Instructions : (33 points). Solve each of the following problems and choose the correct answer.

(**1**) The domain of the function $f(x) = |3x - 6|$ is

(**a**) $\mathbb{R} - \{2\}$

(**b**) $[2, \infty)$

(**c**) $\mathbb{R} - \{-2\}$

(**d**) $\mathbb{R}$ *

(**2**) The domain of the function $f(x) = \dfrac{x+2}{x^2 + x - 6}$ is

(**a**) $\mathbb{R} - \{-2, 3\}$

(**b**) $\mathbb{R} - \{-2, -3\}$

(**c**) $\mathbb{R} - \{2, -3\}$ *

(**d**) $\mathbb{R} - \{2, 3\}$

(**3**) The domain of the function $f(x) = \sqrt{4 - x^2}$ is

(**a**) $(-2, 2)$

(**b**) $[-2, 2]$ *

(**c**) $(-\infty, -2] \cup [2, \infty)$

(**d**) $(2, \infty)$

(**4**) The range of the function $f(x) = \sqrt{25 + x^2}$ is

(**a**) $(-\infty, 5]$

(**b**) $(-\infty, 5)$

(**c**) $(5, \infty)$

(**d**) $[5, \infty)$ *

(**5**) The range of the function $f(x) = 9 - x^2$ is

(**a**) $(-\infty, 9]$ *

(**b**) $[9, \infty)$

(**c**) $(-\infty, -9]$

(**d**) $[-9, \infty)$

(**6**) The function $f(x) = 10 - x^3$ is even.

(**a**) True

(**b**) False *

(**7**) The function $f(x) = x^{\frac{2}{3}} + x^2$ is

(**a**) Algebraic function *

(**b**) Power function

(**c**) Polynomial function

(**d**) Exponential function

(**8**) If $h(x) = |\cos x|$, $f(x) = \cos x$, $g(x) = |x|$, then

(**a**) $h = f \circ g$

(**b**) $h = g \circ f$ *

(**c**) $h = f.g$

(**d**) $h = f \circ f$

(**9**) The function $f(x) = \dfrac{7 - x^2}{x^3 + 3x}$ is symmetric about the origin.

(**a**) True *

(**b**) False

(**10**) The function $f(x) = (x - 1)^2$ is

(**a**) increasing on $(1,\infty)$ *

(**b**) increasing on $(-\infty,1)$

(**c**) decreasing on $(1,\infty)$

(**d**) decreasing on $(-1,\infty)$

(**11**) The degree measure of $\theta = \frac{7\pi}{6}$ is

(**a**) 100°

(**b**) 120°

(**c**) 210° *

(**d**) 75°

(**12**) The radian measure of $\theta = 150^\circ$ is

(**a**) $\frac{5\pi}{6}$ *

(**b**) $\frac{10\pi}{3}$

(**c**) $\frac{10\pi}{9}$

(**d**) $\frac{4\pi}{3}$

(**13**) If $f(x) = x^2$ and $g(x) = \sqrt{2+x}$, then $(f \circ g)(x) =$

(**a**) $2 + x^2$

(**b**) $\sqrt{2+x^2}$

(**c**) $(2+x)^2$

(**d**) $2 + x$ *

(**14**) If $f(x) = x$ and $g(x) = 3x^2 + x$, then $(\frac{f}{g})(x) =$

(**a**) $\frac{x}{3x^2-1}$

(**b**) $\frac{1}{3x+1}$ *

(**c**) $\frac{1}{3x-1}$

(**d**) $\frac{x}{3x^2+1}$

(**15**) If $f(x) = \sqrt{x}$ and $g(x) = \sqrt{2-x}$, then the domain of $(f+g)(x)$ is

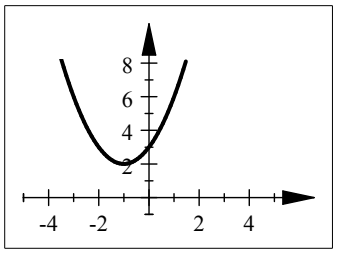
(**a**) $(-\infty,2]$

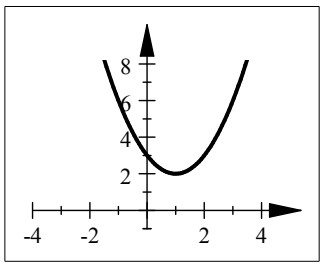
(**b**) $[0,2]$ *

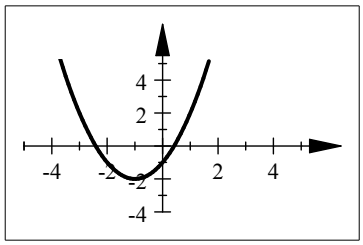
(**c**) $[0,\infty)$

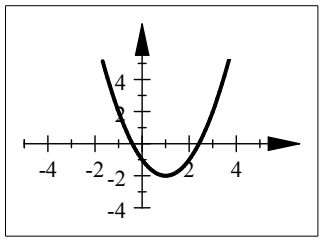
(**d**) $(0,2)$

(**16**) The graph of the function $f(x) = (x+1)^2 + 2$ is

(a)* 

(b) 

(c) 

(d) 

(**17**) The graph of $g(x) = |x-4|$ is a shifting of the graph of $f(x) = |x|$

(**a**) 4 units to the left

(**b**) 4 units to the right *

(**c**) 4 units downward

(**d**) 4 units upward

(**18**) If the graph of $f(x) = 3^x$ is reflected about the $y-axis$, then the equation of the new function is

(**a**) $(\frac{1}{3})^{-x}$

(**b**) $(-3)^x$

(**c**) $(\frac{1}{3})^x$ *

(**d**) $-(3^x)$

(**19**) If $\cos x = \frac{3}{2}$, $\sin x = \frac{1}{2}$, then $\sin(2x) =$

(**a**) $\frac{3}{2}$ *

(**b**) 2

(**c**) 4

(**d**) $\frac{3}{4}$

(**20**) The function $f(x) = \left(\frac{1}{2}\right)^x$ is increasing on $\mathbb{R}$.

(**a**) True

(**b**) False *

(**21**) If $\sin\theta = \frac{3}{4}$ and $0 < \theta < \frac{\pi}{2}$, then $\cos\theta =$

(**a**) $\frac{-3}{\sqrt{7}}$

(**b**) $-\frac{\sqrt{7}}{4}$

(**c**) $\frac{3}{\sqrt{7}}$

(**d**) $\frac{\sqrt{7}}{4}$ *

(**22**) If $\theta = \frac{-\pi}{3}$, then $\sin\theta =$

(**a**) $\frac{1}{2}$

(**b**) $\frac{\sqrt{3}}{2}$

(**c**) $\frac{-\sqrt{3}}{2}$ *

(**d**) $\frac{-1}{2}$

(**23**) The range of the function $f(x) = \sin x$ is

(**a**) $\mathbb{R}$

(**b**) $(-1, 1)$

(**c**) $\mathbb{R} - (-1, 1)$

(**d**) $[-1, 1]$ *

(**24**) The function $f(x) = \cot x$ is

(**a**) even

(**b**) odd *

(**c**) even and odd

(**d**) neither even nor odd

(**25**) If a is a positive number and x, y are real numbers, then $(a^x)^y =$

(**a**) a^{x+y}

(**b**) $a^{x.y}$ *

(**c**) $a^x . a^y$

(**d**) $a^{x/y}$

(**26**) The range of the function $y = 2^x + 1$ is

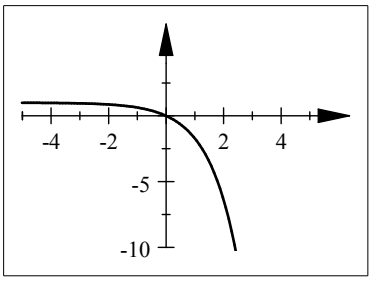
(**a**) $(1, \infty)$ *

(**b**) $[1, \infty)$

(**c**) $(-\infty, 1)$

(**d**) $(-\infty, 1]$

(**27**) The following graph represents the function $f(x) =$



(**a**) $-e^x - 1$

(**b**) $e^{-x} + 1$

(**c**) $e^{-x} - 1$

(**d**) $1 - e^x$ *

(**28**) The domain of the function $f(x) = \frac{1}{1 - e^{2x}}$ is

(**a**) $\mathbb{R} - \{0\}$ *

(**b**) $\mathbb{R} - \{1\}$

(**c**) $\mathbb{R} - \{0, 1\}$

(**d**) $\mathbb{R}$

(**29**) If $f(x) = 3x + 2$, then $f^{-1}(x) =$

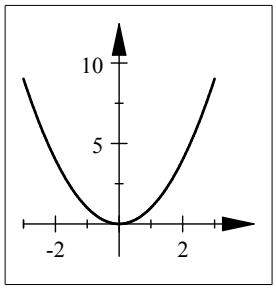
(**a**) $\frac{x - 3}{2}$

(**b**) $\frac{x + 3}{2}$

(**c**) $\frac{x-2}{3}$ *

(**d**) $\frac{x+2}{3}$

(**30**) The following graph represents one - to - one function



1. (**a**) true

(**b**) false *

(**31**) The range of the function $f(x) = \sqrt{x}$ is

(**a**) $\mathbb{R}$

(**b**) $\mathbb{R} - \{0\}$

(**c**) $[0, \infty)$ *

(**d**) $(0, \infty)$

(**32**) One of the following identities is true

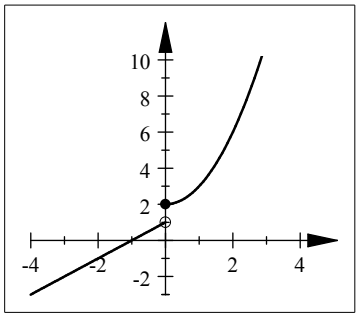
(**a**) $\cos(2x) = \cos^2 x - \sin^2 x$ *

(**b**) $\cos(2x) = \cos^2 x + \sin^2 x$

(**c**) $\cos(2x) = \cos^2(2x) - \sin^2(2x)$

(**d**) $\cos(2x) = 2\sin x . \cos x$

(**33**) The following graph



represents the function :

(**a**) $f(x) = \begin{cases} x^2 + 2 & \text{if } x > 0 \\ x + 1 & \text{if } x \leq 0 \end{cases}$

(**b**) $f(x) = \begin{cases} x^2 + 2 & \text{if } x \geq 0 \\ x + 1 & \text{if } x < 0 \end{cases}$ *

(**c**) $f(x) = \begin{cases} x^2 + 2 & \text{if } x < 0 \\ x + 1 & \text{if } x \geq 0 \end{cases}$

(**d**) $f(x) = \begin{cases} x^2 + 2 & \text{if } x \leq 0 \\ x + 1 & \text{if } x > 0 \end{cases}$