1. The solution to the equation

$$5 \cdot 4^t = 3^t$$

is

(a) $t = \dfrac{2\log 2}{\log 5 - \log 3}$ 　　　　 (b) $t = \dfrac{\log 3}{2\log 2 - \log 5}$ 　　　　 (c) $t = \dfrac{\log 5}{\log 3 - 2\log 2}$

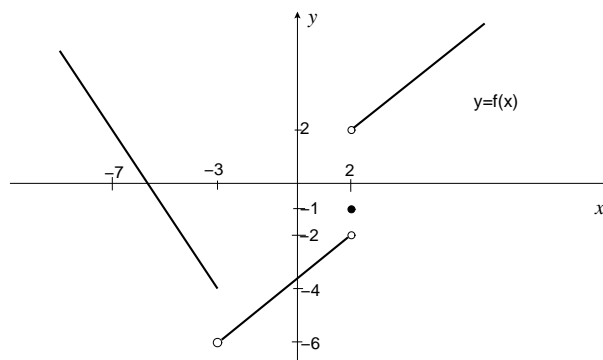(d) $t = \dfrac{\log 3}{\log 5 - 2\log 2}$ 　　　　　　 (e) $t = \dfrac{2\log 2}{\log 3 - \log 5}$

2. For a function f, it is known

$$f(x + h) - f(x) = -4\,\frac{h}{(x + h + 3)(x + 3)}\ .$$
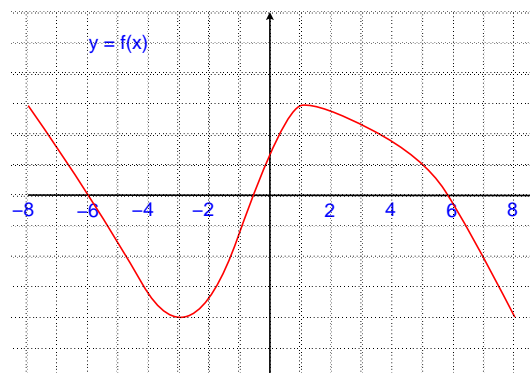
The derivative $f'(1)$ equals:

(a) $-\dfrac{1}{2}$ 　　　 (b) -1 　　　 (c) $-\dfrac{1}{9}$ 　　　 (d) $-\dfrac{1}{16}$ 　　　 (e) $-\dfrac{1}{4}$

3. Find $\lim\limits_{x \to 2^+} f(x)$ from its graph shown below.

(a) 2 　　　　 (b) -1 　　　　 (c) -2 　　　　 (d) -4 　　　　 (e) does not exist

4. The derviative of the following differentiable function is always positive on the following interval:

(a) $6 < x < 8$ 　　 (b) $-8 < x < -6$ 　　 (c) $2 < x < 6$ 　　 (d) $-2 < x < 1$ 　　 (e) $1 < x < 7$

5. An automobile starts from the rest and travels down a straight section of road. The distance y (in feet) of the car from the starting position after x seconds is given by $y = f(x) = x^2 - x + 10$. Find the average speed of the car from $x = 2$ seconds to $x = 6$ seconds :

(a) 4.67 ft/sec   (b) 7 ft/sec   (c) 14 ft/sec   (d) 10 ft/sec   (e) 3 ft/sec

6. Determine the tangent line to the graph of the function $y = f(x) = 4x^2 - x + 7$ at the point $(1, f(1))$.

(a) $y = 9x + 2$ (b) $y = 12x + 2$ (c) $y = 7x + 3$

(d) $y = 8x + 2$ (e) $y = 4x - 1$

7. Suppose a principal of \$179,045 is invested in a bank account compounded quarterly with an annual interest rate of 8.8%. How long will it take for the compounded amount to reach \$203,104 (please give your answer accurate to two decimal places) ?:

(a) 15.40 quarters (b) 5.29 quarters (c) 6.88 quarters (d) 5.79 quarters (e) none of the above

8. Find the limit $\lim\limits_{x \to -3} \dfrac{x^2 - 2x - 15}{x^2 - 9}$

(a) Does not exist   (b) $\frac{3}{4}$ (c) 1   (d) $\frac{4}{3}$ (e) $\frac{-5}{3}$

9. The population (in millions) of the state of Arizona USA, is $1.3 \cdot 1.035^t$ where t is the number of years from the start of 1960. In what month and year did Arizona achieve a population of 3.1 million?

(a) July 1972   (b) April 1975   (c) February 1980   (d) January 1971   (e) April 1985

10. Find $\lim\limits_{x \to 3^+} \dfrac{|x - 3|}{x - 3}$.

(a) 3   (b) −3   (c) 1   (d) −1   (e) Does not exist.

Answers: 1.c   2.e   3.a   4.d   5.b   6.c   7.d   8.d   9.e   10.c