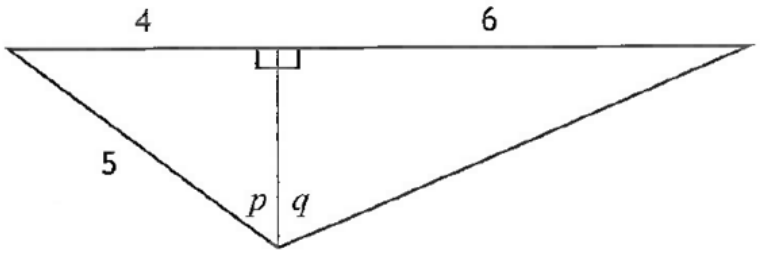
# SQA Past paper questions

## 2023 – Paper 1 – Question 4

The diagram shows two right-angled triangles with angles $p$ and $q$ as marked.




(a) Determine the value of:

(i) $\cos p$ 1

(ii) $\cos q$. 1

(b) Hence determine the value of $\cos(p+q)$. 3

Click here for video solution.

## 2023 – Paper 1 – Question 13

Functions $f$ and $g$ are defined by:

- $f(x) = 2\sin x$, where $0 < x < \frac{\pi}{2}$
- $g(x) = 2x$, where $0 < x < \frac{\pi}{4}$

(a) (i) Evaluate $f\left(g\left(\frac{\pi}{6}\right)\right)$. 1

(ii) Determine an expression for $f(g(x))$. 2

(b) (i) Given that $f(p) = \frac{1}{3}$, determine the exact value of $\sin p$. 1

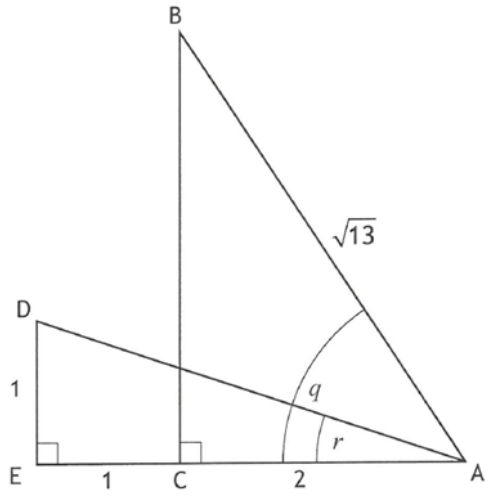
(ii) Hence, determine the exact value of $f(g(p))$. 3

Click here for video solution.

## 2022 – Paper 1 – Question 7

Triangles ABC and ADE are both right angled.

Angle BAC = $q$ and angle DAE = $r$ as shown in the diagram.




(a) Determine the value of:

(i) $\sin r$ 1

(ii) $\sin q$. 1

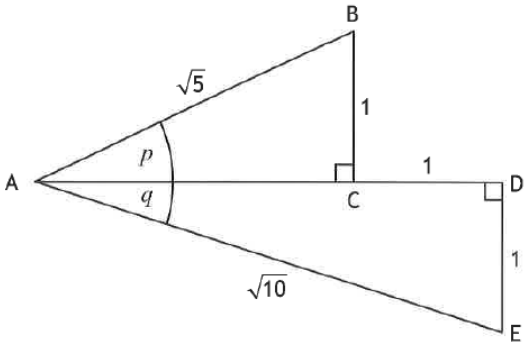
(b) Hence determine the value of $\sin(q-r)$. 3

Click here for video solution.

## 2019 – Paper 1 – Question 13

Triangles ABC and ADE are both right angled.

Angles $p$ and $q$ are as shown in the diagram.




(a) Determine the value of

(i) $\cos p$ 1

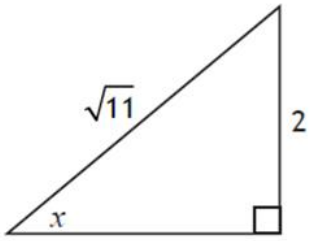
(ii) $\cos q$. 1

(b) Hence determine the value of $\sin(p+q)$. 3

Click here for video solution.

## 2018 – Paper 1 – Question 13

The right-angled triangle in the diagram is such that $\sin x = \frac{2}{\sqrt{11}}$ and $0 < x < \frac{\pi}{4}$.




(a) Find the exact value of:

(i) $\sin 2x$ 3

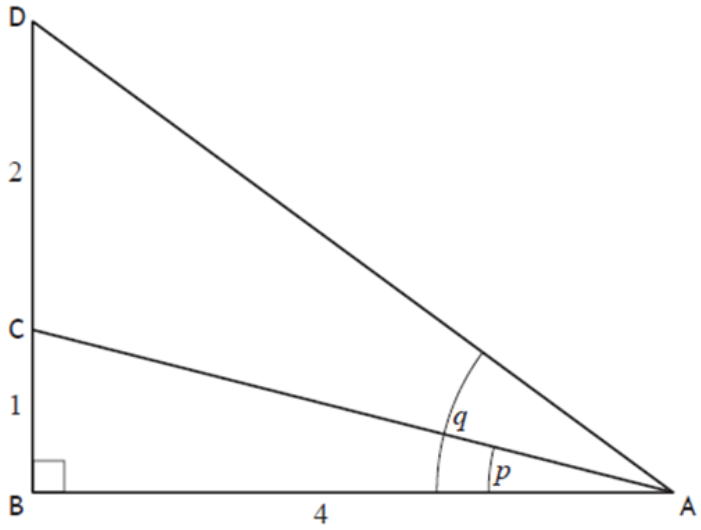
(ii) $\cos 2x$. 1

(b) By expressing $\sin 3x$ as $\sin(2x + x)$, find the exact value of $\sin 3x$. 3

Click here for video solution.

## 2016 – Paper 1 – Question 13

Triangle ABD is right-angled at B with angles BAC = $p$ and BAD = $q$ and lengths as shown in the diagram below.




Show that the exact value of $\cos(q - p)$ is $\frac{19\sqrt{17}}{85}$. 5

Click here for video solution.

## 2015 – Paper 1 – Question 10

Given that $\tan 2x = \frac{3}{4}$, $0 < x < \frac{\pi}{4}$, find the exact value of

(a) $\cos 2x$ 1

(b) $\cos x$. 2

Click here for video solution.

## Specimen – Paper 1 – Question 6

(a) Find an equivalent expression for $\sin(x + 60)^\circ$. 1

(b) Hence, or otherwise, determine the exact value of $\sin 105^\circ$. 3

Click here for video solution.

## 2010 – Paper 2 – Question 23

(a) Diagram 1 shows a right angled triangle, where the line OA has equation $3x - 2y = 0$.

(i) Show that $\tan a = \frac{3}{2}$.

(ii) Find the value of $\sin a$.

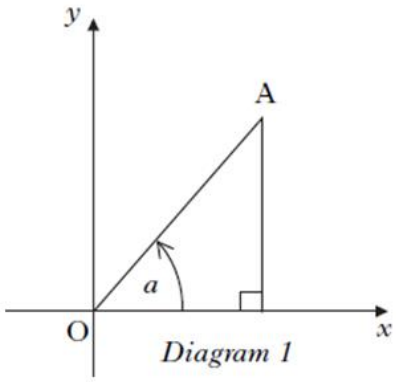


Diagram 1

4

(b) A second right angled triangle is added as shown in Diagram 2.

The line OB has equation $3x - 4y = 0$.

Find the values of $\sin b$ and $\cos b$.

4

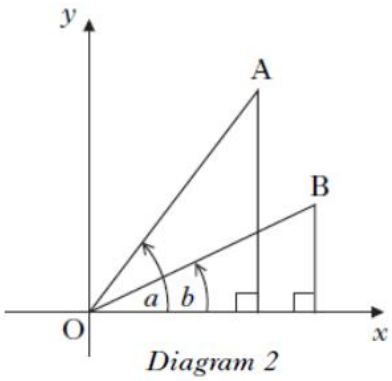


Diagram 2

(c) (i) Find the value of $\sin(a - b)$.

(ii) State the value of $\sin(b - a)$.

4

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## 2008 – Paper 2 – Question 24

(*a*) Using the fact that $\frac{7\pi}{12} = \frac{\pi}{3} + \frac{\pi}{4}$, find the exact value of $\sin\left(\frac{7\pi}{12}\right)$. **3**

(*b*) Show that $\sin(A + B) + \sin(A - B) = 2\sin A \cos B$. **2**

(*c*) (i) Express $\frac{\pi}{12}$ in terms of $\frac{\pi}{3}$ and $\frac{\pi}{4}$.

(ii) Hence or otherwise find the exact value of $\sin\left(\frac{7\pi}{12}\right) + \sin\left(\frac{\pi}{12}\right)$. **4**

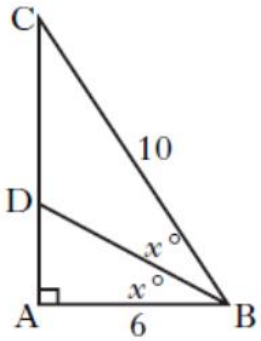
Click here for video solution.

## Specimen 1 – Paper 2 – Question 7

Triangle ABC is right-angled at A and BD is the bisector of angle ABC.

AB = 6 units and CB = 10 units.

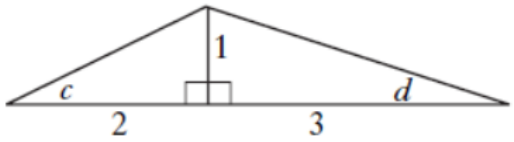
Determine the exact value of BD, expressing your answer in its simplest form. **5**




Click here for video solution.

## 2007 – Paper 2 – Question 2

The diagram shows two right-angled triangles with angles $c$ and $d$ marked as shown.




(*a*) Find the exact value of $\sin(c + d)$. **4**

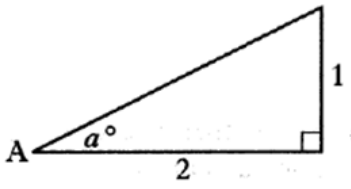
(*b*) (i) Find the exact value of $\sin 2c$.

(ii) Show that $\cos 2d$ has the same exact value. **4**

Click here for video solution.

## 2006 – Paper 2 – Question 8

The diagram shows a right-angled triangle with height 1 unit, base 2 units and an angle of $a°$ at A.




(a) Find the exact values of:

(i) $\sin a°$;

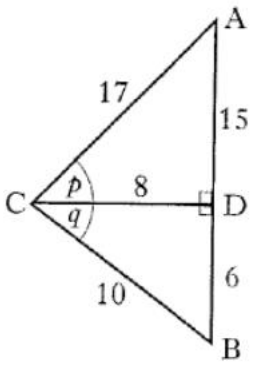
(ii) $\sin 2a°$. **4**

(b) By expressing $\sin 3a°$ as $\sin(2a + a)°$, find the exact value of $\sin 3a°$. **4**

Click here for video solution.

## 2005 – Paper 2 – Question 2

Triangles ACD and BCD are right-angled at D with angles $p$ and $q$ and lengths as shown in the diagram.




(a) Show that the exact value of $\sin(p + q)$ is $\frac{84}{85}$. **4**

(b) Calculate the exact values of:

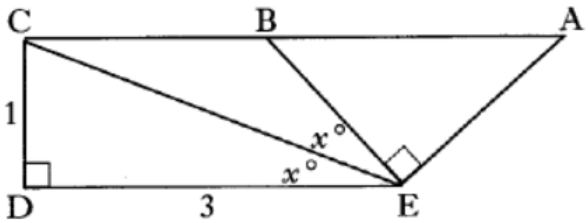
(i) $\cos(p + q)$;

(ii) $\tan(p + q)$. **3**

Click here for video solution.

## 2004 – Paper 1 – Question 10

In the diagram
angle DEC = angle CEB = $x°$ and
angle CDE = angle BEA = 90°.
CD = 1 unit; DE = 3 units.




By writing angle DEA in terms of $x°$, find the exact value of $\cos(D\hat{E}A)$. **7**

Click here for video solution.

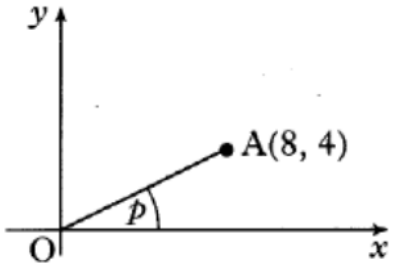
## 2003 – Paper 1 – Question 10

A is the point (8, 4). The line OA is inclined at an angle $p$ radians to the $x$-axis.

(a) Find the exact values of:

(i) $\sin(2p)$;

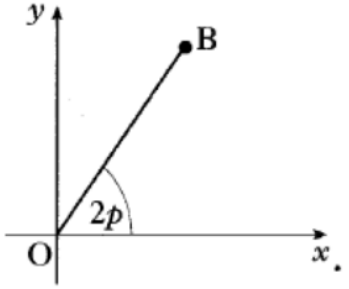
(ii) $\cos(2p)$.




**5**

The line OB is inclined at an angle $2p$ radians to the $x$-axis.

(b) Write down the exact value of the gradient of OB.

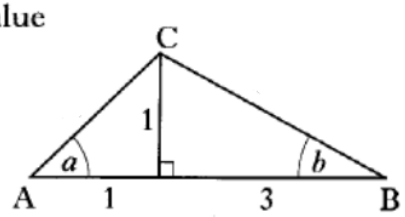



**1**

Click here for video solution.

## 2000 – Paper 1 – Question 1

In triangle ABC, show that the exact value of $\sin(a+b)$ is $\frac{2}{\sqrt{5}}$.



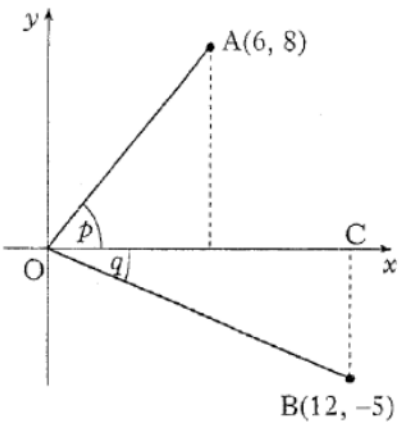

**4**

Click here for video solution.

## 1999 – Paper 1 – Question 1

On the coordinate diagram shown, A is the point (6, 8) and B is the point (12, –5). Angle AOC = $p$ and angle COB = $q$.

Find the exact value of $\sin(p+q)$.




**4**

Click here for video solution.

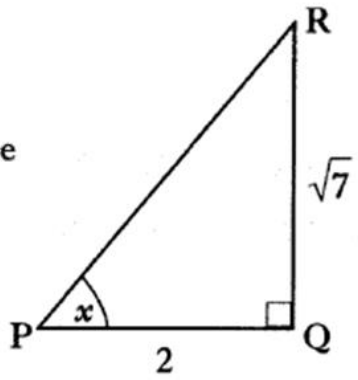
## 1997 – Paper 1 – Question 7

If $x°$ is an acute angle such that $\tan x° = \frac{4}{3}$, show that the exact value of $\sin(x+30)°$ is $\frac{4\sqrt{3}+3}{10}$. (3)

Click here for video solution.

## 1999 – Paper 1 – Question 12

Using triangle PQR, as shown, find the exact value of $\cos 2x$. (3)

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## 1995 – Paper 1 – Question 12

Given that $\tan \alpha = \frac{\sqrt{11}}{3}$, $0 < \alpha < \frac{\pi}{2}$, find the exact value of $\sin 2\alpha$. (3)

Click here for video solution.

## 1993 – Paper 1 – Question 6

For acute angles P and Q, $\sin P = \frac{12}{13}$ and $\sin Q = \frac{3}{5}$.

Show that the exact value of $\sin(P+Q)$ is $\frac{63}{65}$. (3)

Click here for video solution.

## 1991 – Paper 1 – Question 12

Given that $\sin A = \frac{3}{4}$, where $0 < A < \frac{\pi}{2}$, find the exact value of $\sin 2A$. (3)

Click here for video solution.