

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

1. The number $r = 14.34$ is rational.
 - (a) True
 - (b) False

2. $(-14, -2] \setminus (-5, 10) =$
 - (a) $(-14, -5)$
 - (b) $(-14, -5]$
 - (c) $[-2, 10)$
 - (d) $(-2, 10)$

3. The solution set of the inequality $|x+2| \leq 5$ is
 - (a) $(-7, 3)$
 - (b) $[-7, 3]$
 - (c) $(-3, 7)$
 - (d) $[-3, 7]$

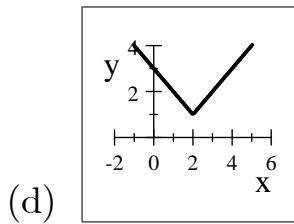
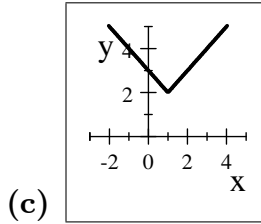
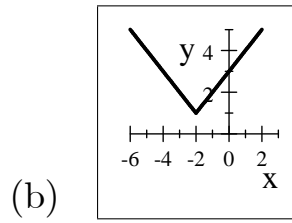
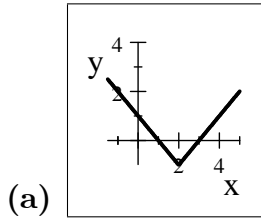
4. The solution set of the inequality $4 \leq 3x - 2 < 13$ is
 - (a) $[-2, 5)$
 - (b) $(-2, 5)$
 - (c) $(2, 5)$
 - (d) $[2, 5)$

5. The solution set of the inequality $x^2 - x - 6 < 0$ is
 - (a) $(-\infty, -2) \cup (3, \infty)$
 - (b) $(-\infty, -2] \cup [3, \infty)$
 - (c) $(-2, 3)$
 - (d) $[-2, 3]$

6. The distance between two points $(1, 2)$ and $(3, 5)$ is
- (a) $\sqrt{65}$
 - (b) $\sqrt{13}$
 - (c) $\sqrt{10}$
 - (d) $\sqrt{5}$
7. The equation of the line which passes through the point $(2, 3)$ and perpendicular to the line $2x - 3y = 6$ is
- (a) $2y - 3x = 12$
 - (b) $2y + 3x = 12$
 - (c) $2y - 3x = -12$
 - (d) $2y + 3x = -12$
8. The equation of the line which passes through the points $(1, -3)$ and $(3, -6)$ is
- (a) $y = \frac{2}{3}x - \frac{11}{3}$
 - (b) $y = -\frac{2}{3}x - \frac{7}{3}$
 - (c) $y = \frac{3}{2}x - \frac{9}{2}$
 - (d) $y = -\frac{3}{2}x - \frac{3}{2}$
9. The y - intercept of the line $2x + 3y = 15$ is
- (a) $\frac{15}{2}$
 - (b) 5
 - (c) 15
 - (d) -5
10. The domain of the function $f(x) = \frac{5}{x - 2}$ is
- (a) $(-\infty, 2) \cup (2, \infty)$
 - (b) $(-\infty, -2) \cup (-2, \infty)$
 - (c) $(2, \infty)$
 - (d) $[2, \infty)$

11. The domain of the function $f(x) = \frac{x-2}{x^2+2x-3}$ is
- (a) $\mathbb{R} - \{2\}$
 - (b) $\mathbb{R} - \{1\}$
 - (c) $\mathbb{R} - \{-3\}$
 - (d) $\mathbb{R} - \{1, -3\}$
12. The domain of the function $f(x) = \frac{1}{\sqrt{4-x^2}}$ is
- (a) $[-2, 2]$
 - (b) $(-\infty, -2) \cup (2, \infty)$
 - (c) $(-\infty, -2] \cup [2, \infty)$
 - (d) $(-2, 2)$
13. The function $f(x) = \log_3(x)$ is
- (a) Algebraic function
 - (b) Trigonometric function
 - (c) Exponential function
 - (d) Logarithmic function
14. The function $f(x) = x^5 + x$ is odd.
- (a) True
 - (b) False
15. If $f(x) = x^4$, then $f(x) = (x+6)^4$ is shifting
- (a) 6 Units to the right
 - (b) 6 Units to the left
 - (c) 6 Units upward
 - (d) 6 Units downward

16. The graph of the function $f(x) = |x - 2| + 1$ is



17. If $f(x) = \sqrt[5]{x}$, $g(x) = 2x + 3$ then $(f \circ g)(x) =$

- (a) $2\sqrt[5]{x} + 3$
- (b) $\sqrt[5]{2x + 3}$
- (c) $\sqrt[5]{x}$
- (d) $2x + 3$

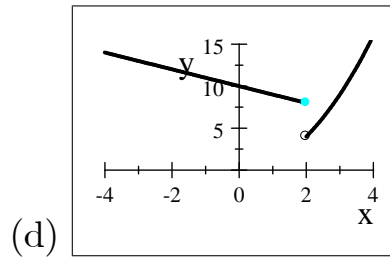
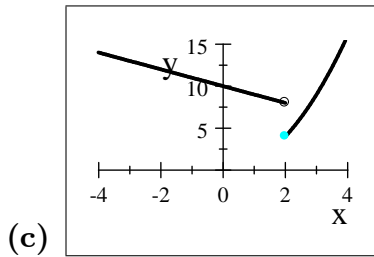
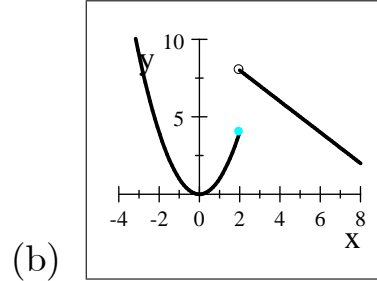
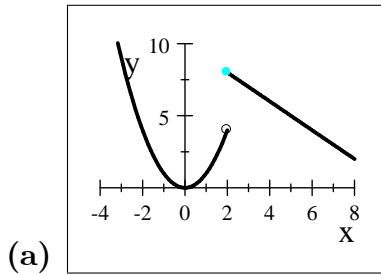
18. If $f(x) = \frac{1}{x}$, $g(x) = \frac{x + 4}{2x}$, then $(f + g)(x) =$

- (a) $\frac{x + 5}{3x}$
- (b) $\frac{x + 2}{x}$
- (c) $\frac{x + 4}{2x^2}$
- (d) $\frac{x + 6}{2x}$

19. If $f(x) = \frac{1}{x - 1}$, $g(x) = x^2$, then the domain of $f \circ g$ is

- (a) $\mathbb{R} - \{1\}$
- (b) $\mathbb{R} - \{0\}$
- (c) $\mathbb{R} - \{\pm 1\}$
- (d) $\mathbb{R} - \{-1\}$

20. The graph of the function $f(x) = \begin{cases} x^2 & x < 2 \\ 10 - x & x \geq 2 \end{cases}$ is given by



21. If $f(x) = \begin{cases} 1 + x & \text{if } x \leq 1 \\ x^3 & \text{if } x > 1 \end{cases}$, then $f(-2) =$

- (a) 8
- (b) -8
- (c) -1
- (d) 1

22. If $h(x) = \sqrt{\cos x}$, then $h(x) = (f \circ g)(x)$ where

- (a) $f(x) = \cos x, g(x) = \sqrt{x}$
- (b) $f(x) = \sqrt{x}, g(x) = \cos x$
- (c) $f(x) = \cos \sqrt{x}, g(x) = x$
- (d) $f(x) = x, g(x) = \cos \sqrt{x}$

23. If $g(x)$ is the horizontal compress by factor of 3 of the function $f(x) = \sin x$, then $g(x) =$

- (a) $3 \sin x$
- (b) $\sin 3x$
- (c) $\frac{1}{3} \sin x$
- (d) $\sin \frac{x}{3}$

24. If $\theta = \frac{5\pi}{12}$, then $\theta =$

- (a) 85°
- (b) 95°
- (c) 70°
- (d) 75°

25. The radian measure of 270° is

- (a) $\frac{3\pi}{2}$
- (b) $\frac{2\pi}{3}$
- (c) $\frac{5\pi}{2}$
- (d) $\frac{5\pi}{3}$

26. If $\cos \theta = -\frac{3}{5}$ and $\frac{\pi}{2} < \theta < \pi$, then $\sin \theta =$

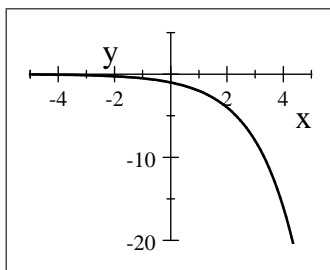
- (a) $\frac{3}{4}$
- (b) $-\frac{4}{5}$
- (c) $\frac{4}{5}$
- (d) $-\frac{3}{4}$

27. If $\sin \theta = \frac{1}{3}$, then $\sin 2\theta =$

- (a) $\frac{2\sqrt{8}}{9}$
- (b) $\frac{\sqrt{8}}{9}$
- (c) $\frac{2\sqrt{10}}{9}$
- (d) $\frac{\sqrt{10}}{9}$

28. If $\theta = \frac{5\pi}{6}$, then $\sin \theta =$
- (a) $\frac{\sqrt{3}}{2}$
 - (b) $-\frac{\sqrt{3}}{2}$
 - (c) $\frac{1}{2}$
 - (d) $-\frac{1}{2}$
29. Simplifying the function $f(x) = \frac{(2^{3x})^2 \times 9}{18}$ gives $f(x) =$
- (a) 2^{5x-1}
 - (b) 2^{5x+1}
 - (c) 2^{6x-1}
 - (d) 2^{6x+1}
30. The domain of the function $f(x) = \frac{1}{1 - e^x}$ is
- (a) $(-\infty, 0) \cup (0, \infty)$
 - (b) $(0, \infty)$
 - (c) $(-\infty, 0)$
 - (d) \mathbb{R}
31. The range of the function $f(x) = 3^x$ is $(-\infty, \infty)$.
- (a) True
 - (b) False
32. The exponential function $f(x) = 2^x$ is increasing on \mathbb{R} .
- (a) True
 - (b) False

33. The following figure



shows the graph of the

function $f(x) =$

- (a) -2^x
- (b) $-\left(\frac{1}{2}\right)^x$
- (c) 2^x
- (d) $\left(\frac{1}{2}\right)^x$