

### PRACTICE FINAL 111

1. The equation of the line passing through the points  $(0,2)$  and  $(3, -7)$  is:

- |                  |                 |
|------------------|-----------------|
| a. $y = 2x - 7$  | b. $y = 7x + 2$ |
| c. $y = -3x + 2$ | d. $y = x + 1$  |
| e. $y = 7x - 3$  |                 |

2. The equation of the tangent line at  $x=2$  to the curve  $y = (2x- 5)^{12}$  is

- |                    |                   |
|--------------------|-------------------|
| a. $y = -12x + 25$ | b. $y = 12x + 23$ |
| c. $y = x - 1$     | d. $y = -x + 1$   |
| e. $y = -24x + 49$ |                   |

3. Let  $f(x) = x^4 + x^2 + 1$  and  $g(x) = \frac{1}{\sqrt{x}}$ . Then  $f(g(x)) =$

- |                                   |                                      |
|-----------------------------------|--------------------------------------|
| a. $\frac{1}{\sqrt{x^4+x^2+1}}$   | b. $x^2 + x + 1$                     |
| c. $\sqrt{x^4 + x^2 + 1}$         | d. $\frac{1}{x^2} + \frac{1}{x} + 1$ |
| e. $\frac{1}{\sqrt{x^2 + x + 1}}$ |                                      |

4. The point of inflection of  $y = -x^3 + 3x^2 - 1$  occurs at  $x =$

- |       |       |      |      |
|-------|-------|------|------|
| a. -2 | b. -1 | c. 0 | d. 1 |
| e. 2  |       |      |      |

5. The curve  $y = \frac{e^x}{\ln(x+1)}$  has a vertical asymptote at  $x =$

- |       |       |      |      |
|-------|-------|------|------|
| a. -2 | b. -1 | c. 0 | d. 1 |
| e. 2  |       |      |      |

6. Let  $y = e^{2x} (x^2 + x + 1)$ . Then  $\frac{dy}{dx} =$

- a.  $2e^{2x} (x^2 + x + 1)$
- b.  $e^{2x} (x^2 + x + 1)$
- c.  $e^{2x} (2x + 1)$
- d.  $e^{2x}(2x + 1) + e^{2x} (x^2 + x + 1)$
- e.  $e^{2x} (2x^2 + 4x + 3)$

7. The curve  $y = x^3 - 3x^2 - 9x + 4$  has a relative minimum at  $x =$

- a. 1
- b. -1
- c. 3
- d. -3
- e. 0

8. Let  $y = \left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)^2$  Then  $\frac{dy}{dx} =$

- a.  $2 \left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)$
- b.  $1 - \frac{1}{x^2}$
- c.  $2 \left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)$
- d.  $x^2 - 1$
- e.  $\sqrt{x} + \frac{1}{\sqrt{x}}$

9. Let  $f(x) = \frac{2x+1}{x+1}$ . Then  $f'(x) =$

- a.  $\frac{1}{(x+1)^2}$
- b. 0
- c.  $\frac{x}{(x+1)^2}$
- d.  $\frac{4x+3}{(x+1)^2}$
- e.  $\frac{x^2 - 2x - 1}{(x+1)^2}$

10. Let  $f(x) = \ln [(x+1)(x^2+1)(x^3+1)]$ . Then  $f'(x) =$

- a.  $\ln(x+1) + \ln(x^2+1) + \ln(x^3+1)$       b.  $\frac{1}{x+1} + \frac{1}{x^2+1} + \frac{1}{x^3+1}$   
c.  $\frac{1}{(x+1)(x^2+1)(x^3+1)}$       d.  $\frac{1}{x+1} + \frac{x}{x^2+1} + \frac{x^2}{x^3+1}$   
e.  $\frac{1}{x+1} + \frac{2x}{x^2+1} + \frac{3x^2}{x^3+1}$

11.  $e^{(2 \ln 3 - \frac{1}{2} \ln 9)} =$

- a. 6      b. 3      c.  $e^6$       d.  $\frac{1}{3}$       e. -6

12. Solve the equation  $e^{2x} e^{3x} = 5$  for x:

- a.  $x=1$       b.  $x = \frac{1}{5} \ln 5$       c.  $x = -1$       d.  $x=0$       e.  $x = \frac{1}{5} e^5$

13. The slope of the curve  $y = x \ln x$  at  $x = 1$  is:

- a.  $\frac{1}{3}$       b. 2      c. 0      d. 1      e.  $\ln 2$

14.  $3 \ln 3 - \ln 9 - \ln 3 =$

- a. 1      b.  $-\ln 3$       c.  $\ln 15$       d.  $\ln 3$       e. 0

15. What is the compound amount of \$1,000 invested at 10% interest, compounded annually, at the end of two years?

a. 1,210

b.  $1,000 e^{0.2}$

c. 1,220

d. 1,111.11

e. 1,200

16.  $\int \left(x^2 + \frac{2}{x}\right) dx =$

a.  $\frac{1}{3} x^3 + 2 \ln |x| + C$

b.  $\frac{1}{3} x^3$

c.  $2x - \frac{2}{x^2} + C$

d.  $x^3 + 2 + C$

e.  $2(x + \ln |x|) + C$

17.  $\int 4e^{4x} dx =$

a.  $e^{4x} + C$

b.  $16 e^{4x} + C$

c.  $4 e^x + C$

d.  $e^{16x} + C$

e.  $4x + e^{4x} + C$

18. The area under the graph of  $f(x) = x^2 + 2$  from  $x = 0$  to  $x = 3$  is

a. 33

b. 6

c. 15

d. 9

e. 12

$$19. \int_0^9 \sqrt{x} \, dx =$$

- a. 3      b. 27      c.  $\sqrt{27}$       d. 18      e.  $50/3$

20. Let  $f(x)$  be a function satisfying  $f'(x) = 3x^2 + 4$  and  $f(1) = 1$ . Then  $f(0) =$

- a. 4      b. 5      c. -4      d. -5      e. 0

21. What is the present value of \$10,000, to be obtained in three years, if money can be invested at 10% interest, compounded continuously?

22. What is the effective annual interest rate of an investment of \$100 paying 10% interest compounded semi-annually?

