CAPRA COACHING

HSC Advanced Maths Exam Booklet:
Arithmetic Skills

Arithmetic Skills	**Name:**

Easy:

1. Which expression is a correct factorization of $x^3 - 8$?

(A) $(x-2)(x^2-2x+4)$

(B) $(x-2)(x^2-4x+4)$

(C) $(x-2)(x^2+2x+4)$

(D) $(x-2)(x^2+4x+4)$

2. Solve $|4x-5| = 3\,(x+1)$.

3. Express $\frac{\sqrt{8}}{\sqrt{8}-\sqrt{7}}$ in the form of a $+$ b$\sqrt{14}$, where a and b are integers.

Arithmetic Skills	**Name:**

4. The sum of the interior angles of a regular polygon is 4,140°. What is the size of each interior angle?

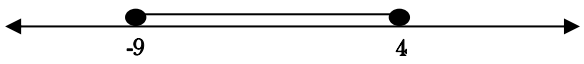
(A) 157. 5°

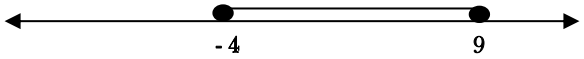
(B) 160°

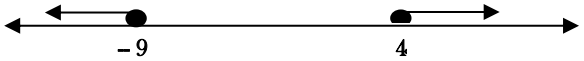
(C) 162°

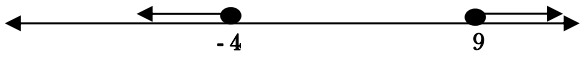
(D) 165. 6°

5. Which graph shows the solution to $|2x - 5| \leq 13$?

(A) 

(B) 

(C) 

(D) 

6. Solve $\log_3(2x - 7) = 2$.

7. Make y the subject of the equation $x = \log_3 y$.

Arithmetic Skills	**Name:**

8. Simplify $\log_4 54 - 2\ \log_4 3$.

(A) $\log_4 9$

(B) $\log_4 48$

(C) $\log_4 6$

(D) 1

9. $\log_4 2 =$

(A) $\frac{1}{2}$

(B) 1

(C) 2

(D) 4

10. The solution of the inequality $x^2 - 6x + 8 \leq 0$ is:

(A) $x \geq 4\ or\ x \leq 2$

(B) $2 \leq x \leq 4$

(C) $2 < x < 4$

(D) $x \leq 4\ or\ x \geq 2$

Arithmetic Skills	**Name:**

11. Solve $|3 - x| \geq 6$.

(A) $x \geq 3$ *or* $x \leq 9$

(B) $x \leq -3$ *or* $x \geq 9$

(C) $x \leq -3$ *or* $x \leq 9$

(D) $-3 \leq x \leq 9$

Arithmetic Skills	**Name:**

Medium:

12. Simplify $\frac{3^{m+1} - 3^m}{3^{m+1} - 3^{2m}}$.

13. If $a > b$, which of the following is always true?

(A) $a^2 > b^2$

(B) $\frac{1}{a} > \frac{1}{b}$

(C) $-a > -b$

(D) $2^a > 2^b$

14. What is the solution to the equation? $\log_e(x+2) - \log_e x = \log_e 4$?

(A) $\frac{2}{5}$

(B) $\frac{2}{3}$

(C) $\frac{3}{2}$

(D) $\frac{5}{2}$

Arithmetic Skills	**Name:**

15. Given $\log_7 2 = 0.36 \; and \; \log_7 5 = 0.83$, find the values of

(i) $\log_7 0.4$

(ii) $\log_7 50$

16. Solve for x: $4^x - 5 \times 2^x + 4 = 0$

17. Graph the solution of $4x \leq 15 \leq -9x$ on a number line.

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18. Given $4^x + 5x + 6 \equiv A\,(x+1)^2 + B\,(x+1) + C$, find the values of A, B, and C.

19. Change the subject of y = 3 ln2x + 1 to x.

Arithmetic Skills	**Name:**

Hard:

20.

i. Rationalise the denominator in the expression $\frac{1}{\sqrt{n}+\sqrt{n+1}}$, where n is a positive integer.

ii. Using your result from the part i or otherwise, find the value of the sum

$$\frac{1}{\sqrt{1}+\sqrt{2}}+\frac{1}{\sqrt{2}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{4}}+\cdots+\frac{1}{\sqrt{99}+\sqrt{100}}$$

Arithmetic Skills	**Name:**

21. What are the solutions to the equation $25^x - 5^{x+1} + 6 = 0$?

(A) $x = 2$ or $x = 3$

(B) $x = \frac{ln2}{ln5}$ *or* $x = \frac{ln3}{ln5}$

$(C)\ x = \ln\frac{2}{5}$ *or* $x = \ln\frac{3}{5}$

(D) *No Solutions*

22. If $\log_5 8 = a$, prove that $\log_{10} 2 = \frac{a}{a+3}$