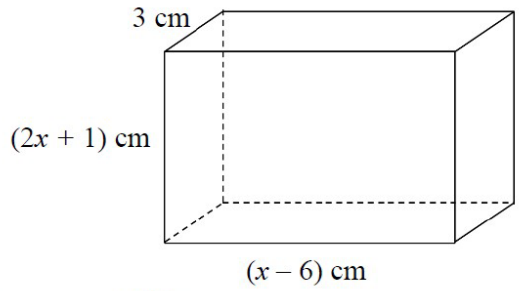
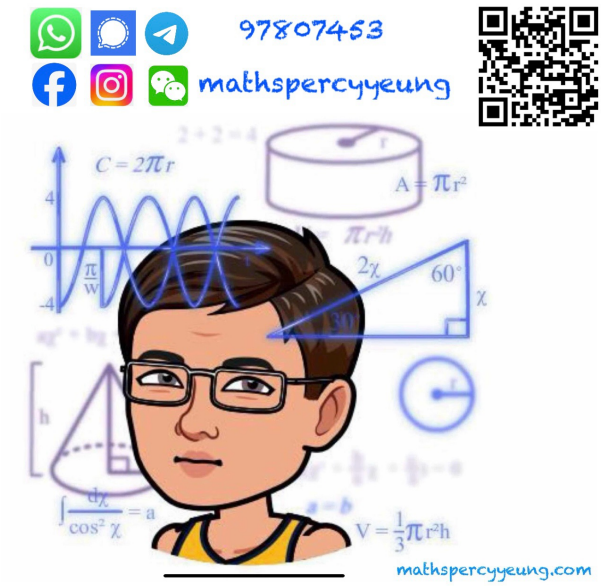
# GHS Sorted Past Paper - MC
# S5-01 More about Equations

1. [20 - 21 S4 Final Exam - 09] (50%)

**9.** The figure shows a solid metallic cuboid. If the volume of the cuboid is 102 $cm^3$, find the value of $x$.




**A.** $x = 8.06$
**B.** $x = 8.06$ or $-2.23$
**C.** $x = 8$
**D.** $x = 8$ or $-2.5$



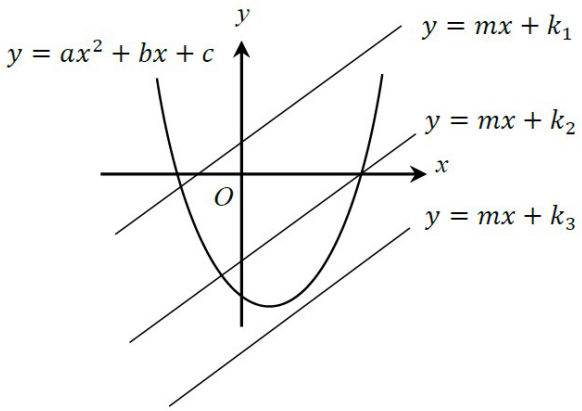

2. [21 - 22 S4 Final Exam - 13] (37%)

**13.** The figure shows the graphs of $y = ax^2 + bx + c$, $y = mx + k_1$, $y = mx + k_2$ and $y = mx + k_3$. Which of the following are true?

I. $\begin{cases} y = ax^2 + bx + c \\ y = mx + k_1 \end{cases}$ has 1 real root only.

II. $\begin{cases} y = ax^2 + bx + c \\ y = mx + k_2 \end{cases}$ has 2 distinct real roots.

III. $\begin{cases} y = ax^2 + bx + c \\ y = mx + k_3 \end{cases}$ has no real roots.




**A.** I and II only
**B.** I and III only
**C.** II and III only
**D.** I, II and III

3. [21 - 22 S4 Final Exam - 14] (80%)

**14.** Solve $x^2 + xy = 2x - y + 20 = 28$.

**A.** $\left(-\frac{14}{3}, -\frac{52}{3}\right)$ or $(2, -4)$

**B.** $\left(\frac{10}{3}, -\frac{4}{3}\right)$ or $(10, 12)$

**C.** $\left(\frac{14}{3}, \frac{4}{3}\right)$ or $(-2, -12)$

**D.** $\left(\frac{14}{3}, \frac{4}{3}\right)$ or $(2, -4)$

4. [22 - 23 S4 Final Exam - 10] (81%)

**10.** If the simultaneous equations $\begin{cases} y = -x^2 + 10x - k \\ y = 2x + k \end{cases}$ have only one solution, then $k =$

**A.** –25.
**B.** –8.
**C.** 8.
**D.** 25.

5. [22 - 23 S4 Final Exam - 14] (45%)

**14.** If $\sqrt{16 - 5x} = 2 - x$, then $x =$

**A.** –4.
**B.** 3.
**C.** –3 or 4.
**D.** –4 or 3.

6. [22 - 23 S4 Standardized Test - 06] (68%)

**6.** Solve $4x+11\sqrt{x}-3=0$.

**A.** $x=\frac{1}{16}$

**B.** $x=\frac{1}{2}$

**C.** $x=9$

**D.** $x=9$ or $x=\frac{1}{16}$

7. [24 - 25 S4 Final Exam - 21] (42%)

**21.** If $\frac{14}{4\log x-5}-4=\frac{2}{\log x+1}$, then $\log\frac{1}{x}=$

**A.** $2$ or $-\frac{11}{8}$.

**B.** $-2$ or $\frac{11}{8}$.

**C.** $\frac{1}{2}$ or $-\frac{8}{11}$.

**D.** $-\frac{1}{2}$ or $\frac{8}{11}$.

8. [21 - 22 S5 Final Exam - 25] (71%)

**25.** Solve $2^x - \sqrt{2^x + 65} = 7$.

**A.** $x = 4$
**B.** $x = 16$
**C.** $x = 0$ or $4$
**D.** $x = -1$ or $16$

9. [21 - 22 S5 Mid-year Exam - 24] (52%)

**24.** If $4x^2 - y^2 + 2 = 4x + y = 5$, then $y =$

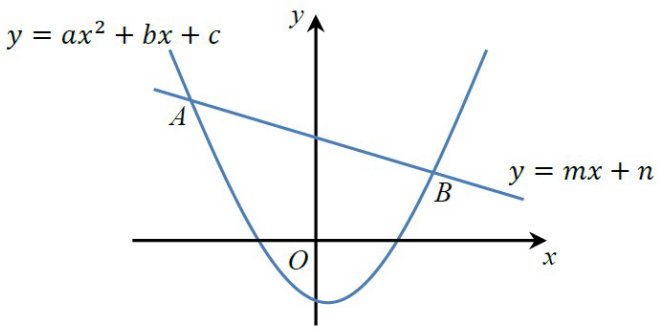
**A.** $-1$ or $3$.
**B.** $-1$ or $5$.
**C.** $1$ or $-\frac{13}{3}$.
**D.** $1$ or $\frac{7}{3}$.

10. [21 - 22 S5 Mid-year Exam - 29] (41%)

**29.** The figure shows the graphs of $y = ax^2 + bx + c$ and $y = mx + n$. The two graphs intersect at two distinct points $A$ and $B$. Which of the following must be true?

I. $b^2 > 4ac$
II. The equation $ax^2 + (b - m)x + (c - n) = 0$ has no real roots.
III. The $x$-coordinate of the mid-point of $AB$ is $\frac{m - b}{2a}$.

**A.** I only
**B.** II only
**C.** I and III only
**D.** II and III only



11. [22 - 23 S5 Final Exam - 44] (43%)

**44.** Solve the equation $\frac{1}{x}-\frac{1}{\sqrt{x}}=30$.

**A.** $x=-\frac{1}{5}$ or $x=\frac{1}{6}$

**B.** $x=-\frac{\sqrt{5}}{5}$ or $x=\frac{\sqrt{6}}{6}$

**C.** $x=\frac{1}{36}$

**D.** $x=\frac{1}{25}$ or $x=\frac{1}{36}$

12. [22 - 23 S5 Mid-year Exam - 29] (25%)

**29.** If $x^2-y+5x=-2x+3y+4=0$, find the value of $xy$.

**A.** $-\frac{1}{3}$ or $-4$

**B.** $-\frac{14}{9}$ or $4$

**C.** $-\frac{14}{9}$ or $-4$

**D.** $\frac{14}{27}$ or $16$

13. [24 - 25 S5 Final Exam - 33] (48%)

**33.** If $\begin{cases} \log_2 y^2 = 2x+2 \\ (\log_2 y)^2 = x+7 \end{cases}$, then $y =$

**A.** $\frac{1}{16}$ or 2.

**B.** $\frac{1}{8}$ or 4.

**C.** $\frac{1}{4}$ or 8.

**D.** $\frac{1}{2}$ or 16.

14. [24 - 25 S5 Mid-year Exam - 22] (85%)

**22.** Solve $x^4 - 3x^2 - 4 = 0$.

**A.** $x = -2$ or $x = 2$

**B.** $x = -1$ or $x = 1$

**C.** $x = -1$ or $x = 4$

**D.** $x = -2$ or $x = -1$ or $x = 1$ or $x = 2$

15. [24 - 25 S5 Mid-year Exam - 23] (66%)

**23.** Solve $3^{2x+1} - 5(3^x) - 2 = 0$.

**A.** $x = \log_3 2$

**B.** $x = -\frac{1}{3}$ or $x = \log_3 2$

**C.** $x = -\frac{1}{3}$ or $x = 2$

**D.** $x = -1$ or $x = \log_3 2$

# GHS Sorted Past Paper - Conventional Questions
# S5-01 More about Equations

1. [24 - 25 S4 Final Exam - 16] (48%)

**16.** Solve the following equations.

**(a)** $3^{x+1}+3^{2-x}-28=0$, **(3 marks)**

**(b)** $(\log_4 x)^2-\log_2 x^2-12=0$. **(3 marks)**

2. [22 - 23 S4 Standardized Test - 01] (79%)

**1.** If the graphs of $y=2x^2-5x+9$ and $y=3x+k$ do not meet, find the range of values of $k$. **(3 marks)**

3. [21 - 22 S4 Final Exam - 11] (36%)

**11.** A wire of length 52 cm is bent into a rhombus $ABCD$. The diagonals $AC$ and $BD$ intersect at $E$. It is given that $AC=\frac{2}{x}$ cm and $BD=\left(\frac{8}{x}-16\right)$ cm, where $x>0$. Find the area of the rhombus. **(5 marks)**

4. [21 - 22 S4 Final Exam - 08] (73%)

**8.** Find the range of values of $k$ so that the simultaneous equations $\begin{cases}2x-y+k=0\\ y=-x^2+4x+10\end{cases}$ have real solutions. **(4 marks)**

5. [21 - 22 S5 Mid-year Exam - 18] (36%)

**18.** Let $C$ be the graph of $y=2x^2-12kx+32k^2+6$, where $k$ is a real constant.

**(a)** Using the method of completing the square, express the coordinates of the vertex of $C$ in terms of $k$. **(3 marks)**

**(b)** Let $L$ be a straight line with slope $4k$. Someone claims that if $y$-intercept of $L$ is negative, then $L$ and $C$ must not intersect. Do you agree? Explain your answer. **(3 marks)**

6. [21 - 22 S5 Mid-year Exam - 14] (43%)

**14.** Solve the following equations.

**(a)** $6x+5\sqrt{3x-1}=9$ **(2 marks)**

**(b)** $9^{x+1}+26(3^x)-3=0$ **(2 marks)**

7. [22 - 23 S4 Standardized Test - 03] (69%)

**3. (a)** Simplify the expression $\frac{x}{x-3}-\frac{7}{x+9}$. **(2 marks)**

**(b)** Hence, or otherwise, solve $\frac{x}{x-3}-\frac{7}{x+9}=2$ . **(2 marks)**

**(c)** By using the results in **(b)**, write down the root(s) of the equation $\frac{y^2}{y^2-3}-\frac{7}{y^2+9}=2$. **(1 mark)**

8. [24 - 25 S5 Mid-year Exam - 16] (79%)

**16.** Solve the following equations.

**(a)** $x=\sqrt{4x+17}-3$ **(2 marks)**

**(b)** $\frac{2}{x^2}+\frac{9}{x^2+2}=2$ **(3 marks)**

9. [21 - 22 S4 Final Exam - 07] (57%)

**7.** Solve the following equations.

**(a)** $\sqrt{x+1}=x-1$ **(2 marks)**

**(b)** $6^{2x}-6^{2x-1}=5$ **(3 marks)**

**(c)** $\frac{1}{2}\log_2 x-1=\log_2 4x$ **(4 marks)**