

GCSE MATHEMATICS Higher Tier

NON-CALCULATOR GUIDED REVISION SHEET 3

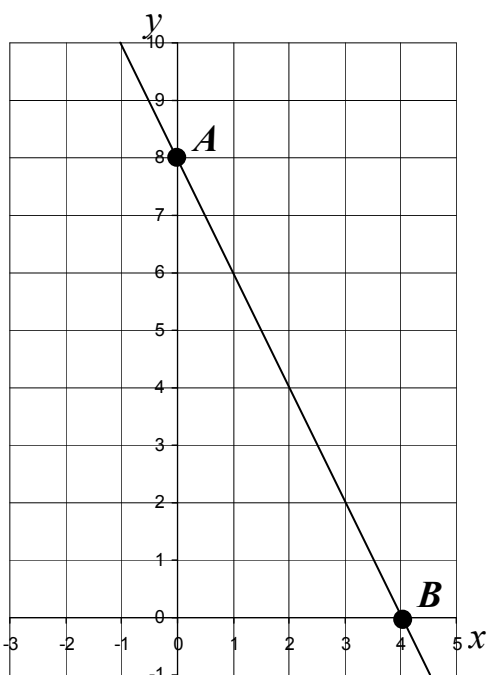
1. Evaluate the following.

a) $16^{\frac{1}{2}}$, b) 4^{-2} , c) $2^{-2} \times 2^5$, d) $27^{\frac{2}{3}}$,
 e) 10^0 , f) $8^{-\frac{2}{3}}$.

2. Evaluate the following.

a) $25^{\frac{1}{2}}$, b) 3^{-2} , c) $2^{-3} \times 2^5$, d) $8^{\frac{2}{3}}$,
 e) 1000^0 , f) $16^{-\frac{3}{4}}$, g) 1^4 .

3.



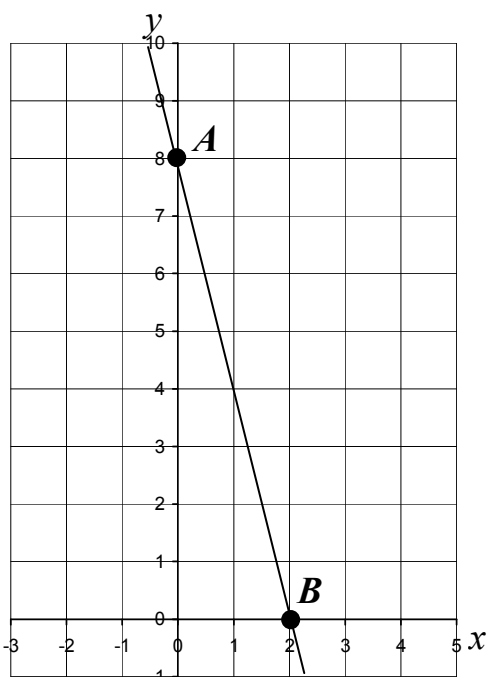
a) The line shown passes through the points $A(0, 8)$ and $B(4, 0)$.

Find an equation for the line through AB .

b) Write down the equation of any line which is parallel to AB .

c) Find an equation for the line which passes through the points $(0, 1)$ and $(2, 2)$.

4.



a) The line shown passes through the points $A(0, 8)$ and $B(2, 0)$.

Find an equation for the line through AB .

b) Write down the equation of any line which is parallel to AB .

c) Find an equation for the line which passes through the points $(0, 2)$ and $(3, 8)$.

5. Express the following in standard form.
- | | | | |
|----|--|----|--|
| a) | 550 | b) | 20000 |
| c) | 0.065 | d) | 100 |
| e) | $(3 \times 10^3) \times (2 \times 10^4)$ | f) | $(2.4 \times 10^6) \times (3 \times 10^{-2})$ |
| g) | $(6 \times 10^2) \times (2 \times 10^3)$ | h) | $(30 \times 10^5) \times (4 \times 10^{-2})$. |
6. Express the following in standard form.
- | | | | |
|----|---|----|---|
| a) | 2500 | b) | 220000 |
| c) | 0.15 | d) | 1000 |
| e) | $(2 \times 10^5) \times (4.1 \times 10^4)$ | f) | $(2.5 \times 10^8) \times (3 \times 10^{-2})$ |
| g) | $(8 \times 10^{11}) \times (3 \times 10^3)$ | h) | $(300 \times 10^5) \times (5 \times 10^{-1})$. |
7. a) Find the highest common factor of the numbers 16 and 40.
- b) The number 40 expressed as the product of its prime factors in index form is given by $2^3 \times 5$.
Express 90 as the product of its prime factors in index form.
- c) Use your answer to b) to write 40×90 as the product of its prime factors in index form.
8. a) Write 600 as a product of prime numbers in index form.
- b) Use your result in part a) to write down the smallest multiple of 600 which is a perfect square.
9. It is given that $ab^3 = 54$.
Find the values of a and b .
10. Work out a) $\frac{1}{0.2^2}$ b) 2.5^2 .
11. Work out a) $\frac{2}{0.1^2}$ b) 1.5^2 c) 1.5^3 .
12. Show that the square of an odd number is always an odd number itself.
13. Show that the square of an even number is always an even number itself.
14. Bob says "The quantity $2^n - 1$ is always a prime number."
Show by **counter example** that Bob is incorrect.

Answers.

1. a) 4 b) $\frac{1}{16}$ c) $2^3 = 8$ d) 9
e) 1 f) $\frac{1}{4}$.
2. a) 5 b) $\frac{1}{9}$ c) $2^2 = 4$ d) 4
e) 1 f) $\frac{1}{8}$ g) 1.
3. a) $y = 8 - 2x$ b) $y = c - 2x$ for any value of c except 8
c) $y = \frac{1}{2}x + \frac{1}{2}$.
4. a) $y = 8 - 4x$ b) $y = c - 4x$ for any value of c except 8
c) $y = 2x + 2$.
5. a) 5.5×10^2 b) 2×10^4 c) 6.5×10^{-2} d) 1×10^2
e) 6×10^7 f) 7.2×10^4 g) 1.2×10^6 h) 1.2×10^5 .
6. a) 2.5×10^3 b) 2.2×10^5 c) 1.5×10^{-1} d) 1×10^3
e) 8.2×10^9 f) 7.5×10^6 g) 2.4×10^{15} h) 1.5×10^7 .
7. a) 8 b) $2 \times 3^2 \times 5$ c) $2^4 \times 3^2 \times 5^2$.
8. a) $2^3 \times 3 \times 5^2$ b) 6.
9. $a = 2, b = 3$.
10. a) 25 b) $\frac{25}{4}$ or 6.25.
11. a) 200 b) $\frac{9}{4}$ or 2.25 c) $\frac{27}{8}$.
12. $(2n + 1)^2 = (2n + 1) \times (2n + 1) = 4n^2 + 4n + 1$.
13. $(2n)^2 = 4n^2$.
14. E.g. $2^4 - 1 = 16 - 1 = 15$ which is not a prime number.