

Solutions

MATH F251: Calculus I

Quiz 1: SAMPLE B

Fall 2019

Directions: The quiz contains 20 problems. Place your answer in the blank provided. For graphing questions, a set of axes are provided. All graphs must be labeled.

1. Simplify $(\frac{8}{9})^{-1/2}$.

$$= \left(\frac{9}{8}\right)^{1/2} = \frac{3}{2\sqrt{2}}$$

$$\frac{3}{2\sqrt{2}}$$

2. Write the slope intercept form (that is, the form: $y = mx + b$) of the equation of the line containing the point $(2, 3)$ parallel to the line $6x + 2y = 7$.

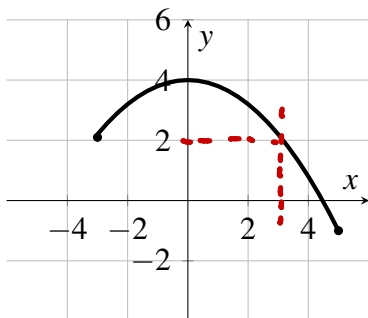
$$y = \frac{1}{2}(7 - 6x) \quad y - 3 = -3(x - 2)$$
$$m = -3 \quad y = -3x + 9$$

$$y = -3x + 9$$

3. Simplify the expression $\frac{3x^2y - 4x^3}{xy^2}$. Write your answer without negative exponents.

$$\frac{3xy - 4x^2}{y^2}$$

4. Use the graph of $f(x)$ below to estimate $f(3)$.



$$f(3) \approx 2$$

5. Simplify the rational expression: $\frac{x+y}{1+\frac{1}{y}} \cdot \frac{y}{y}$

$$\frac{x+y^2}{y+1}$$

$$\frac{x+y^2}{y+1}$$

6. Solve the equation $3x^2 - 2x - 1 = 0$.

$$(3x + 1)(x - 1) = 0$$

$$x = -\frac{1}{3}, x = 1$$

$$\underline{x = -\frac{1}{3} \text{ or } x = 1}$$

7. Given the piecewise defined function below, determine the value(s) of x such that $f(x) = 3$.

$$f(x) = \begin{cases} x^2 & x \leq 1 \\ x + 3 & x > 1 \end{cases}$$

$$\underline{x = -\sqrt{3}}$$

if $x \leq 1$, $x^2 = 3$ means $x = -\sqrt{3}$

if $x > 1$, $x + 3 = 3$ means $x = 0$; fails $x > 1$ requirement.

8. Find the exact value of $\sin(2\pi/3)$.

$$\underline{\frac{\sqrt{3}}{2}}$$



9. Find the equation for the top half of the circle with center $(0, 0)$ and radius 3.

$$y^2 + x^2 = 9$$

$$\underline{y = \sqrt{9 - x^2}}$$

$$y = +\sqrt{9 - x^2}$$

10. For the function $f(x) = x^2$, find the expression $f(2) - f(2+h)$. Simplify your answer if possible.

$$\underline{-4h - h^2}$$

$$f(2) - f(2+h)$$

$$= 2^2 - (2+h)^2$$

$$= 4 - 4 - 4h - h^2 = -4h - h^2$$

11. Using the table of values for the function $f(x)$, determine $f^{-1}(2)$.

x	1	2	3	4	5	6	7	8	9	10
$f(x)$	0.5	1	1.7	1.9	2	4	4.5	5.1	6.7	10.8

5

12. Let $g(x) = 2x + 1$, find $(g \circ g)(x)$. You do not need to simplify your answer.

$(g \circ g)(x) = 4x + 3$

$$g(g(x)) = g(2x+1) = 2(2x+1) + 1 = 4x + 3$$

13. Solve for x in the equation $\ln(x^2 - 5) = 4$.

$$x^2 - 5 = e^4$$

$$x^2 = 5 + e^4$$

$$x = \pm \sqrt{5 + e^4}$$

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14. Determine the domain of $f(x) = \frac{1}{1 - \sqrt[3]{x}}$. Give your answer in interval notation

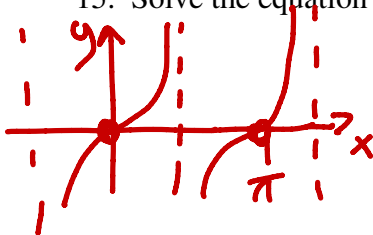
Avoid $1 - \sqrt[3]{x} = 0$

or $1 = \sqrt[3]{x}$

or $1 = x$

$(-\infty, 1) \cup (1, \infty)$

15. Solve the equation $0 = \tan x$.



$x = \dots -\pi, 0, \pi, 2\pi, 3\pi, \dots$

or
 $x = \pi K, K \text{ integer}$

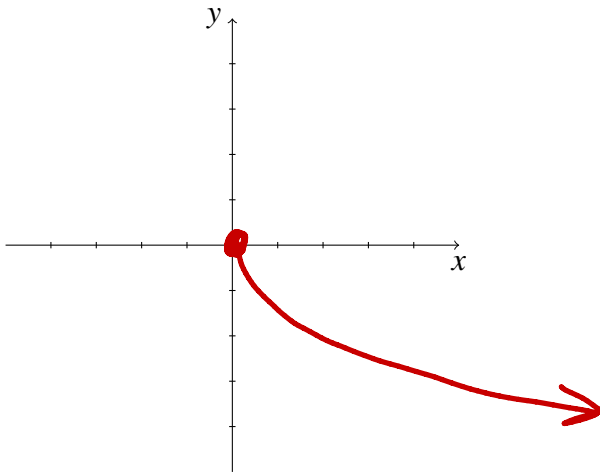
16. Find the exact value of the expression $\log_{10}(25) + \log_{10}(4)$.

$$\log_{10}(25 \cdot 4) = \log_{10}(100)$$

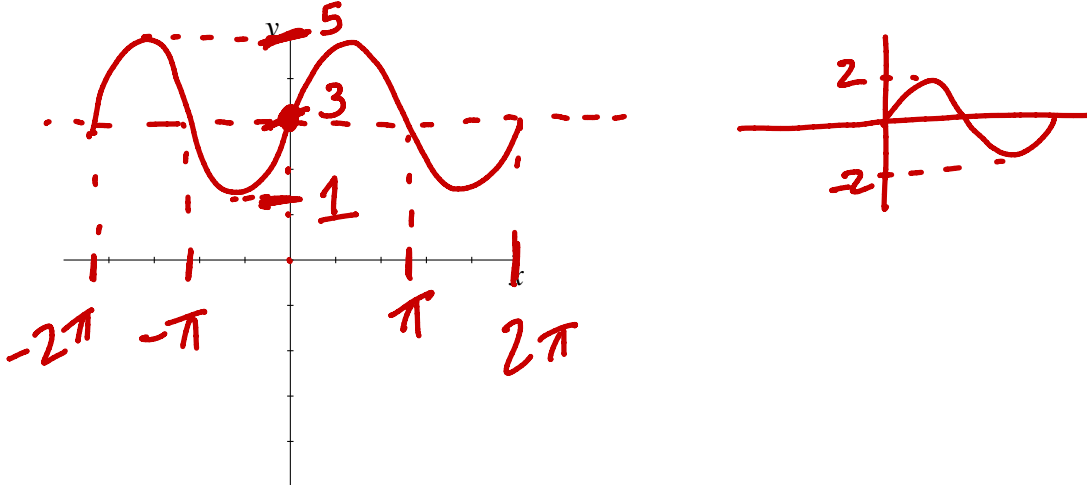
$$= \log_{10} 10^2 = 2$$

2

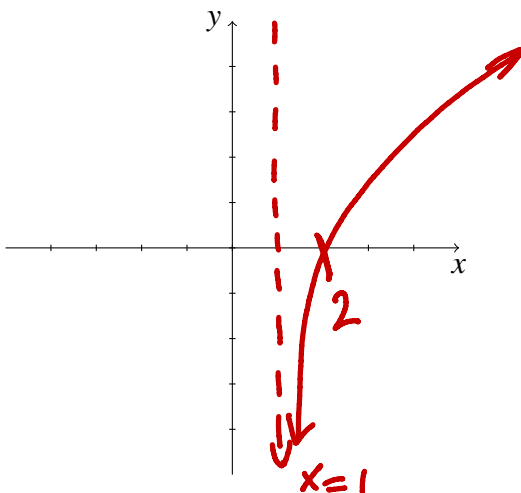
17. On the axes below, sketch the graph of $y = -\sqrt{x}$.



18. On the axes below, sketch the graph of $y = 2\sin(x) + 3$ on the interval $[-2\pi, 2\pi]$.



19. On the axes below, sketch the graph of $y = \ln(x - 1)$.



20. Solve the inequality $x^2 - 4 \geq 0$.

Want $x^2 \geq 4$

$(-\infty, -4) \cup (4, \infty)$