NOTICE

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

`1.0.0b1.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

Find the value of:

$$10 \times 2$$

Question 2

Evaluate:

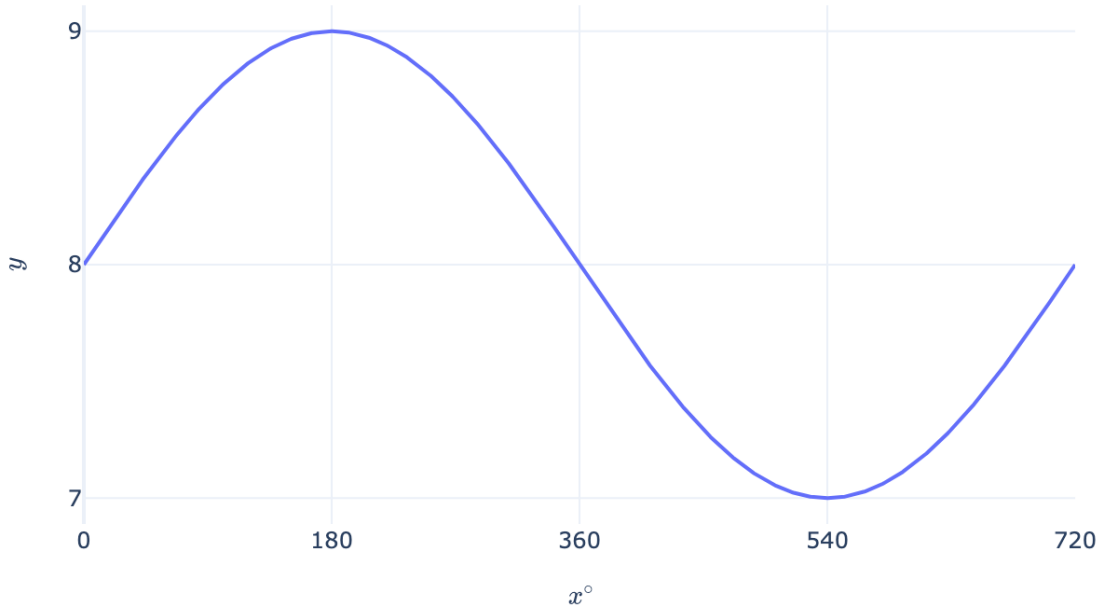
$$100 + 600 \div 200$$

Question 3

Solve for x:

$$12x - 345 = 678$$

Question 4



Determine the values of a, b and c in

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

given the graph of that equation 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

$$4x^7 + 12x^6 + 17x^5 + 22x^4 + 27x^3 + 32x^2 + 37x + 24$$

is divided by $2x + 3$.

Question 6

Solve the quadratic equation with real roots for 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 x:

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

Question 9

Solve for the **values** of x:

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

Question 10

Differentiate the following with respect to x:

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

Question 11

Calculate:

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

Question 12

Integrate the following with respect to x, leaving out the constant of integration (C) in your answer:

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

Question 13

Solve for the **values** of x:

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

Question 14

Solve for the **values** of x in the following simultaneous equations:

$$5y = x + 46,$$
$$\left(x+5\right)^2 + \left(y-16\right)^2 = 65.$$

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**.

Question 1

20

Question 2

103

Question 3

$x = 85.25$

Question 8

7031250

Question 4

0

Question 12

$x_1 = -9$ and $x_2 = -3$

Question 5

$-\frac{20}{27}$

Question 6

$x = 36.75$

Question 7

$x_1 = 8$ or $x_2 = 32768$

Question 9

$$-5\sin\left(5x+6\right) - 5\cos\left(5x+6\right) - \frac{3}{2-3x}$$

Question 10

-1133.333

Question 11

$$3e^{x+7} + 2\tan(x) + 9\sin(x+3)$$

Question 13

$x_1 = -1$, $x_2 = -6$ and $x_3 = -4$

Question 14

$x_1 = -1$ and $x_2 = -6$

END OF ANSWERS DOCUMENT