Answer ALL questions.

1 State the value of the underlined digit, in base ten, in the number $1\underline{1}0011_2$.

A. 4
C. 16
B. 8
D. 32

2 State the value of the digit 5, in base ten, in the number 7502_8.

A. 80
C. 320
B. 160
D. 500

3 Express 10111_2 as a number in base ten.

A. 31_{10}
C. 15_{10}
B. 23_{10}
D. 55_{10}

4 Given that $1p3_{10} = 243_8$, find the value of p.

A. 7
C. 4
B. 6
D. 2

5 Express 126 as a number in base two.

A. 111110_2
C. 1111110_2
B. 1110110_2
D. 1111111_2

6 Express $2^5 + 2^3 + 2$ as a number in base eight.

A. 42_8
C. 25_8
B. 52_8
D. 22_8

7 Express $5^3 + 3$ as a number in base five.

A. 103_5
C. 1003_5
B. 303_5
D. 3003_5

8 Given that $8^3 + 5\,(8) + 6 = y_8$, find the value of y.

A. 8056_8
C. 856_8
B. 1056_8
D. 156_8

9 Convert 324_8 to a number in base two.

A. 100001011_2
C. 11001100_2
B. 100010011_2
D. 11010100_2

10 Convert 201_5 directly to an octal number.

A. 25_8
C. 163_8
B. 63_8
D. 251_8

11 Given that $x_2 = 243_5$, then $x =$

A. 1001_2 C. 1001001_2

B. 101001_2 D. 10100101_2

12 $11011_2 + 111_2 =$

A. 100010_2 C. 110011_2

B. 101100_2 D. 111101_2

13 Given that $1011_2 + x = 1110_2$, then $x =$

A. 10_2 C. 100_2

B. 11_2 D. 110_2

14 Given that $110111_2 - x = 11001_2$, then $x =$

A. 10110_2 C. 11110_2

B. 11010_2 D. 111111_2

15 Express 10111_2 as a number in base five.

A. 301421_5 C. 34_5

B. 43_5 D. 23_5

16 $2(3x + y)^2 - 15xy =$

A. $36x^2 + 9xy + 4y^2$ C. $18x^2 - 9xy + 2y^2$

B. $36x^2 - 3xy + y^2$ D. $18x^2 - 3xy + 2y^2$

17 $(3p - m)(p + 2m) =$

A. $3p^2 + 5pm - 2m^2$ C. $3p^2 + 7pm - 2m^2$

B. $3p^2 - 5pm + 2m^2$ D. $3p^2 - 7pm + 2m^2$

18 Factorise completely $18 - 32k^2$.

A. $2(3 - 16k)(3 + 16k)$ C. $2(3 - 4k)(3 + 4k)$

B. $2(9 - 4k)(9 + 4k)$ D. $2(9 - 16k^2)$

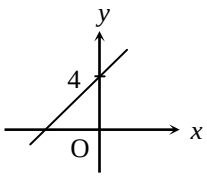
19 Factorise completely $3p^2q - 12q$.

A. $3q(p^2 - 4)$ C. $3q(p - 2)^2$

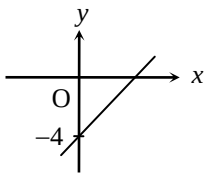
B. $3q(p + 2)^2$ D. $3q(p + 2)(p - 2)$

20 Which one of the following graphs represents $y = 4 - x$?

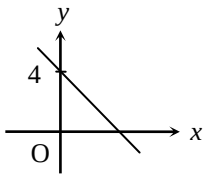
A.



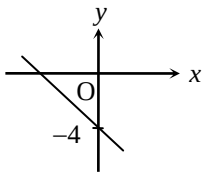
C.



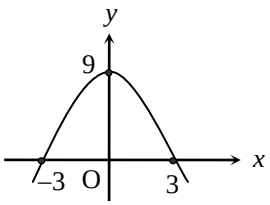
B.



D.



21 The diagram shows the graph of a quadratic function.



The equation that represent the function is

A. $y = (x + 3)(x - 3)$

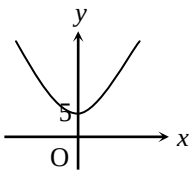
C. $y = x^2 + 9$

B. $y = (x - 3)^2$

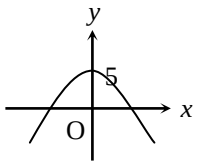
D. $y = 9 - x^2$

22 Which of the following graphs represents $y = 5 - x^2$

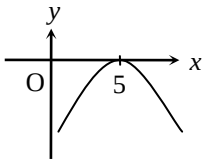
A.



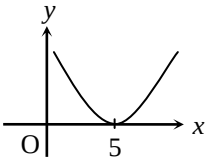
C.



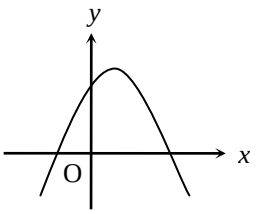
B.



D.



23 The diagram shows the graph of a quadratic function.



The equation that represent the function is

A. $y = 2x^2 + 3x$

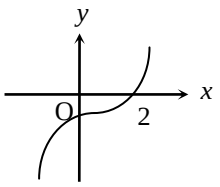
B. $y = x^2 - 3x + 2$

C. $y = -x^2 + 2x$

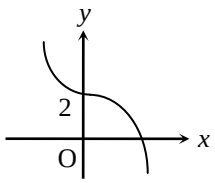
D. $y = -x^2 + x + 6$

24 Which of the following graphs represents $y = x^3 + 2$?

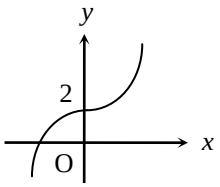
A.



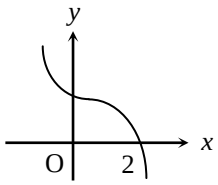
C.



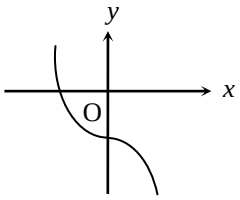
B.



D.



25 The diagram shows the graph of a cubic function.



The equation that represent the function is

A. $y = x^3 - 3x$

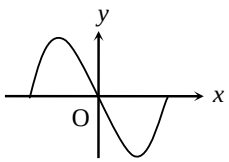
B. $y = \frac{x^2}{2} - x$

C. $y = -5 - x^3$

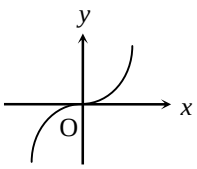
D. $y = -\frac{x^3}{3}$

26 Which of the following graphs represents $y = \frac{2}{x}$?

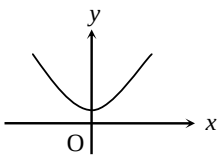
A.



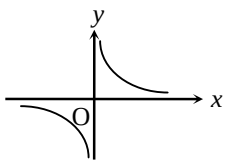
C.



B.

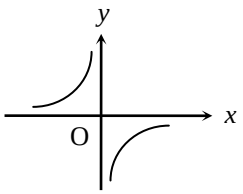


<u>D.</u>

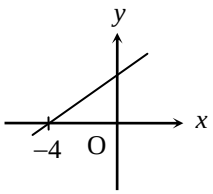


27 Which of the following graphs represents $xy = -4$?

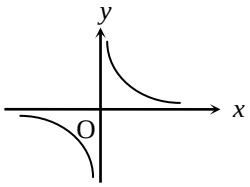
<u>A.</u>



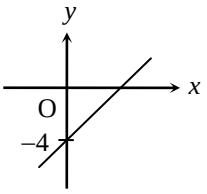
C.



B.



D.



28 $2\begin{pmatrix}3 & 1\\ 4 & 6\end{pmatrix} - \begin{pmatrix}1 & 0\\ -1 & 4\end{pmatrix} =$

A. $\begin{pmatrix}4 & 2\\ 10 & 4\end{pmatrix}$

C. $\begin{pmatrix}5 & 2\\ 5 & 2\end{pmatrix}$

B. $\begin{pmatrix}4 & 3\\ 7 & 4\end{pmatrix}$

<u>D.</u> $\begin{pmatrix}5 & 2\\ 9 & 8\end{pmatrix}$

29 $\begin{pmatrix}5 & 2\\ 7 & 1\end{pmatrix} + 3\begin{pmatrix}2 & 0\\ 2 & -3\end{pmatrix} - \begin{pmatrix}-3 & 1\\ -2 & 5\end{pmatrix} =$

<u>A.</u> $\begin{pmatrix}14 & 1\\ 15 & -13\end{pmatrix}$

C. $\begin{pmatrix}8 & 4\\ 15 & -13\end{pmatrix}$

B. $\begin{pmatrix}13 & 4\\ 16 & -4\end{pmatrix}$

D. $\begin{pmatrix}7 & 3\\ 10 & 0\end{pmatrix}$

30 Given that $\begin{pmatrix}2 & 8\\ b & 0\end{pmatrix} - 3\begin{pmatrix}1 & 3\\ -2 & 0\end{pmatrix} = \begin{pmatrix}-1 & c\\ -2 & 0\end{pmatrix}$, find the values of b and c.

<u>A.</u> $b = -8,\ c = -1$

C. $b = -4,\ c = 5$

B. $b = -8,\ c = 5$

D. $b = -2,\ c = -1$

31 Given that $M + \begin{pmatrix} 2 & 3 \\ -1 & 4 \end{pmatrix} = \begin{pmatrix} 0 & -2 \\ -3 & 5 \end{pmatrix}$, then $M =$

A. $\begin{pmatrix} 2 & -5 \\ -2 & 1 \end{pmatrix}$

C. $\begin{pmatrix} 2 & 1 \\ -4 & 9 \end{pmatrix}$

B. $\begin{pmatrix} -2 & 5 \\ -2 & -1 \end{pmatrix}$

<u>D.</u> $\begin{pmatrix} -2 & -5 \\ -2 & 1 \end{pmatrix}$

32 Given that $\begin{pmatrix} -1 \\ 3 \end{pmatrix} - 2Q = \begin{pmatrix} 7 \\ 7 \end{pmatrix}$, then $Q =$

A. $\begin{pmatrix} 4 \\ 5 \end{pmatrix}$

<u>C.</u> $\begin{pmatrix} -4 \\ -2 \end{pmatrix}$

B. $\begin{pmatrix} 4 \\ 2 \end{pmatrix}$

D. $\begin{pmatrix} -4 \\ 5 \end{pmatrix}$

33 $\begin{pmatrix} 2 & 3 \end{pmatrix} \begin{pmatrix} 4 \\ -5 \end{pmatrix} =$

<u>A.</u> $\begin{pmatrix} -7 \end{pmatrix}$

C. $\begin{pmatrix} 8 & -10 \\ 12 & -15 \end{pmatrix}$

B. $\begin{pmatrix} 8 & -5 \end{pmatrix}$

D. $\begin{pmatrix} 8 & 12 \\ -10 & -15 \end{pmatrix}$

34 $\begin{pmatrix} 5 \\ -2 \end{pmatrix} \begin{pmatrix} -1 & 4 \end{pmatrix} =$

A. $\begin{pmatrix} 9 \end{pmatrix}$

C. $\begin{pmatrix} 15 \\ -6 \end{pmatrix}$

B. $\begin{pmatrix} -13 \end{pmatrix}$

<u>D.</u> $\begin{pmatrix} -5 & 20 \\ 2 & -8 \end{pmatrix}$

35 Given that $\begin{pmatrix} m \\ 3 \end{pmatrix} \begin{pmatrix} 2 & -1 \end{pmatrix} = \begin{pmatrix} 6-m & m-4 \\ 6 & -3 \end{pmatrix}$, find the value of m.

<u>A. 2</u>

C. 4

B. 3

D. 5

36 Given $\begin{pmatrix} k & 5 \end{pmatrix} \begin{pmatrix} 3 & 0 \\ -k & 1 \end{pmatrix} = \begin{pmatrix} 24 & 5 \end{pmatrix}$, calculate the value of k.

<u>A. –12</u>

C. 3

B. –1

D. 8

37 The inverse matrix of $\begin{pmatrix} -3 & -1 \\ -4 & -2 \end{pmatrix}$ is

A. $\begin{pmatrix} 1 & \frac{1}{2} \\ 2 & \frac{3}{2} \end{pmatrix}$

C. $\begin{pmatrix} -2 & 1 \\ 4 & -3 \end{pmatrix}$

B. $\begin{pmatrix} -1 & \frac{1}{2} \\ 2 & -\frac{3}{2} \end{pmatrix}$

D. $\begin{pmatrix} -2 & -1 \\ -4 & -3 \end{pmatrix}$

38 Round off 63864 correct to three significant figures.

A. 638

C. 63800

B. 639

D. 63900

39 Round off 0.08108 correct to three significant figures.

A. 0.08

C. 0.0810

B. 0.081

D. 0.0811

40 Round off 1.00764 correct to four significant figures.

A. 1.008

C. 1.0076

B. 1.0080

D. 1.00764

End of the questions