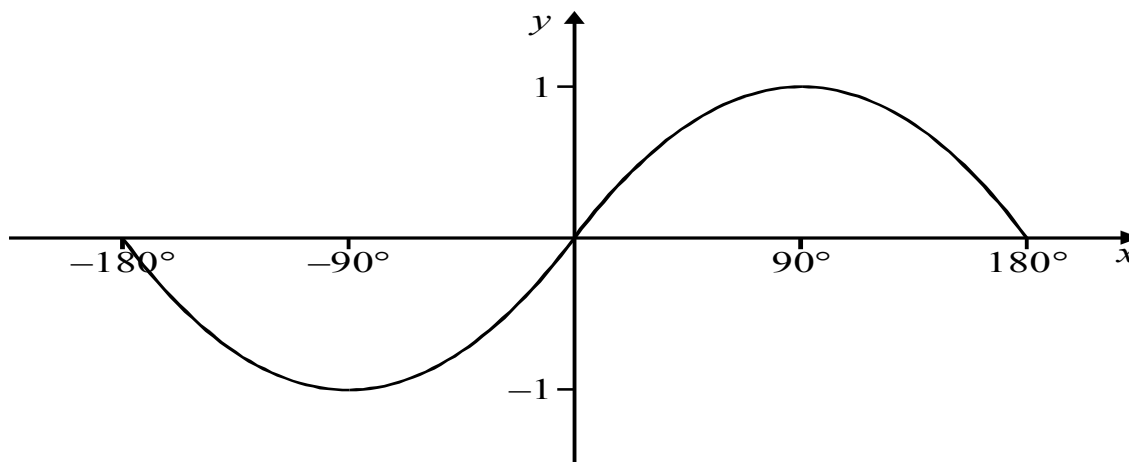


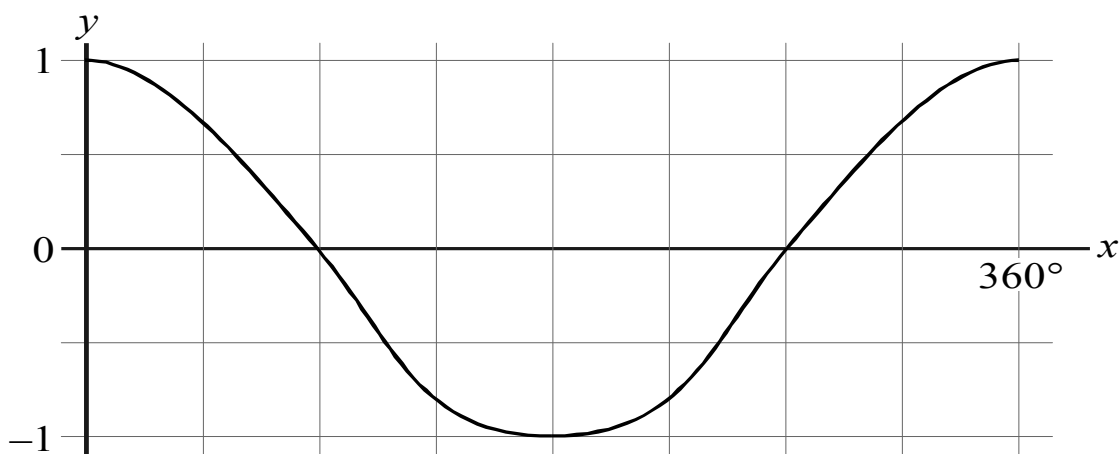
GCSE MATHEMATICS Higher Tier
NON-CALCULATOR GUIDED REVISION SHEET 2

1. The diagram shows a sketch of the graph of $y = \sin x$ for x between -180° and 180° .



- a) One solution of the equation $\sin x = 0.8$ is 53° to the nearest degree.
Find the other solution of the equation $\sin x = 0.8$ between -180° and 180° .
- b) One solution of the equation $\sin x = 0.9$ is 64° to the nearest degree.
Find **two solutions** of the equation $\sin x = -0.9$ for x between -180° and 180° .

2. The diagram shows a sketch of the graph of $y = \cos x$ for x between 0° and 360° .



- a) One solution of the equation $\cos x = 0.8$ is 37° to the nearest degree.
Find the other solution of the equation $\cos x = 0.8$ between 0° and 360° .
- b) One solution of the equation $\cos x = 0.9$ is 26° to the nearest degree.
Find **two solutions** of the equation $\cos x = -0.9$ for x between 0° and 360° .

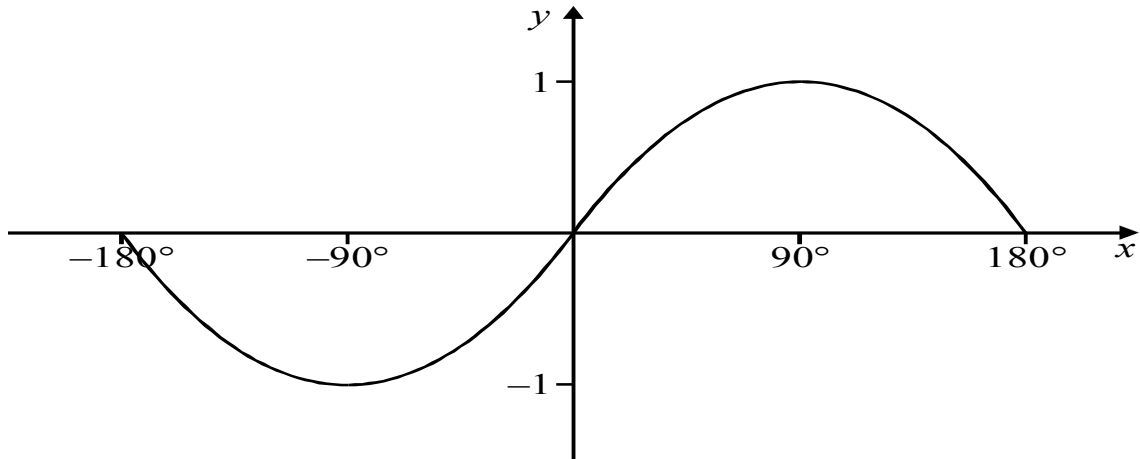
3. a) By rationalising the denominator, simplify $\frac{20}{\sqrt{5}}$.
- b) Show that $(\sqrt{2} + \sqrt{8})^2 = 18$.
- c) Express $0.1\dot{2}\dot{5}$ as a fraction.
- d) Write $\sqrt{300} + 2\sqrt{48}$ in the form $p\sqrt{3}$ where p is an integer.
4. Simplify the following:
- a) $\sqrt{63} - \sqrt{28}$ b) $\sqrt{18} + \sqrt{32}$ c) $\frac{6}{\sqrt{2}}$
- d) $\frac{9}{2\sqrt{3}}$ e) $(\sqrt{3} + \sqrt{12})^2$ f) $(\sqrt{7} - \sqrt{3})^2$.
5. Express the following as fractions: a) $1.3\dot{1}\dot{6}$ b) $0.0\dot{5}$.
6. y is proportional to the square of x . When $y = 27$, $x = 3$.
- a) Find the value of y when $x = 4$.
- b) Find the values of x when $y = 75$.
7. y is inversely proportional to the square-root of x . When $y = 4$, $x = 9$.
- a) Find the value of y when $x = 4$.
- b) Find the value of x when $y = 2.4$.
8. y is proportional to x . When $y = 10$, $x = 2$.
- a) Find the value of y when $x = 6$.
- b) Find the values of x when $y = 25$.
9. y is inversely proportional to the square of x . When $y = 5$, $x = 2$.
- a) Find the value of y when $x = 4$.
- b) Find the values of x when $y = 0.2$.
10. Simplify a) $\frac{4x - 12}{x^2 - 9}$ b) $\frac{3x - 12}{x^2 + x - 20}$
- c) $\frac{2x^2 + 3x + 1}{x^2 + x}$.
11. Make m the subject of the following formulae
- a) $A = mab + \frac{1}{2}md^2$ b) $2m + A = 3b^2m + 1$
- c) $A = ma^2 - \frac{1}{2}m$ d) $5m - 2 = 3am + B$
- e) $A = m(b + d^2) + D$ f) $y = a(m + d^2) - D$
- g) $x = m(b - ab)$ h) $\frac{A}{m + b} = b$.
12. Express the following as products of their prime factors in index form.
- a) 60 b) 96 c) 400 d) 150.

Answers.

1. a) $x = 127^\circ$.
b) $x = -64^\circ$ or $x = -116^\circ$.
2. a) $x = 323^\circ$.
b) $x = 154^\circ$ or $x = 206^\circ$.
3. a) $4\sqrt{5}$.
c) $\frac{124}{990}$.
d) $18\sqrt{3}$.
4. a) $\sqrt{7}$ b) $7\sqrt{2}$ c) $3\sqrt{2}$ d) $\frac{3\sqrt{3}}{2}$
e) 27 f) $10 - 2\sqrt{21}$.
5. a) $\frac{1303}{990}$ b) $\frac{5}{90}$ or $\frac{1}{18}$.
6. $\{y = 3x^2\}$ a) $y = 48$ b) $x = -5$ or $x = 5$.
7. $\left\{y = \frac{12}{\sqrt{x}}\right\}$ a) $y = 6$ b) $x = 25$.
8. $\{y = 5x\}$ a) $y = 30$ b) $x = 5$.
9. $\left\{y = \frac{20}{x^2}\right\}$ a) $y = \frac{5}{4}$ b) $x = -10$ or $x = 10$.
10. a) $\frac{4}{x + 3}$ b) $\frac{3}{x + 5}$ c) $\frac{2x + 1}{x}$
11. a) $m = \frac{2A}{(2ab + d^2)}$ b) $m = \frac{A - 1}{(3b^2 - 2)}$
c) $m = \frac{2A}{(2a^2 - 1)}$ d) $m = \frac{B + 2}{(5 - 3a)}$
e) $m = \frac{A - D}{(b + d^2)}$ f) $m = \frac{y + D - ad^2}{a}$
g) $m = \frac{x}{(b - ab)}$ h) $m = \frac{A}{b} - b$ or $\frac{A - b^2}{b}$.
12. a) $2^2 \times 3 \times 5$ b) $2^5 \times 3$ c) $2^4 \times 5^2$ d) $2 \times 3 \times 5^2$.

GCSE MATHEMATICS Higher Tier
NON-CALCULATOR HOMEWORK

1. The diagram shows a sketch of the graph of $y = \sin x$ for x between -180° and 180° .



- a) One solution of the equation $\sin x = 0.4$ is 24° to the nearest degree.
Find the other solution of the equation $\sin x = 0.4$ between -180° and 180° .
- b) One solution of the equation $\sin x = 0.7$ is 44° to the nearest degree.
Find **two solutions** of the equation $\sin x = -0.7$ for x between -180° and 180° .
2. Sketch the graph of $y = \tan x$ for values of x between 0 and 360° .
Write down a value of x such that $\tan x = \tan 55^\circ$.
3. Simplify the following:
- a) $\sqrt{12} + 2\sqrt{27}$ b) $\frac{10}{\sqrt{2}}$ c) $(\sqrt{8} - \sqrt{2})^2$.
4. y is inversely proportional to the square-root of x . When $y = 5$, $x = 4$.
- a) Find the value of y when $x = 9$. b) Find the value of x when $y = 0.5$.
5. Simplify $\frac{9x^2 - 1}{6x^2 - 2x}$.
6. Make m the subject of the following formulae
- a) $A = mab - \frac{2}{3}md^2$ b) $5m - A = bm + 1$.
7. Write 240 as a product of prime factors in index form.

Answers.

1. a) $x = 156^\circ$.
b) $x = -44^\circ$ or $x = -136^\circ$.

2. $x = 235^\circ$.

3. a) $8\sqrt{3}$ b) $5\sqrt{2}$ c) 2.

4. $\left\{y = \frac{10}{\sqrt{x}}\right\}$ a) $y = \frac{10}{3}$ b) $x = 400$.

5. $\frac{3x + 1}{2x}$.

6. a) $m = \frac{3A}{3ab - 2d^2}$ b) $m = \frac{A + 1}{5 - b}$.

7. $240 = 2^4 \times 3 \times 5$.