

1) If $f(x) = 3x^2 - 2x$ then $f(2 - \sqrt{2})$ equals

- (a) $14 - 10\sqrt{2}$
- (b) $10 - 14\sqrt{2}$
- (c) $14 + 10\sqrt{2}$
- (d) $10 + 14\sqrt{2}$

2) The expression $\frac{\sec x \csc x}{\csc^2 x + \sec^2 x}$ is equal to

- (a) $\tan x$
- (b) $\sec x \tan x$
- (c) $\sin x$
- (d) $\sin x \cos x$

3) The solution of the system $\begin{array}{l} x - 2y - z = -6 \\ -2x + 3y + 2z = 8 \\ 3x - y - 4z = 9 \end{array}$ is

- (a) $(4, 4, 2)$
- (b) $(1, 4, -1)$
- (c) $(-1, -4, -3)$
- (d) $(-5, 4, -7)$

4) The hyperbola $x^2 - 25y^2 = 25$ has asymptotes:

- (a) $y = \pm 5x$
- (b) $y = \pm \frac{1}{5}x$
- (c) $y = \pm x$
- (d) $y = \pm \frac{1}{25}x$

5) Given that the equation $x^3 + 3x + 14 = 0$ has -2 as one root, the other two are

- (a) 1, 7
- (b) $1 \pm i\sqrt{6}$
- (c) $-2 \pm i\sqrt{7}$
- (d) 1, -7

6) If $\ln(x+3) - 4 = \ln(x-5)$ then x equals

(a) $\ln(12/5)$

(b) $\frac{e^4 - 3}{e^4}$

(c) $\frac{5e^4 + 3}{e^4 - 1}$

(d) $\frac{4 - e^3}{e^5}$

7) The radius of the circle $9x^2 + 9y^2 - 18x - 72y + 72 = 0$ is

(a) 3

(b) 9

(c) 16

(d) 4

8) If a , b , and c are solutions to $2x^3 - x^2 - 15x = 0$ then $a + b + c$ equals

(a) $3/5$

(b) $2/3$

(c) $1/2$

(d) $-7/2$

9) The inverse of $f(x) = \frac{x+4}{5}$ equals:

(a) $f^{-1}(x) = 5x - 4$

(b) $f^{-1}(x) = \frac{5}{x+4}$

(c) $f^{-1}(x) = 5x - 4/5$

(d) $f^{-1}(x) = 5x + 4$

10) The 20th term of the arithmetic sequence $-42, -29, -16, \dots$ is

(a) 194

(b) 201

(c) 205

(d) 209

11) Use a graphing calculator to determine which of the following are **true** statements about the graph of: $y = \frac{x^2 + 1}{x^3}$

- (1) It is symmetric about the x-axis
- (2) It is symmetric about the y-axis
- (3) It is symmetric about the origin
- (4) It has no x-intercept
- (5) It has two y-intercepts

- (a) Statements 2 and 3 only
- (b) Statements 2 and 4 only
- (c) Statements 3 and 4 only
- (d) Statements 3, 4 and 5 only

12) If $f(x) = 3x^2 - 4x + 1$ and $g(x) = 2x - 3$ then $f(g(4))$ equals

- (a) 63
- (b) 48
- (c) 56
- (d) 15

13) Let $f(x) = -4x^2 - 4x + 5$. For what x value does f(x) have a maximum?

- (a) $-1/2$
- (b) $-5/8$
- (c) $-1/4$
- (d) $-3/8$

14) If $\cos \theta = -\frac{4}{7}$ and $180^\circ < \theta < 270^\circ$ then $\tan \theta$ equals

- (a) $-\frac{\sqrt{33}}{4}$
- (b) $\frac{\sqrt{33}}{4}$
- (c) $\frac{4\sqrt{33}}{33}$
- (d) $\frac{-4\sqrt{33}}{33}$

15) The value of $\log_5 27$ equals: (a) 0.488 (b) 0.699 (c) 2.048 (d) 18.872

Solutions:

- 1) A
- 2) D
- 3) D
- 4) B
- 5) B
- 6) C
- 7) B
- 8) C
- 9) A
- 10) C
- 11) C
- 12) C
- 13) A
- 14) B
- 15) C