

MATH 111 PRACTICE TEST 1

1.(8 points) Find the equation of the line passing through $(-1, 3)$ and parallel to the line $2x + y = 3$.

2.(8 points) Find the equation of the line with y -intercept = 3 and passing through $(1, -2)$.

3.(8 points) Find the domain of the function $f(x) = \frac{1}{(x^2 + 1)(x^2 - 3x - 4)}$.

4.(8 points) Let $f(x) = \begin{cases} -x^2 + x + 1 & \text{for } x \geq 0 \\ x^2 - x + 1 & \text{for } x < 0 \end{cases}$

Then $f(2) = \underline{\hspace{2cm}}$ and $f(-2) = \underline{\hspace{2cm}}$

5.(9 points) Let $f(t) = \frac{1}{t+2}$; $g(t) = \frac{1}{t+1}$ and $h(t) = f(t) \times g(t)$

Then a. $f(g(2)) =$

b. $g(f(2)) =$

c. $h\left(\frac{1}{2}\right) = \underline{\hspace{2cm}}$

6.(6 points) Simplify $(27)^{\frac{1}{6}} (36)^{\frac{1}{4}}$

7.(8 points) Find the point(s) of intersection of the curves

$$y = x^2 + 5x - 6 \text{ and } y = 2x^2 + 3x - 9$$

8.(9 points) Let $g(x) = x^2 + 2x - 1$

Find a. $(g(2+h) - g(2))/h =$

b. $\lim_{h \neq 0} \frac{g(2+h) - g(2)}{h} = \underline{\hspace{2cm}}$

c. $g'(2) = \underline{\hspace{2cm}}$

9.(10 points) Let $f(x) = \sqrt[4]{x^3}$ Then

a. $f'(x) =$ _____

b. $f'(16) =$ _____

10.(10 points) Let $f(x) = \sqrt{x}$

a. The slope of the tangent line at $x = 4$ _____

b. Find the equation of the tangent line of part a. _____

11.(8 points) a. $\lim_{x \rightarrow 3} (\sqrt{x^2 - 5} / x + 1) =$ _____

b. $\lim_{x \rightarrow 0} \frac{\sqrt{x+9} - 3}{x} =$ _____

12.(8 points) Let $\lim_{x \rightarrow 1} f(x) = 2$ and $\lim_{x \rightarrow 1} g(x) = 4$

Find a. $\lim_{x \rightarrow 1} \frac{1}{5} f(x) =$ _____

b. $\lim_{x \rightarrow 1} \frac{g(x)}{f(x) + 3} =$ _____

13. (6 points) What is the equation of the line with y -intercept = 2 and parallel to the line $3x - 4y = 1$?

ANSWER: _____

14. (6 points) What is the slope of the line perpendicular to the line $2x + 3y = 2$?

ANSWER: _____

15. (8 points) The line $2x + 3y = -1$ has

(i) y -intercept = _____

(ii) slope = _____

16. (6 points) What is the slope of the line passing through $(1, -2)$ and $(3, 1)$?

ANSWER: _____

17. (6 points) What is the domain of $f(x) = \frac{1}{\sqrt{9-x^2}}$?

Give your answer in interval form, eg (a, b) etc.

ANSWER: _____

18. (6 points) Let $f(x) = \begin{cases} -3x + x^2 & x < 3 \\ 2x - 1 & x \geq 3 \end{cases}$

(i) $f(3) =$ _____

(ii) $f(-2) =$ _____

19. (12 points) Let $f(t) = \frac{1}{\sqrt{4-t^2}}$ $g(t) = \sqrt{4-t^2}$

Then (i) $f(g(t)) =$ _____

(ii) $f(g(1)) =$ _____

(iii) $g(f(t)) =$ _____

(iv) $g(f(1)) =$ _____

20. (6 points) The curve of $y = x^3 - 3x^2 + 2x$ crosses the x - axis at $x =$

ANSWER: _____

21. (8 points) What are the points of intersection of $y = x - 1$ and $y = x^2 - 5x - 8$?

ANSWER: _____

22. (6 points) $\left(\frac{1}{4}\right)^{\frac{4}{3}}$ = _____

ANSWER: _____

11. (6 points) Let $g(x) = x^2 + x$

Then $g(2+h) - g(2) =$

ANSWER: _____

23. (8 points) Let $f(x) = \sqrt[4]{x}$

Then (i) $f'(x) =$ _____

(ii) $f'(16) =$ _____

24. (8 points) Let $g(x) = 1/\sqrt{x}$

Then (i) $g'(x) =$ _____

(ii) $g'(4) =$ _____

25. (8 points) The graph $y = f(x)$ has derivative $f'(x) = x^2 - 2x$.

(i) What is the slope of the tangent line at $x = -1$?

(ii) What is the equation of the tangent line passing through $(-1, 4)$?