1. What approximate value do you get for $\sqrt{4.1}$ if you use the linear approximation at 4?

   A. 2

   B. 2.025

   C. 2.05

   D. 2.075

   E. 2.1

2. Evaluate $\cosh(\ln 5)$.

   A. 2.4

   B. 2.5

   C. 2.6

   D. 3

   E. 5

3. The maximum value of $x^3 - 3x + 9$ for $-3 \leq x \leq 2$ is

A. 5

B. 7

C. 9

D. 11

E. 13

4. The minimum value of $x^3 - 3x + 9$ for $-3 \leq x \leq 2$ is

A. -9

B. -1

C. 3

D. 5

E. 7

5. Given that $f(3) = 0$ and $f'(x) \geq 3$ for $0 \leq x \leq 3$, the largest $f(0)$ can be is

A. -9

B. -3

C. 0

D. 6

E. Cannot be determined.

6. If $f'(x) = x(x-1)^2(x-2)$, then f has

A. 3 local minima.

B. 2 local minima and 1 local maximum.

C. 1 local minimum and 2 local maxima.

D. 3 local maxima.

E. 1 local maximum and 1 local minimum.

7. If $f'(x) = 3(x-1)^{2/3} - x$, the interval(s) where f is concave down is (are)

A. $(-\infty, 9)$ only

B. $(-\infty, 1)$ only

C. $(9, \infty)$ only

D. $(-\infty, 1)$ and $(9, \infty)$

E. $(-\infty, 9)$ and $(9, \infty)$

8. $\lim_{x \to \infty} \dfrac{\ln(1+2x)}{\ln(3x)} =$

A. 2/3

B. 3/2

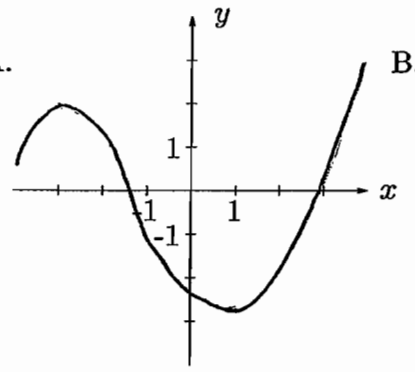
C. 6

D. 1

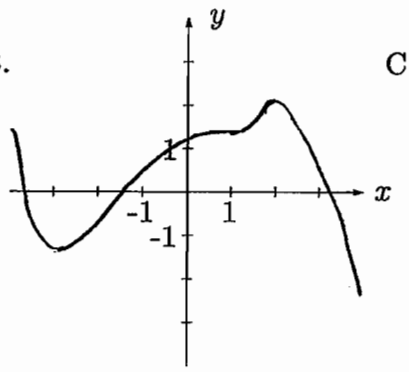
E. 0

9. If $f'(x) = (x-1)(2-x)(x+3)$, then the graph of f can look like which one of the following graphs?

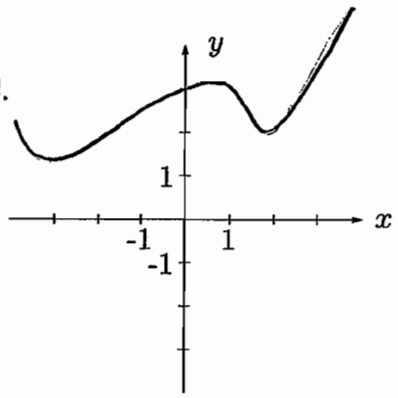
A.



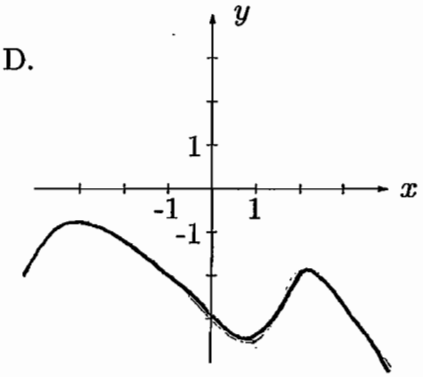
B.



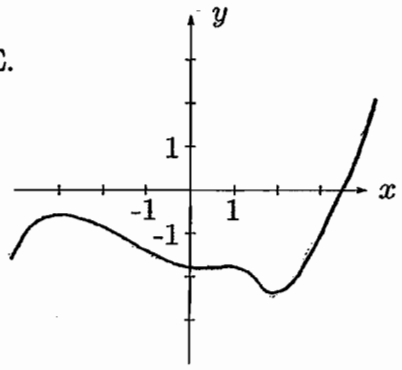
C.



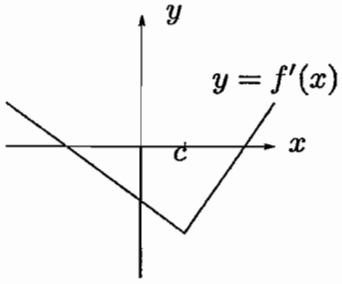
D.



E.



10. The graph of f' is given below. Only one of the following is true. Which one?



A. f has a local min at $x = c$.

B. f is not differentiable at $x = c$.

C. f has an inflection point at $x = c$.

D. f is increasing for all x such that $x > c$.

E. $f(c) < 0$.

11. Find the x–coordinate of the point on the line $3x - 2y = 2$ that is closest to the point $(2, 1)$.

A. $\frac{20}{13}$

B. $\frac{10}{13}$

C. $\frac{8}{13}$

D. $\frac{20}{17}$

E. $\frac{10}{17}$

12. Suppose at the point $(2, -3)$ on the curve $y = f(x)$, the tangent line has slope 4. If Newton's method is used to locate a root of the equation $f(x) = 0$ and the initial approximation is $x_1 = 2$, find the second approximation x_2.

A. $x_2 = -\frac{11}{4}$

B. $x_2 = -\frac{4}{11}$

C. $x_2 = \frac{4}{11}$

D. $x_2 = \frac{11}{4}$

E. $x_2 = \frac{3}{2}$

13. Find the most general antiderivative of the function $g(x) = \cos(2x) - 3\sin(x)$.

A. $2\sin(2x) + \frac{1}{3}\cos(3x) + C$

B. $\frac{1}{2}\sin(2x) + 3\cos(x) + C$

C. $\frac{1}{2}\sin(2x) - 3\cos(x) + C$

D. $-2\sin(2x) + \frac{1}{3}\cos(3x) + C$

E. $2\sin(2x) - \frac{1}{3}\cos(3x) + C$

14. If $f''(x) = x^{1/3}$, $f'(8) = 10$, and $f(1) = 0$, then $f(0) =$

A. $-\frac{9}{28}$

B. $\frac{9}{28}$

C. $\frac{45}{28}$

D. $\frac{8}{28}$

E. $\frac{47}{28}$