pi) = \cos \theta$	
$\tan$	$\tan \theta = \frac{y}{x}$	$\tan(\theta + \pi) = \tan \theta$	
$\csc$	$\csc \theta = \frac{1}{\sin \theta}$	$\csc(\theta + 2\pi) = \csc \theta$	
$\sec$	$\sec \theta = \frac{1}{\cos \theta}$	$\sec(\theta + 2\pi) = \sec \theta$	
$\cot$	$\cot \theta = \frac{1}{\tan \theta}$	$\cot(\theta + \pi) = \cot \theta$	

MATHEMATICS Grade 12

Higher Maths UNIT 1 OUTCOME 2 PART 3 Trigonometric Functions PAGE 8

NOTE
Solving Trigonometric Equations Graphically
It is possible to solve trigonometric equations by sketching a graph.

Example

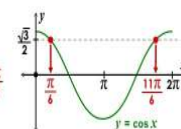
Solve $2 \cos x - \sqrt{3} = 0$ for $0 \leq x \leq 2\pi$

$$2 \cos x = \sqrt{3}$$

$$\cos x = \frac{\sqrt{3}}{2}$$

Sketching $y = \cos x$ gives:

$$x = \frac{\pi}{6} \quad \text{or} \quad x = 2\pi - \frac{\pi}{6} = \frac{11\pi}{6}$$



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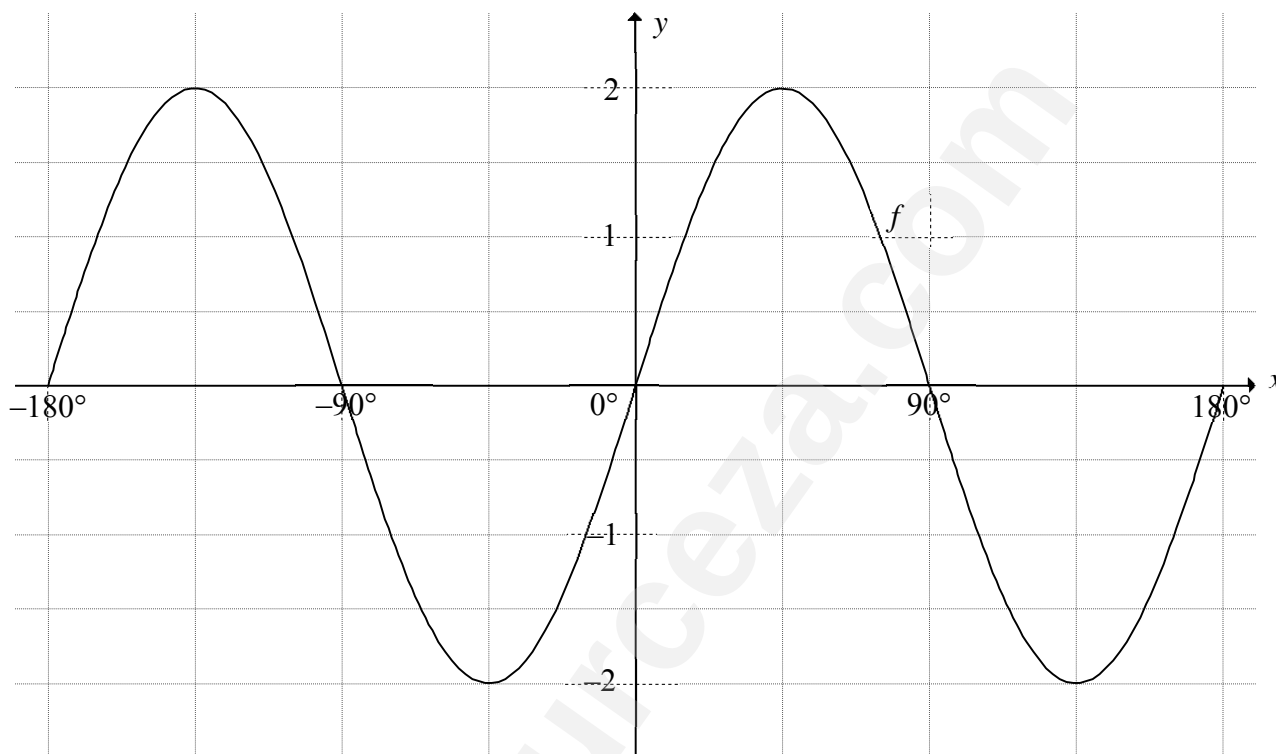
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DBE/November 2016

QUESTION 6

In the diagram the graph of $f(x) = 2 \sin 2x$ is drawn for the interval $x \in [-180^\circ; 180^\circ]$.

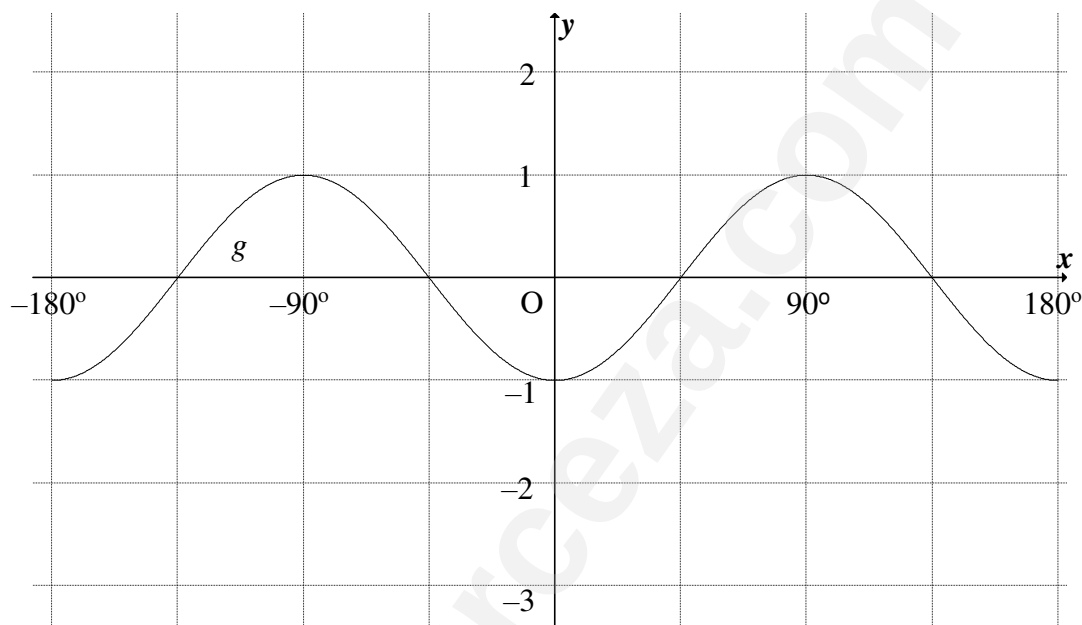


- 6.1 On the system of axes on which f is drawn in the ANSWER BOOK, draw the graph of $g(x) = -\cos 2x$ for $x \in [-180^\circ; 180^\circ]$. Clearly show all intercepts with the axes, the coordinates of the turning points and end points of the graph. (3)
- 6.2 Write down the maximum value of $f(x) - 3$. (2)
- 6.3 Determine the general solution of $f(x) = g(x)$. (4)
- 6.4 Hence, determine the values of x for which $f(x) < g(x)$ in the interval $x \in [-180^\circ; 0^\circ]$. (3)
- [12]**

DBE/2016

QUESTION 6

- 6.1 Determine the general solution of $4\sin x + 2\cos 2x = 2$ (6)
- 6.2 The graph of $g(x) = -\cos 2x$ for $x \in [-180^\circ; 180^\circ]$ is drawn below.



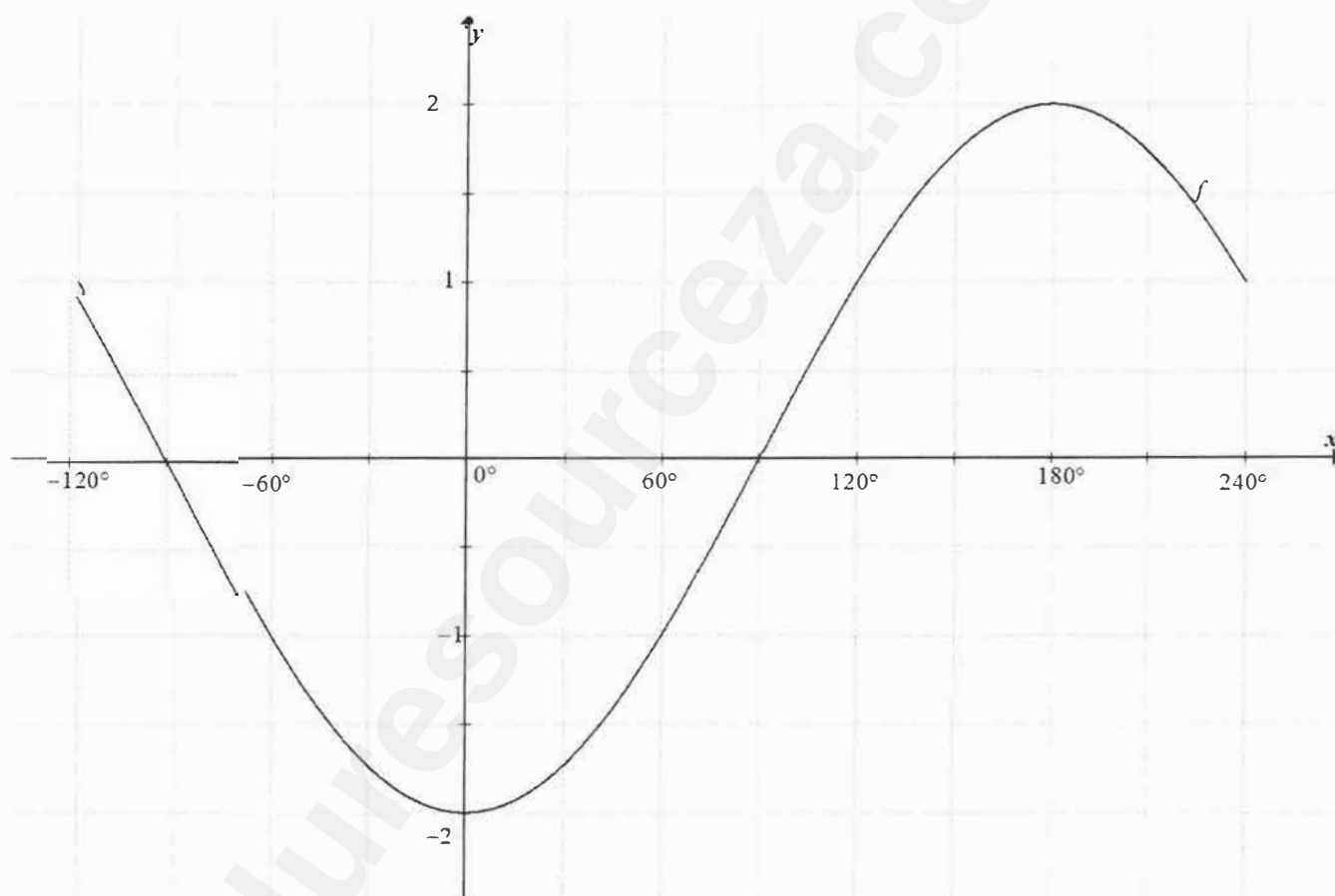
- 6.2.1 Draw the graph of $f(x) = 2\sin x - 1$ for $x \in [-180^\circ; 180^\circ]$ on the set of axes provided in the ANSWER BOOK. (3)
- 6.2.2 Write down the values of x for which g is strictly decreasing in the interval $x \in [-180^\circ; 0^\circ]$ (2)
- 6.2.3 Write down the value(s) of x for which $f(x + 30^\circ) - g(x + 30^\circ) = 0$ for $x \in [-180^\circ; 180^\circ]$ (2)
- [13]**

DBE/Feb.–Mar. 2016

QUESTION 6

Given the equation: $\sin(x + 60^\circ) + 2\cos x = 0$

- 6.1 Show that the equation can be rewritten as $\tan x = -4 - \sqrt{3}$. (4)
- 6.2 Determine the solutions of the equation $\sin(x + 60^\circ) + 2\cos x = 0$ in the interval $-180^\circ \leq x \leq 180^\circ$. (3)
- 6.3 In the diagram below, the graph of $f(x) = -2\cos x$ is drawn for $-120^\circ \leq x \leq 240^\circ$.



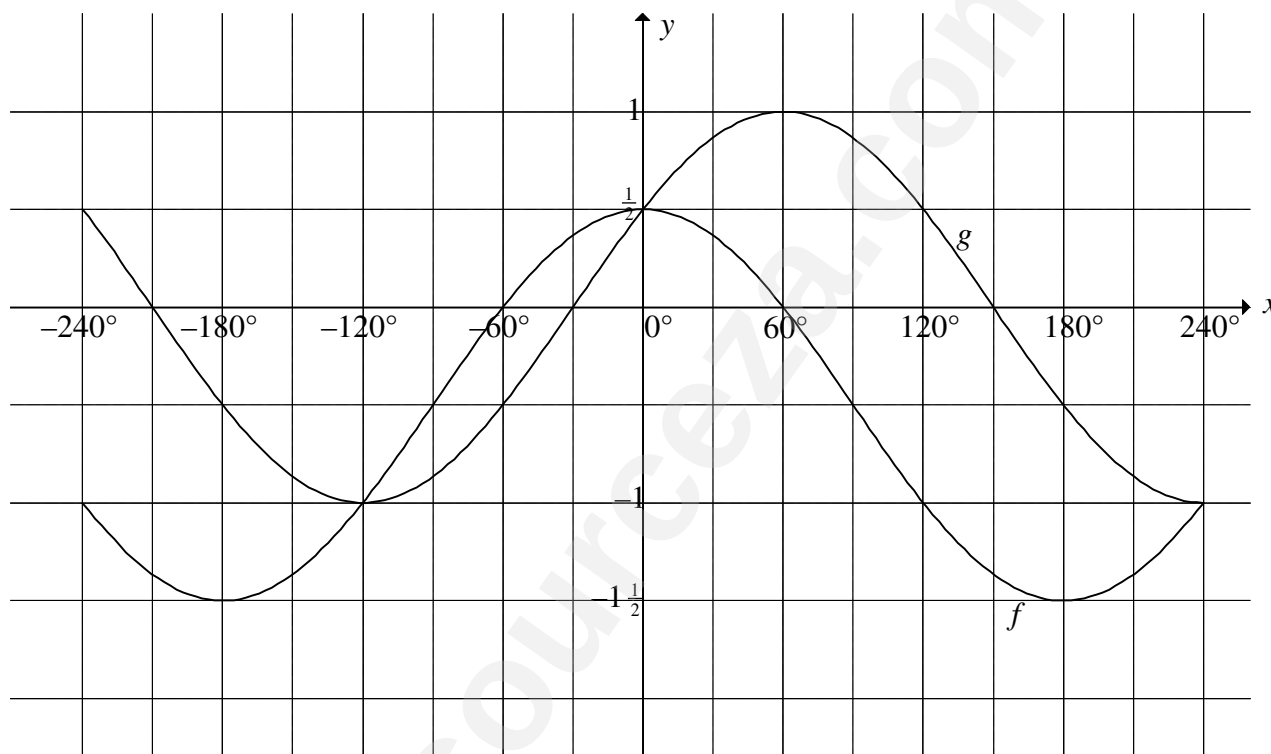
- 6.3.1 Draw the graph of $g(x) = \sin(x + 60^\circ)$ for $-120^\circ \leq x \leq 240^\circ$ on the grid provided in the ANSWER BOOK. (3)
- 6.3.2 Determine the values of x in the interval $-120^\circ \leq x \leq 240^\circ$ for which $\sin(x + 60^\circ) + 2\cos x > 0$. (3)

[13]

DBE/November 2015

QUESTION 6

In the diagram below, the graphs of $f(x) = \cos x + q$ and $g(x) = \sin(x + p)$ are drawn on the same system of axes for $-240^\circ \leq x \leq 240^\circ$. The graphs intersect at $\left(0^\circ; \frac{1}{2}\right)$, $(-120^\circ; -1)$ and $(240^\circ; -1)$.

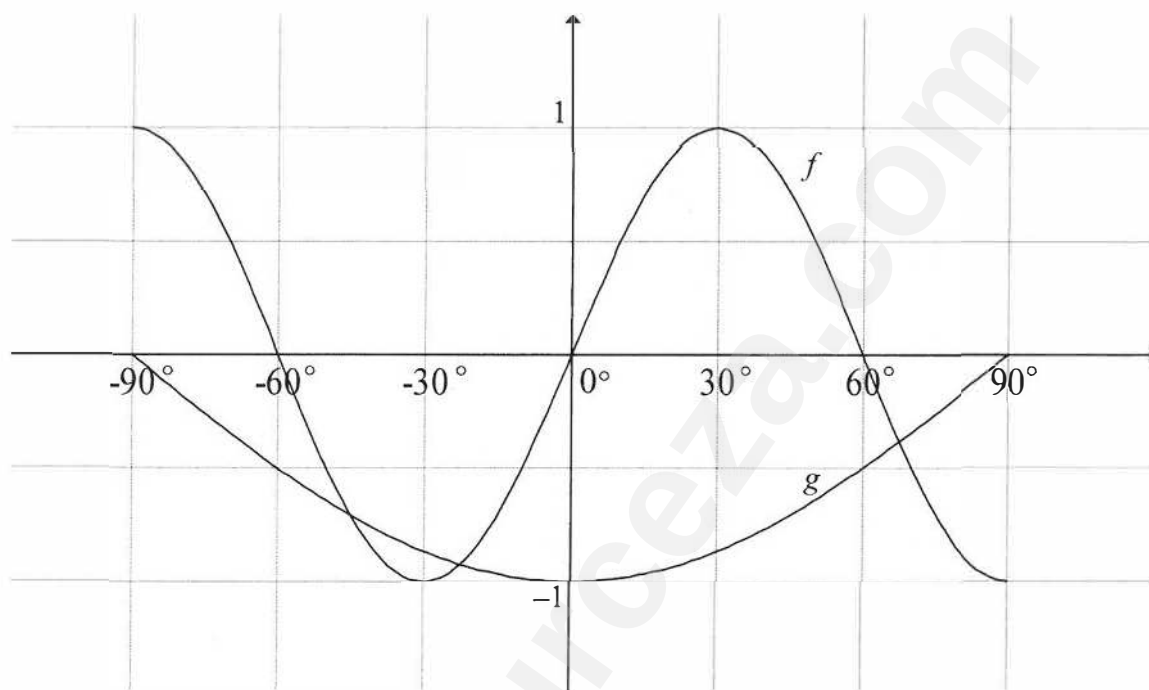


- 6.1 Determine the values of p and q . (4)
- 6.2 Determine the values of x in the interval $-240^\circ \leq x \leq 240^\circ$ for which $f(x) > g(x)$. (2)
- 6.3 Describe a transformation that the graph of g has to undergo to form the graph of h , where $h(x) = -\cos x$. (2)
- [8]**

DBE/2015

QUESTION 6

In the diagram below the graphs of $f(x) = \sin bx$ and $g(x) = -\cos x$ are drawn for $-90^\circ \leq x \leq 90^\circ$. Use the diagram to answer the following questions.

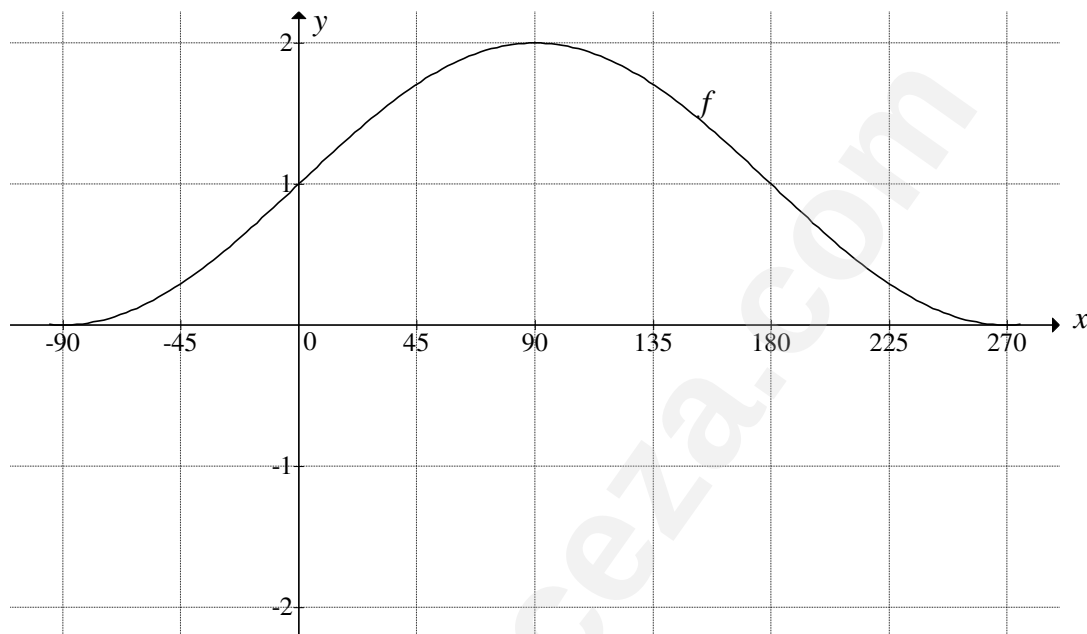


- 6.1 Write down the period of f . (1)
- 6.2 Determine the value of b . (1)
- 6.3 The general solutions of the equation $\sin bx = -\cos x$ are $x = 67,5^\circ + k \cdot 90^\circ$ or $x = 135^\circ + k \cdot 180^\circ$ where $k \in \mathbb{Z}$.
Determine the x -values of the points of intersection of f and g for the given domain. (3)
- 6.4 Write down the values of x for which $\sin bx + \cos x < 0$ for the given domain. (4)
- [9]**

DBE/November 2014

QUESTION 7

In the diagram below, the graph of $f(x) = \sin x + 1$ is drawn for $-90^\circ \leq x \leq 270^\circ$.



7.1 Write down the range of f . (2)

7.2 Show that $\sin x + 1 = \cos 2x$ can be rewritten as $(2 \sin x + 1) \sin x = 0$. (2)

7.3 Hence, or otherwise, determine the general solution of $\sin x + 1 = \cos 2x$. (4)

7.4 Use the grid on DIAGRAM SHEET 2 to draw the graph of $g(x) = \cos 2x$ for $-90^\circ \leq x \leq 270^\circ$. (3)

7.5 Determine the value(s) of x for which $f(x + 30^\circ) = g(x + 30^\circ)$ in the interval $-90^\circ \leq x \leq 270^\circ$. (3)

7.6 Consider the following geometric series:

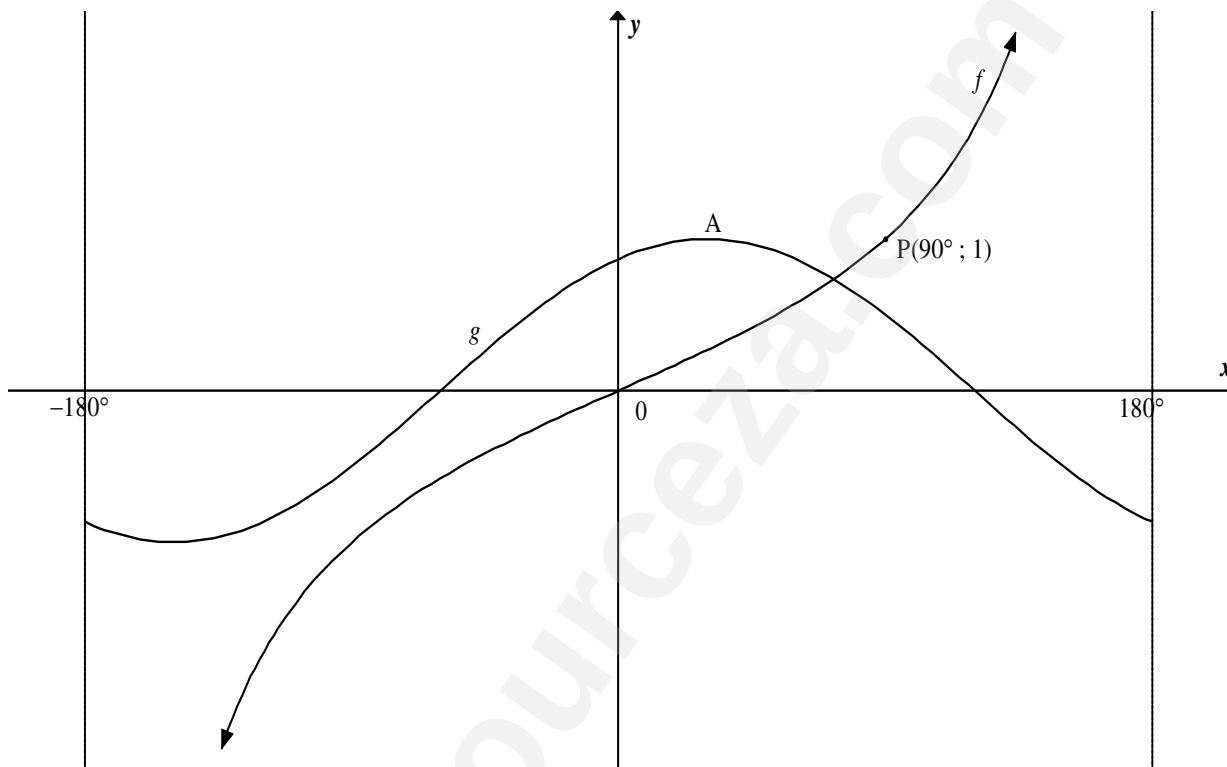
$$1 + 2 \cos 2x + 4 \cos^2 2x + \dots$$

Use the graph of g to determine the value(s) of x in the interval $0^\circ \leq x \leq 90^\circ$ for which this series will converge. (5)

[19]

QUESTION 6

In the diagram below, the graphs of $f(x) = \tan bx$ and $g(x) = \cos(x - 30^\circ)$ are drawn on the same system of axes for $-180^\circ \leq x \leq 180^\circ$. The point $P(90^\circ; 1)$ lies on f . Use the diagram to answer the following questions.



- 6.1 Determine the value of b . (1)
- 6.2 Write down the coordinates of A, a turning point of g . (2)
- 6.3 Write down the equation of the asymptote(s) of $y = \tan b(x + 20^\circ)$ for $x \in [-180^\circ; 180^\circ]$. (1)
- 6.4 Determine the range of h if $h(x) = 2g(x) + 1$. (2)
- [6]**



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TRIGONOMETRY Formulae

MATHEMATICS

Grade 12

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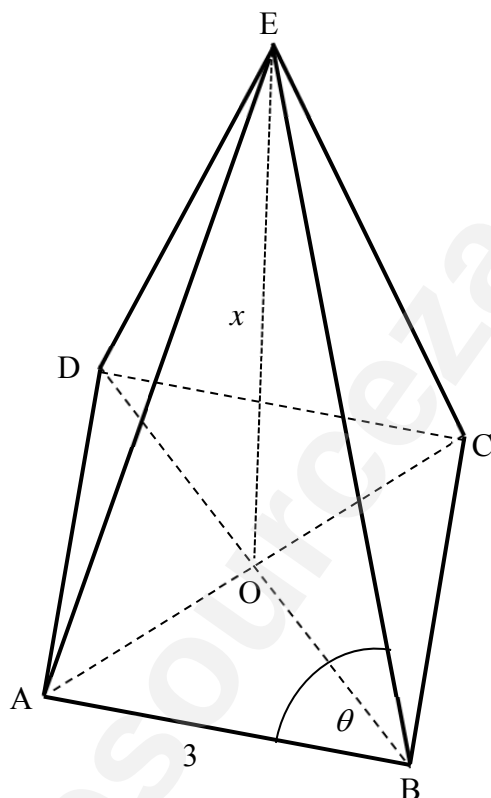
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DBE/November 2016

QUESTION 7

E is the apex of a pyramid having a square base ABCD. O is the centre of the base. $\hat{EBA} = \theta$, $AB = 3$ m and EO, the perpendicular height of the pyramid, is x .

$$\text{Volume of pyramid} = \frac{1}{3} (\text{area of base}) \times (\perp \text{ height})$$



7.1 Calculate the length of OB. (3)

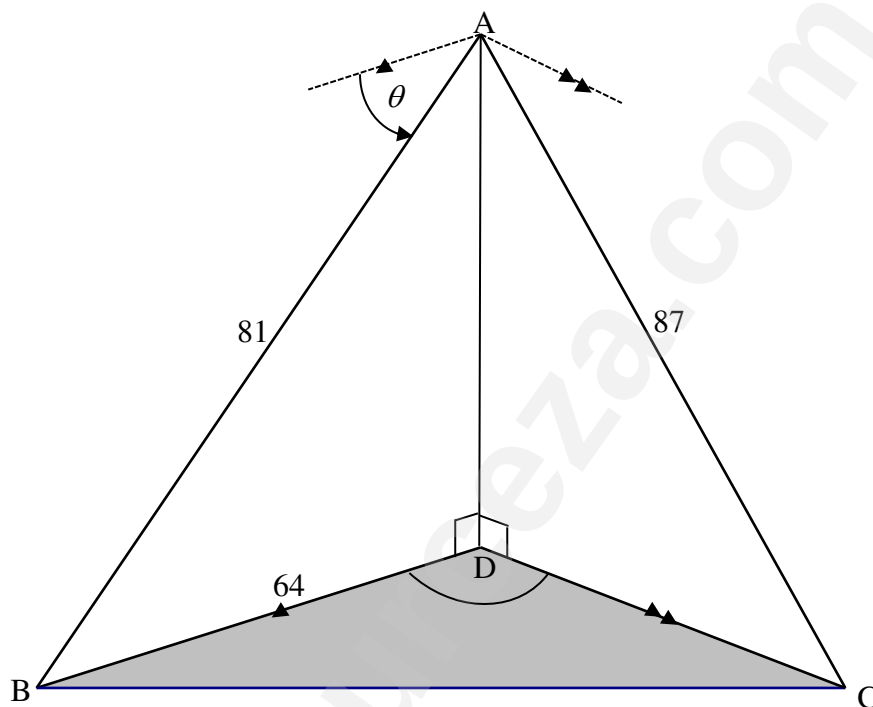
7.2 Show that $\cos \theta = \frac{3}{2\sqrt{x^2 + \frac{9}{2}}}$ (5)

7.3 If the volume of the pyramid is 15 m^3 , calculate the value of θ . (4)
[12]

DBE/2016

QUESTION 7

From point A an observer spots two boats, B and C, at anchor. The angle of depression of boat B from A is θ . D is a point directly below A and is on the same horizontal plane as B and C. $BD = 64$ m, $AB = 81$ m and $AC = 87$ m.

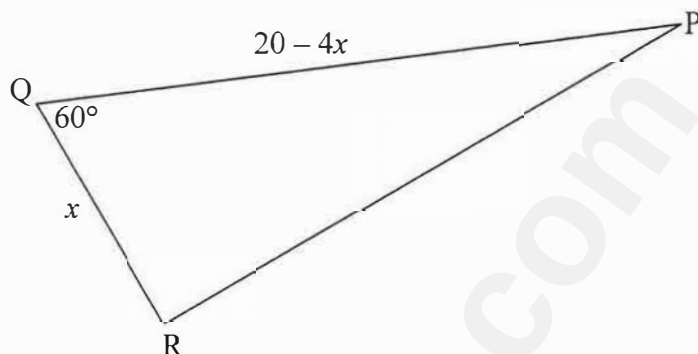


- 7.1 Calculate the size of θ to the nearest degree. (3)
- 7.2 If it is given that $\hat{BAC} = 82,6^\circ$, calculate BC, the distance between the boats. (3)
- 7.3 If $\hat{BDC} = 110^\circ$, calculate the size of $\hat{DCB}$. (3)
- [9]**

DBE/Feb.–Mar. 2016

QUESTION 7

- 7.1 In the diagram below, $\triangle PQR$ is drawn with $PQ = 20 - 4x$, $RQ = x$ and $\hat{Q} = 60^\circ$.

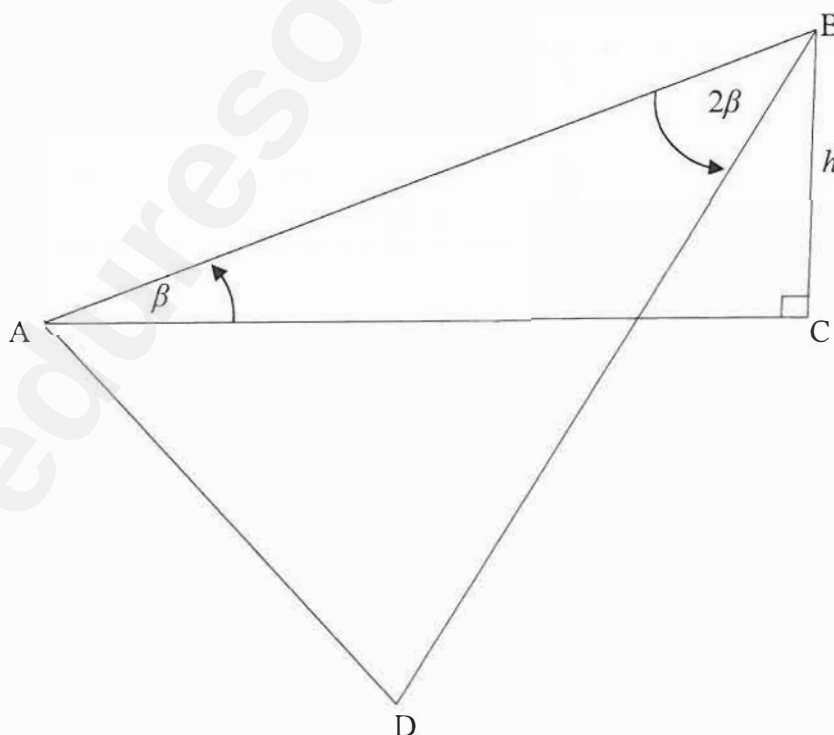


- 7.1.1 Show that the area of $\triangle PQR = 5\sqrt{3}x - \sqrt{3}x^2$. (2)

- 7.1.2 Determine the value of x for which the area of $\triangle PQR$ will be a maximum. (3)

- 7.1.3 Calculate the length of PR if the area of $\triangle PQR$ is a maximum. (3)

- 7.2 In the diagram below, BC is a pole anchored by two cables at A and D . A , D and C are in the same horizontal plane. The height of the pole is h and the angle of elevation from A to the top of the pole, B , is β . $\hat{ABD} = 2\beta$ and $BA = BD$.



Determine the distance AD between the two anchors in terms of h .

(7)
[15]

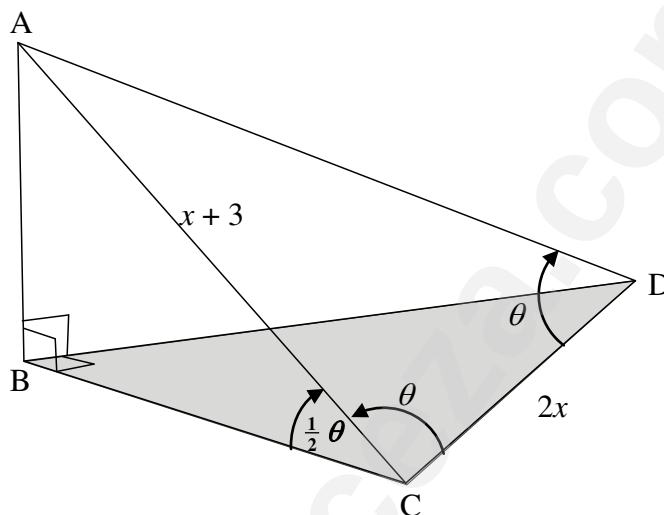
DBE/November 2015

QUESTION 7

A corner of a rectangular block of wood is cut off and shown in the diagram below.

The inclined plane, that is, $\triangle ACD$, is an isosceles triangle having $\angle ADC = \angle ACD = \theta$.

Also $\angle ACB = \frac{1}{2}\theta$, $AC = x + 3$ and $CD = 2x$.



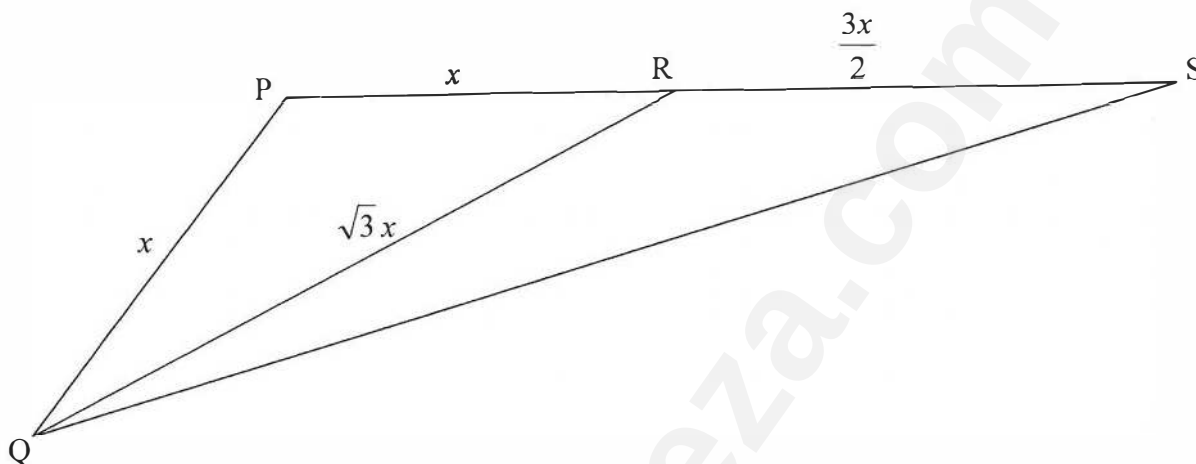
- 7.1 Determine an expression for $\angle CAD$ in terms of θ . (1)
- 7.2 Prove that $\cos \theta = \frac{x}{x+3}$. (4)
- 7.3 If it is given that $x = 2$, calculate AB , the height of the piece of wood. (5)
- [10]**

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QUESTION 7

Triangle PQS forms a certain area of a park. R is a point on PS and QR divides the area of the park into two triangular parts, as shown below, for a festive event.

$PQ = PR = x$ units, $RS = \frac{3x}{2}$ units and $RQ = \sqrt{3}x$ units.

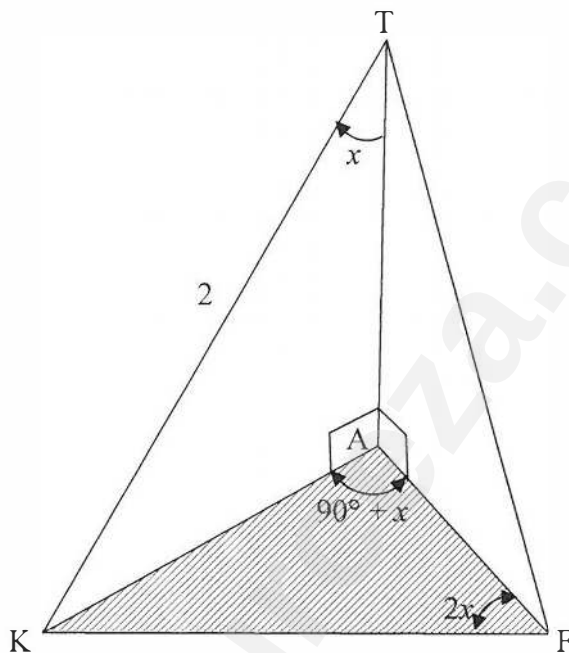


- 7.1 Calculate the size of $\hat{P}$. (4)
- 7.2 Hence, calculate the area of triangle QRS in terms of x in its simplest form. (5)
- [9]

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QUESTION 6

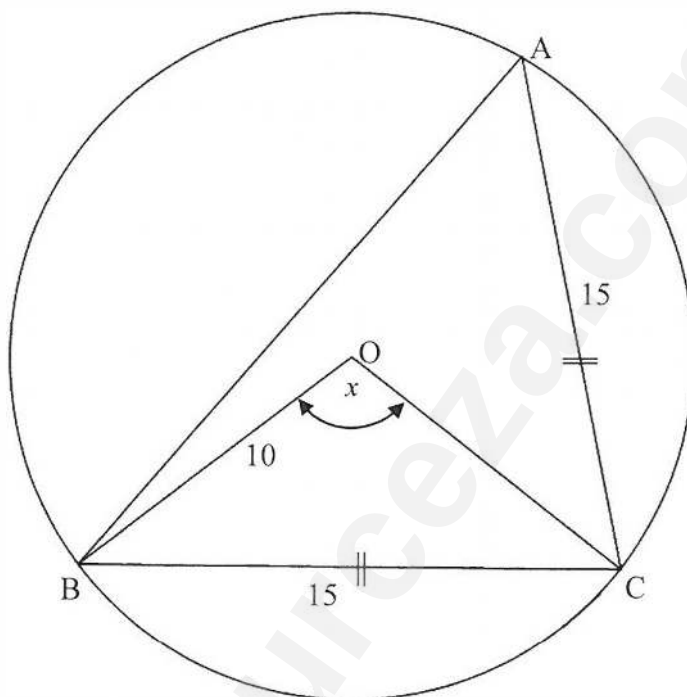
- 6.1 In the figure, points K, A and F lie in the same horizontal plane and TA represents a vertical tower. $\hat{ATK} = x$, $\hat{KAF} = 90^\circ + x$ and $\hat{KFA} = 2x$ where $0^\circ < x < 30^\circ$. $TK = 2$ units.



- 6.1.1 Express AK in terms of $\sin x$. (2)
- 6.1.2 Calculate the numerical value of KF. (5)

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- 6.2 In the diagram below, a circle with centre O passes through A , B and C .
 $BC = AC = 15$ units. BO and OC are joined. $OB = 10$ units and $\hat{BOC} = x$.



Calculate:

6.2.1 The size of x (4)

6.2.2 The size of $\hat{ACB}$ (3)

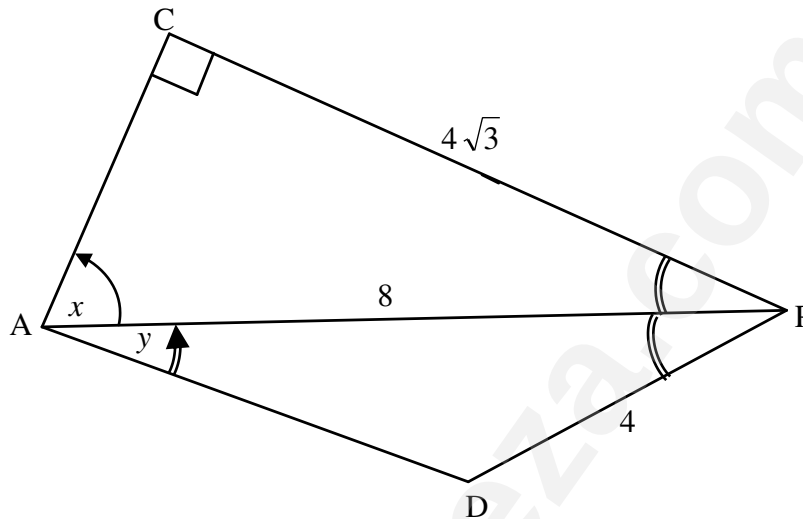
6.2.3 The area of $\triangle ABC$ (2)

[16]

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QUESTION 5

In the figure below, $\triangle ACP$ and $\triangle ADP$ are triangles with $\hat{C} = 90^\circ$, $CP = 4\sqrt{3}$, $AP = 8$ and $DP = 4$.
 PA bisects $\hat{DPC}$. Let $\hat{CAP} = x$ and $\hat{DAP} = y$.

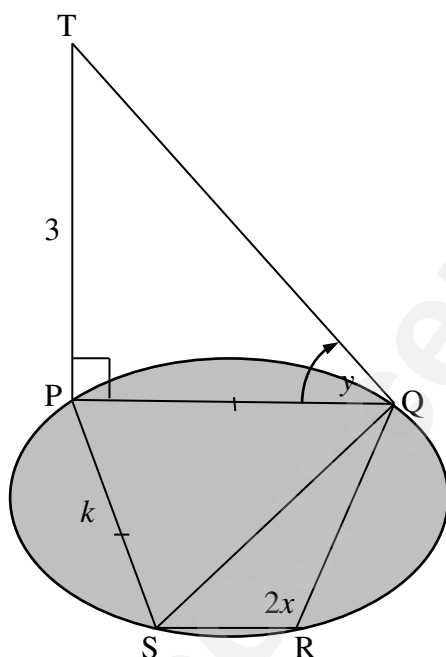


- 5.1 Show, by calculation, that $x = 60^\circ$. (2)
- 5.2 Calculate the length of AD . (4)
- 5.3 Determine y . (3)
- [9]**

QUESTION 7

7.1 Prove that in any acute-angled $\triangle ABC$, $\frac{\sin A}{a} = \frac{\sin B}{b}$. (5)

7.2 The framework for a construction consists of a cyclic quadrilateral PQRS in the horizontal plane and a vertical post TP as shown in the figure. From Q the angle of elevation of T is y° . $PQ = PS = k$ units, $TP = 3$ units and $\hat{SRQ} = 2x^\circ$.



7.2.1 Show, giving reasons, that $\hat{PSQ} = x$. (2)

7.2.2 Prove that $SQ = 2k \cos x$. (4)

7.2.3 Hence, prove that $SQ = \frac{6 \cos x}{\tan y}$. (2)
[13]