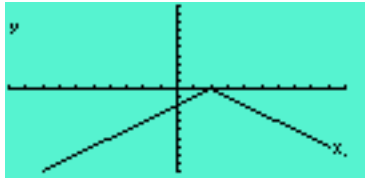
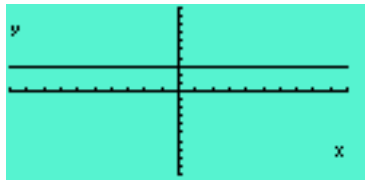
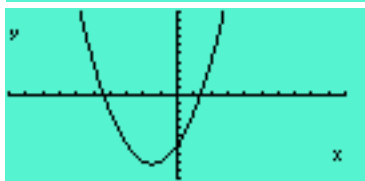
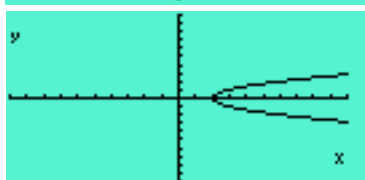


Pennsylvania College of Technology
School of Integrated Studies
Math Department Sample Placement Test

Functions and Graphs Test

1. Which of the following is NOT a function?

- a. 
- b. 
- c. 
- d. 

2. Given $f(x) = x^2 - 3$, what is the range of $f(x)$?

- a. $-3 \leq f(x) < 3$
- b. All Reals
- c. $-3 \leq f(x) \leq 0$
- d. $f(x) \geq -3$

3. Given $g(x) = \sqrt{x^2 - 4}$, evaluate $g(4)$

a. 2

b. 0

c. $2\sqrt{3}$

d. $\sqrt{8}$

4. $\log_4 40$ is

a. between 2 and 3

b. equal to 10

c. between 9 and 10

d. undefined

5. The function, $f(x) = 5 - 3x$, has a slope of

a. -3

b. 5

c. 3

d. a changing value

6. The minimum value for the function, $g(x) = (x-3)^2 + 5$, would occur at

- a. $(-3, 5)$
- b. $(3, 5)$
- c. $(5, 3)$
- d. $(3, 14)$

7. Given the problem below

$$g(x) = \begin{cases} 2x-5, & x \leq 2 \\ x-3, & x > 2 \end{cases}, \text{ find } f(1)$$

- a. -2
- b. 1
- c. -3
- d. -1

8. Find the domain of the function, $f(x) = \sqrt{x-5}$

- a. $x \geq 5$
- b. $x \geq 0$
- c. $x \leq -5$
- d. $0 \leq x \leq 5$

9. The maximum value of the function, $f(x) = -2 + 4\sin(2x)$, is

- a. -2
- b. 4
- c. 2
- d. 1

10. Given: $f(x) = x - 2$ & $g(x) = x^2 - 1$ find $(f + g)(x)$

- a. $2x^2 - 3$
- b. $x^3 - 3$
- c. -3
- d. $x^2 + x - 3$

11.

Given $f(x) = x - 2$ & $g(x) = x^2 - 1$ find $g[f(x)]$

- a. $x^3 - 3$
- b. $x^2 - 4x + 3$
- c. $x^3 - 2x^2 - x + 2$
- d. $x^3 + 2$

12. Given $f(x) = x - 2$ & $g(x) = x^2 - 1$

find $[f(x)g(x)]$

- a. $x^3 + 2$
- b. $x^3 - 3$
- c. $x^2 - 4x + 3$
- d. $x^3 - 2x^2 - x + 2$

13. Which of the following is NOT a function?

- a. $x^2 + y^2 = 12$
- b. $y = |x + 2|$
- c. $y = x\sqrt{x}$
- d. $y = x^{-1}$

14. Evaluate: $\log 10^3$

- a. 30
- b. 3
- c. 1000
- d. $\frac{3}{10}$

15. Find the root(s) of the function: $s(t) = -16t^2 + 96t$

- a. $\{6\}$
- b. $\{-6\}$
- c. $\{0, 6\}$
- d. $\{-6, 0\}$

16. Given: $\ln(e) = \frac{x}{5}$, x must equal

- a. 0
- b. 2.718
- c. π
- d. 5

17.

Given: $h(x) = 5x + 2$, find $h^{-1}(x)$ if it exists.

- a. $\frac{x-2}{5}$
- b. $\frac{1}{5x+2}$
- c. $2x+5$
- d. $h^{-1}(x)$ does not exist

18. Given $f(5) = 2$ the function $f(x)$ could be

a. $x^2 - 8$

b. $x + 3$

c. $\frac{20}{x-2}$

d. $|2-x|-1$

19. A function, $f(x)$, is classified as an even function if $f(-x) = f(x)$.
Which of the following functions is even?

a. $f(x) = x^3 + 1$

b. $f(x) = \sqrt{x} + 2$

c. $f(x) = |x| + 2$

d. $f(x) = 2x + 2$

$$g(x) = \frac{4-x}{x+2}$$

20. What is the vertical asymptote(s) of

- a. $x = 4$
- b. $x = -2$
- c. $x = 4, x = -2$
- d. $x = -1$

21. Evaluate: $\sin(120^\circ)$

- a. $\frac{1}{2}$
- b. $\frac{-\sqrt{3}}{2}$
- c. $\frac{\sqrt{3}}{2}$
- d. 1

22. Solve for θ , $2 \tan \theta - 2 = 0$, where $0^\circ \leq \theta < 360^\circ$

a. $\{-1, 1\}$

b. $\{45^\circ\}$

c. $\{45^\circ, 135^\circ\}$

d. $\{45^\circ, 225^\circ\}$

23.

Given: $f(x) = \sqrt{x}$ & $g(x) = \sqrt{x-2}$, the graph of $g(x)$

compared to $f(x)$ is

a. shifted 2 units right

b. shifted 2 units left

c. shifted 2 units up

d. shifted 2 units down

24. The expression, $\cos x \cot x + \sin x$, is equal to which basic trigonometric function?

a. $\cos x$

b. $\sin x$

c. $\tan x$

d. $\csc x$

25. On what interval(s) is the function, $f(x) = -x^2 + 2$, decreasing?

- a. $(-2, 0)$
- b. $(0, \infty)$
- c. $(-\infty, 2)$
- d. $(-\sqrt{2}, 0) \cup (\sqrt{2}, \infty)$

26. Evaluate $\cos\left(\frac{\pi}{6}\right)$ exactly

- a. $\frac{1}{2}$
- b. $\frac{\sqrt{2}}{2}$
- c. 1
- d. $\frac{\sqrt{3}}{2}$

27. Solve: $\log_3 81 = x$

- a. 4
- b. 27
- c. 9
- d. $\frac{9}{2}$

28. Solve: $2^{x+2} = 64$

- a. 16
- b. 32
- c. 31
- d. 4

29. $\sin(570^\circ) =$

- a. $\sin(30^\circ)$
- b. $\sin(210^\circ)$
- c. $\sin(-170^\circ)$
- d. $\sin(120^\circ)$

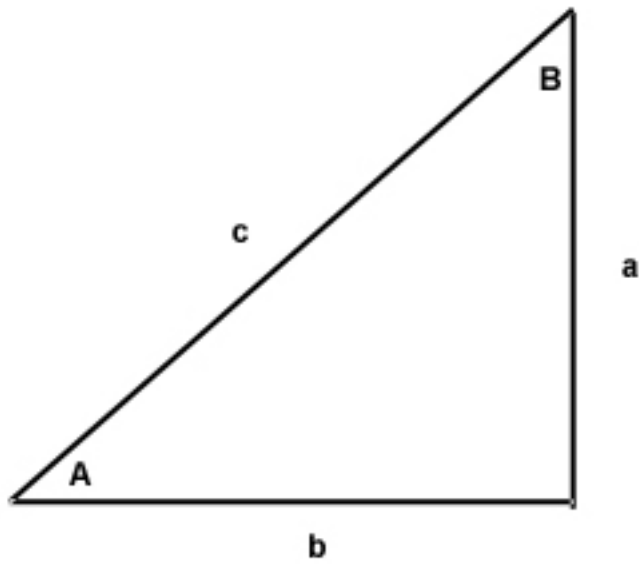
30. The side of a square is doubled in length. As a result its area is increased by what factor?

- a. x^2
- b. $\sqrt{2}$
- c. 4
- d. 2

31. Which of the following formulas is the ONLY one that could represent a formula for computing volume?

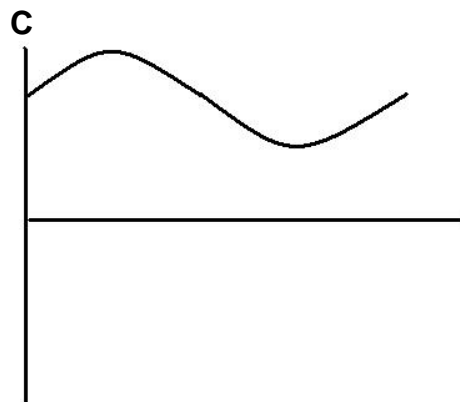
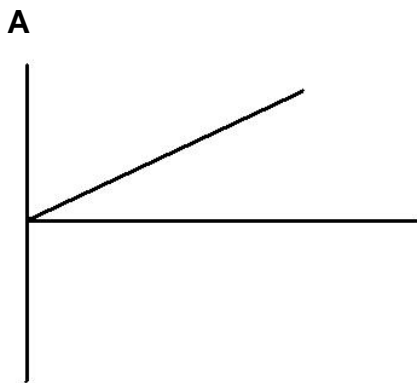
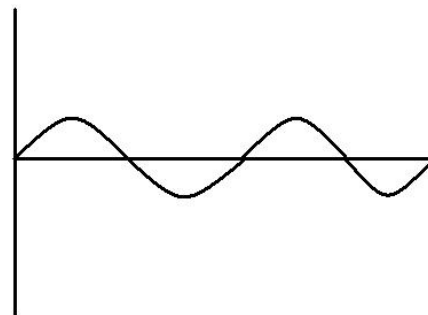
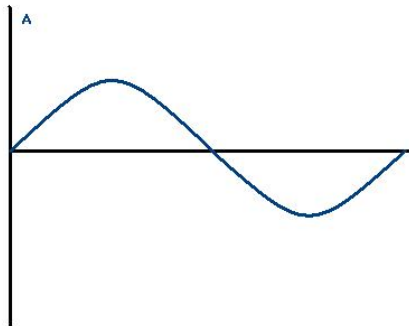
- a. $V = 2l + 2w$
- b. $V = \pi r^2 h$
- c. $V = \frac{1}{2}bh$
- d. $V = \pi r^2$

32. Given the following right triangle, the ratio for the $\cos A$ is



- a. $\frac{b}{c}$
- b. $\frac{a}{c}$
- c. $\frac{a}{b}$
- d. $\frac{b}{a}$

33. Which is the graph of $f(x) = \sin(2x)$?



B

D

34. The line, $y = -3x + 2$, is parallel to which of the following lines?

- a. $y = 3x + 2$
- b. $3x + y = 4$
- c. $y = \frac{-1}{3}x + 1$
- d. $y = -3$

35. The expression, $\log 2x^3$, is equivalent to

- a. $3 \log 2x$
- b. $\log 2 + \log 3x$
- c. $\log 6x$
- d. $\log 2 + 3 \log x$

36. A rectangle has length four inches longer than its width. If the perimeter of the rectangle is 28 inches, what is the value of its width?

- a. 12 inches
- b. $\sqrt{7}$ inches
- c. 3 inches
- d. 5 inches

37.

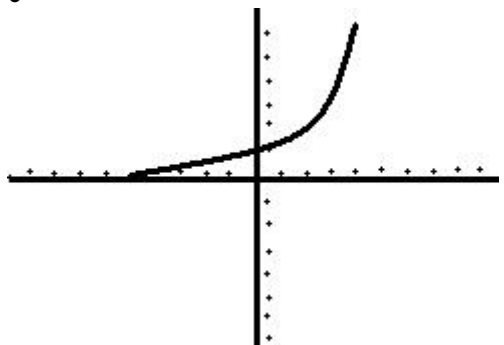
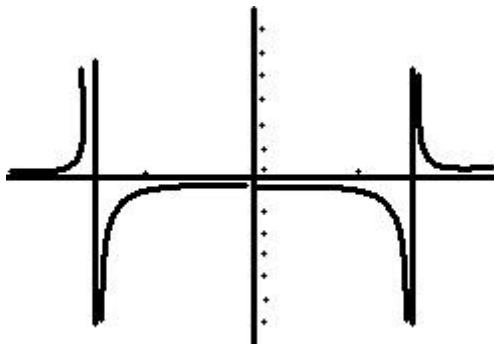
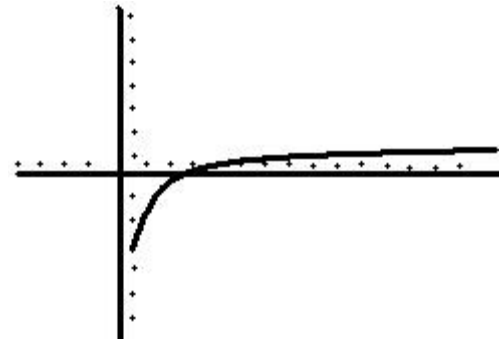
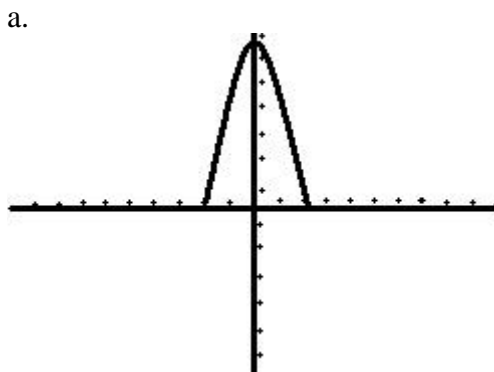
An angle, θ , in standard position has a terminal side that passes through the point $(-5, 12)$. Find the trigonometric ratio for the $\sin \theta$.

- a. $\frac{12}{13}$
- b. $\frac{5}{-12}$
- c. $\frac{12}{\sqrt{119}}$
- d. $\frac{-5}{13}$

38. In which quadrant must the angle, θ , lie if the conditions $\tan \theta > 0$ and $\sin \theta < 0$ are met?

- a. I
- b. II
- c. III
- d. IV

39. Which of the following graphs is most likely a logarithmic graph?



40. Evaluate: $\sin^2(45^\circ) + \cos^2(45^\circ)$

a. $\tan(45^\circ)$

b. $\frac{1}{4}$

c. $\sin(45^\circ) + \cos(45^\circ)$

d. 1