

BC Calculus
Review for Test # 4 (80)

71. Let R be the region in the **first quadrant** bounded by $y = -x^2 - 4x + 5$ and the x and y axes.

A) Find the area of R.

B) Find the volume of the solid formed when R is revolved around the x axis.

72. Evaluate each of the following.

A) $\frac{d}{dx} 17^{3x^2 - 5x}$

B) $\frac{d}{dx} \log_6 3x$

C) $\frac{d}{dx} |-x^2 + 9|$

73. A) $\int 7^{5x} dx$

B) $\int \log_4 x dx$

74. The end of a trough that is 12 meters long is an equilateral triangle with sides that are each two meters long. The top of the trough is horizontal. If the trough is half-filled with water (by volume), how much force is exerted on the end of the trough?

75. A) f is a continuous function on the interval $[-2, 6]$ and $\lim_{x \rightarrow 4} f(x) = 8$. Can you positively conclude that $f(4) = 8$. Explain.

B) Let $f(x) = \begin{cases} ax^2 + bx, & x \geq 2 \\ -2x + 3, & x < 2 \end{cases}$ Find the values of a and b such that f(x) is everywhere continuous.

76. A) $\int \cos^3 x dx =$

B) $\int \sin^3 x \cos^6 x dx =$

77. Find the work done in pumping the water out of the tank described in problem # 74.

78. A particle moves along the x-axis such that $a(t) = 6$, $x(2) = 6$, and $x(4) = 34$. When is the particle at rest? When is the particle 27 units to the right of the origin?

79. Evaluate each of the following limits.

A) $\lim_{x \rightarrow 0} \frac{\sin x}{x}$

B) $\lim_{x \rightarrow 0} \frac{\cos x - 1}{x}$

C) $\lim_{x \rightarrow 0} \frac{2x^3 - 3x^2}{2x - 5x^2}$

D) $\lim_{x \rightarrow \infty} \frac{2x^3 - 3x^2}{2x - 5x^2}$

E) $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\sin x + 2}{\cos x}$

80. List **all** the asymptotes of:
Graph each function.

A) $y = \frac{x^2 + x - 2}{x^3 + 3x^2 - 18x}$

B) $y = \frac{x^3 - x}{x^2 + 3x}$