

Name: _____

1. Let $f(x) = 3x^2 - x$. Find the following:

(a) $f(1)$

(b) $f(-4)$

(c) $f(a + 1)$

2. State the domain and range of the following functions:

(a) $f(x) = x^2 + 1$

(b) $f(x) = \sqrt{x + 3}$

(c) $f(x) = \frac{9}{x - 2}$

3. Use the function given to evaluate the following: $h(x) = \begin{cases} 1 - x^5 & : x < 3 \\ e^x & : x = 3 \\ 8 & : x > 3 \end{cases}$

(a) $h(5)$

(b) $h(-1)$

(c) $h(3)$

4. Let $f(x) = \sqrt{x^2 - 1}$ and $g(x) = x + 1$. Find the following:

(a) $\left(\frac{g}{f}\right)(x)$

(b) $f(g(x))$

(c) $(g \circ f)(2)$

5. Find the equation of the line through the point $(1, 7)$ with slope $\frac{2}{3}$. Present your answer in slope-intercept form.

6. Find the solutions to the following:

(a) $1 - (4 - (5 - x)) = 3x - (4 + x)$

(b) $x^2 + 5x = -4$

(c) $2\theta \cos(\theta) + \theta = 0$ on $[0, 2\pi]$

7. Given $\sin(\theta) = \frac{12}{13}$ and $\frac{\pi}{2} < \theta < \pi$, find the other 5 trigonometric values.

8. Find the inverse, $f^{-1}(x)$, of the following functions.

(a) $f(x) = \frac{4x - 1}{2x + 3}$

(b) $f(x) = \ln(5x - 1)$

9. Solve the following equations:

(a) $4^{2x-3} = 64$

(b) $4e^{2x} - 7e^x = 15$

(c) $\log_3 x + \log_3(x - 6) = 3$

10. Using the properties of logarithms, express the given quantity as a single logarithm:

$$\ln(a + b) + \ln(a - b) - 2 \ln c$$

11. Evaluate the following. *Keep in mind the restricted function values for inverse trig functions.*

(a) $\cos^{-1}\left(\frac{\sqrt{2}}{2}\right)$

(b) $\arctan(\sqrt{3})$

12. Determine if the following functions are even, odd, or neither.

(a) $f(x) = 5x^4 - 3x^2 + 7$

(b) $f(x) = 3x - 6$

(c) $f(x) = 4x^5 + 2x^3 - x$