

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 $f(x) = \frac{x+2}{x^2+x-6}$ 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 $f(x) = \frac{7 - x^2}{x^3 + 3x}$ 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) $2 + x$ *

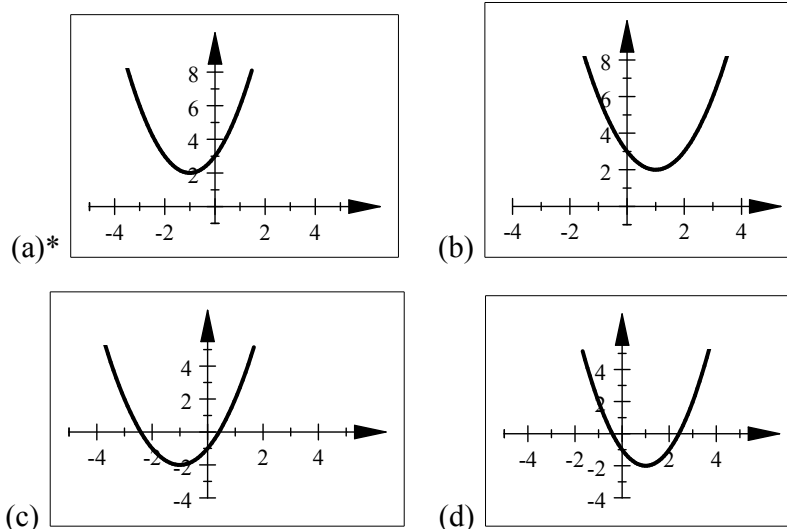
(14) If $f(x) = x$ and $g(x) = 3x^2 + x$, then $\left(\frac{f}{g}\right)(x) =$

- (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



- (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 $f(x) = (\frac{1}{2})^x$ 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

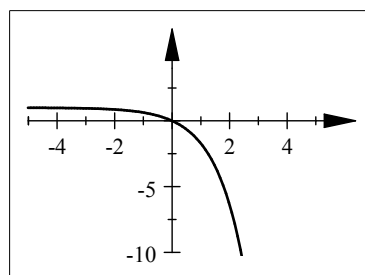
(25) If a is a positive number and x, y are real numbers, then $(a^x)^y =$

- (a) a^{x+y}
- (b) $a^{x \cdot y}$ *
- (c) $a^x \cdot a^y$
- (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}

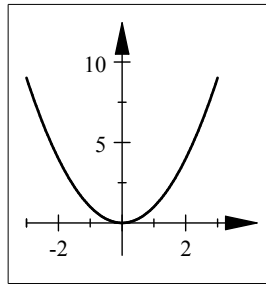
(29) If $f(x) = 3x + 2$, then $f^{-1}(x) =$

- (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 *

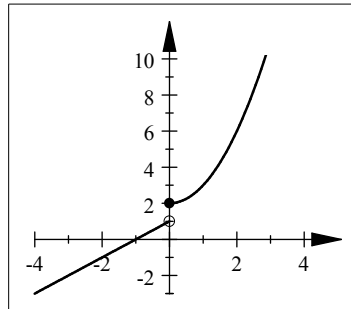
(31) The range of the function $f(x) = \sqrt{x}$ is

- (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) $\cos(2x) = 2 \sin x \cdot \cos x$

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