The Challenge: Sample 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

Factorise the following expression **completely**:

$$\left(8w^3 + 27x^3\right)\left(4y^2 - 9z^2\right)$$

Question 5

Determine the 4th term in the binomial expansion of:

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

Question 6

Solve for x:

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

Question 7

Solve for the **values** of x:

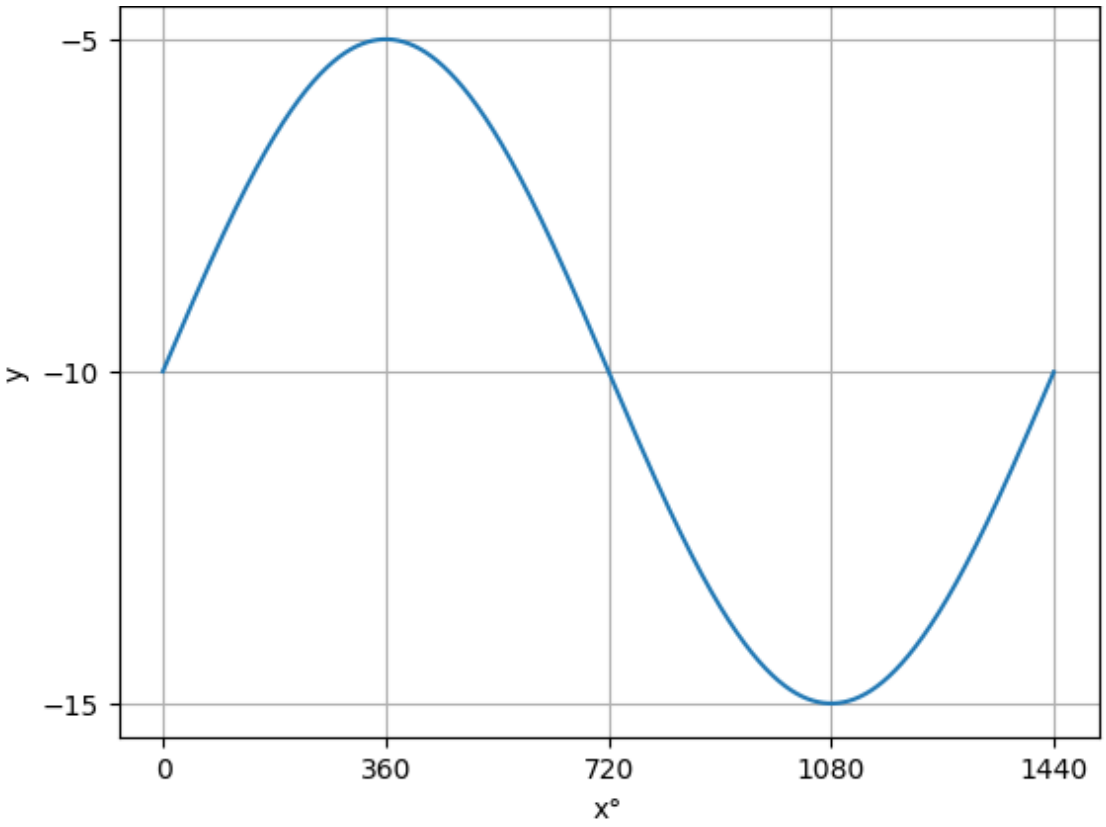
$$3\left|\frac{-1\times\ln(2\times x)}{\ln(4)}+5\right|-9=0.$$

Question 8

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 below.



Question 9

Differentiate the following with respect to x:

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

Question 10

Calculate:

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

Question 11

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 12

Solve the quadratic equation with real root(s) for x:

A) $\dfrac{265x^2}{4} + 11x + 1 = 0$

B) $\dfrac{13x^2}{4} + 12x + 13 = 0$

C) $\dfrac{19x^2}{2} + 19x + \dfrac{19}{2} = 0$

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

The Challenge: Sample Questions' ANSWERS

Question 1

20

Question 2

103

Question 3

$x = 85.25$

Question 4

$(2w + 3x)\left(4w^2 - 6wx + 9x^2\right)\left(2y + 3z\right)\left(2y - 3z\right)$

Question 5

$-\frac{20}{27}$

Question 6

$x = 36.75$

Question 7

$x = 8$ or $x = 32768$

Question 8

$a = 5, b = 4$ and $c = -10$

Question 9

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

Question 10

-1133.333

Question 11

$$3e^{x+7}+\frac{2\sin\left(x\right)}{\cos\left(x\right)}+9\sin\left(x+3\right)=3e^{x+7}+2\tan(x)+9\sin\left(x+3\right)$$

Question 12

$x=-1$

Question 13

$x=-1$ or $x=-6$ or $x=-4$

Question 14

$x=-1$ or $x=-6$

END OF ANSWERS DOCUMENT