1. The value of $\lim_{x\to 10} \dfrac{\sqrt{x-1}-3}{x-10}$ is

   (a) $\dfrac{1}{6}$ ——————————————————————————————— (correct)
   (b) 1
   (c) 0
   (d) ∞
   (e) $\dfrac{1}{3}$

2. $\lim_{x\to 3} \dfrac{x^2-2x-3}{x^2+2x-15} =$

   (a) $\dfrac{1}{2}$ ——————————————————————————————— (correct)
   (b) $\dfrac{2}{3}$
   (c) 0
   (d) ∞
   (e) 1

3. The value of $\lim_{x\to\infty} \dfrac{3-2x-2x^3}{7-5x^3+2x^2}$ is

(a) $\dfrac{2}{5}$ (correct)

(b) 0

(c) ∞

(d) $-\infty$

(e) -2

4. The function $f(x) = \dfrac{x-3}{x^3-9x}$ has discontinuity at

(a) $x = 0$, $x = \pm 3$ only (correct)

(b) $x = 0$ and $x = 3$ only

(c) $x = \pm 3$ only

(d) $x = 3$ only

(e) $x = 0$ and $x = -3$ only

5. Given $f(x) = x^2 - 3$, then $\lim_{h \to 0} \dfrac{f(2+h) - f(2)}{h} =$

(a) 4 _____ (correct)
(b) 0
(c) 2
(d) 1
(e) 3

6. The number of points where the curve $y = \dfrac{x^6}{6} - \dfrac{x^2}{2} + 1$ has a horizontal tangent line is

(a) 3 _____ (correct)
(b) 2
(c) 0
(d) 1
(e) 4

7. If $y = \dfrac{3}{\sqrt[4]{x^3}}$, then $\dfrac{dy}{dx}$ when $x = 1$ is

(a) $\dfrac{-9}{4}$ (correct)
(b) 3
(c) $\dfrac{3}{4}$
(d) $\dfrac{-3}{4}$
(e) -3

8. If a manufacturer's revenue equation is $r = q\left(15 - \dfrac{1}{30}q\right)$ where r is the revenue of producing q units of a product, then the marginal-revenue when 45 units are produced is

(a) 12 (correct)
(b) 15
(c) 10
(d) 20
(e) 5

9. The slope of the tangent line of the graph of $f(x) = \frac{3}{2}(5\sqrt{x} - 2)(3x - 1)$ at $x = 1$ is

(a) 21 (correct)

(b) 20

(c) 18

(d) 14

(e) 19

10. The position function for an object moving in a straight line is $S = \frac{1}{t^3 + 1}$ where t is in seconds, and S is in meters. The velocity of the object at $t = 2$ is

(a) $\frac{-4}{27}$ (correct)

(b) $\frac{4}{81}$

(c) $\frac{-4}{81}$

(d) $\frac{4}{27}$

(e) $\frac{4}{9}$

11. If $y = (x^3 - 2x + 2)^3$, then $\dfrac{dy}{dx}$ where $x = 1$ is equal to

(a) 3 _____(correct)
(b) 2
(c) 1
(d) 0
(e) 4

12. If $y = \left(\dfrac{x-2}{x+1}\right)^3$, then $\dfrac{dy}{dx}$ at $x = 1$ is

(a) $\dfrac{9}{16}$ _____(correct)
(b) $\dfrac{1}{4}$
(c) $\dfrac{3}{8}$
(d) $\dfrac{9}{7}$
(e) $\dfrac{5}{16}$

13. If $f(x) = \ln\left(\dfrac{2x+3}{3x-4}\right)$, then $f'(2) =$

(a) $\dfrac{-17}{14}$ (correct)

(b) $\dfrac{-15}{14}$

(c) $\dfrac{15}{14}$

(d) $\dfrac{17}{8}$

(e) $\dfrac{-17}{8}$

14. If $f(x) = ee^x e^{x^2}$, then $f'(-1) =$

(a) $-e$ (correct)

(b) $2e$

(c) $-2e$

(d) e^2

(e) e^{-1}

15. If $xe^y + y = 13$, then $\dfrac{dy}{dx}$ at the point $(13, 0)$ is equal to

(a) $-\dfrac{1}{14}$ (correct)

(b) $-\dfrac{1}{7}$

(c) $\dfrac{2}{15}$

(d) $-\dfrac{3}{14}$

(e) $-\dfrac{5}{14}$