NOTICE

This document replaces any document with a version that is lower than that of

`1.0.0b5.dev1`

This means that the questions in those documents no longer reflect the current types of questions that may be asked in The Challenge.

DO NOT REFER TO THOSE DOCUMENTS FOR THE TYPES OF QUESTIONS ASKED.

THE CHALLENGE
Practice Questions

Question 1. State the value of

$$10 \times 2$$

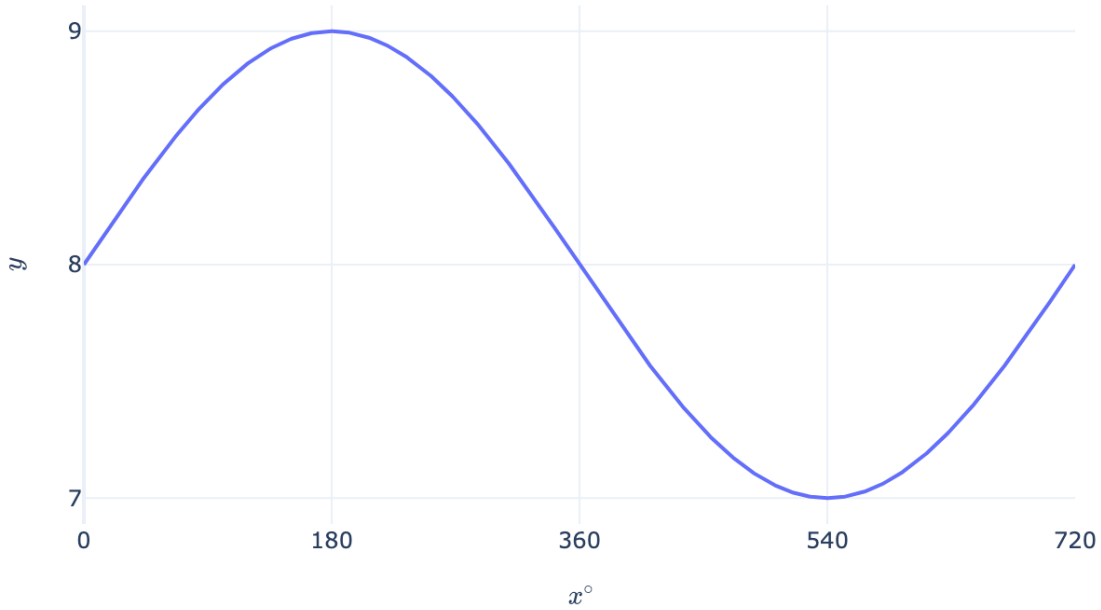
Question 2. State the value of

$$100 + 600 \div 200$$

Question 3. Solve for the value of x in the equation

$$12x - 345 = 678$$

Question 4.



Determine the values of a, b and c of the function

$$y = a \sin\left(\frac{x}{b}\right) + c$$

given the graph of that function as shown above, where $b > 0$. Hence state the exact value of $2^a \times 3^b \times 5^c$.

Question 5. State the remainder when the polynomial

$$\mathrm{P}(x) = 4x^7 + 12x^6 + 17x^5 + 22x^4 + 27x^3 + 32x^2 + 37x + 24$$

is divided by the linear function $\mathrm{L}(x) = 2x + 3$.

Question 6. Solve the quadratic equation with real roots (Equation (A), Equation (B) or Equation (C)) for the **values** of x.

(A) $\dfrac{x^2}{4} + 13x + 493 = 0$

(B) $x^2 + 12x + 27 = 0$

(C) $\dfrac{x^2}{4} + 5x + 425 = 0$

Question 7. Determine the 4th term in the binomial expansion of

$$\left(x^3 - \frac{1}{3x^3}\right)^6$$

Question 8. Solve for the value of x in the equation

$$\sqrt{2\sqrt{3x} + 4} - 5 = 0$$

Question 9. Solve for the **values** of x in the equation

$$3\left|\frac{-1 \times \ln(2x)}{\ln(4)} + 5\right| - 9 = 0$$

Question 10. Differentiate the following expression with respect to x.

$$\ln(2 - 3x) - \sin\left(5x + 6\right) + \cos\left(5x + 6\right)$$

Question 11. State the value of

$$\int_{-5}^{0} \left(8x^3 + 4x^2 + 4x\right)\ \mathrm{d}x$$

Question 12. Integrate the following expression with respect to x, leaving out the constant of integration (C) in your answer.

$$3e^{x+7} + 9\cos\left(x + 3\right) + 2\sec^2\left(x\right)$$

Question 13. Solve for the **values** of x in the equation:

$$\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{x^4}{4} + \frac{11x^3}{3} + 17x^2 + 24x - 92\right) = 0$$

Question 14. Solve for the **values** of x in the following simultaneous equations (Equation (D) and Equation (E)).

(D) $5y = x + 46$

(E) $\left(x + 5\right)^2 + \left(y - 16\right)^2 = 65$

END OF SAMPLE QUESTIONS DOCUMENT

THE CHALLENGE
Sample Questions' Answers

NOTE THE FOLLOWING POINTS:

- Any answer that is *algebraically* the same (which is still within reason) as the suggested answer will be accepted by the system. For example, both $\tan x$ and $\frac{\sin x}{\cos x}$ will be accepted as the anti-derivative of $\sec^2 x$.
- Any answer that is in the Times New Roman font are in **exact form**. Any answer that has been rounded off **will not be accepted by the system**.
- Any answer that is in the Arial font are **rounded off**. Any answer that is not **exactly as shown** in this answer key **will not be accepted by the system**.

No.	Answer	Remarks
1	20	This is trivial.
2	103	This is trivial.
3	85.25	This is the value of x.
4	7031250	There are **no other accepted answers**.
5	0	This question's answer should be rounded to 3 decimal places if it is non-exact.
6	-9 and -3	These are the **solutions** to the equation.
7	$-\frac{20}{27}$	There are no other accepted answers.
8	36.75	This is the value of x.
9	8 and 32768	These are the **solutions** to the equation.
10	$-5\sin(5x+6)-5\cos(5x+6)-\frac{3}{2-3x}$	Any **equivalent** form of the answer will be accepted.
11	-1133.333	This needs to be rounded to 3 decimal places
12	$3e^{x+7}+2\tan(x)+9\sin(x+3)$	Any **equivalent** form of the answer will be accepted.
13	-1 and -4 and -6	These are the **solutions** to the equation. All three must be shown.
14	-1 and -6	These are the **solutions** to the simultaneous equations.

END OF ANSWERS DOCUMENT