

MATH 1310 Practice Midterm:

1. Solve the following for x: $\frac{-3}{8x} + \frac{5}{56x} = 16$

a. $\frac{-1}{24}$

b. $\frac{-7}{8}$

c. $\frac{-1}{56}$

d. $\frac{1}{24}$

e. $\frac{1}{56}$

f. None of the above

2. Solve the following for x: $5x + y = -30$
 $4x - y = -6$

a. -3

b. 2

c. 4

d. -6

e. -4

f. None of the above

3. Paul has 12 coins in his pocket, consisting entirely of dimes and quarters. If he has a total of 240 cents in coins, how many of each type are in his pocket?

a. 7 dimes and 5 quarters

b. 4 dimes and 8 quarters

c. 8 dimes and 4 quarters

d. 5 dimes and 3 quarters

e. 9 dimes and 3 quarters

f. None of the above

4. Rewrite the equation by completing the square: $x^2 + 20x - 6 = 0$

a. $(x + 20)^2 = 100$

b. $(x - 10)^2 = 106$

c. $(x + 10)^2 = 206$

d. $(x + 10)^2 = 106$

e. $(x - 10)^2 = 206$

f. None of the above

5. Solve the equation: $x^2 + 17x = -70$

a. $x = 7, x = 10$

b. $x = -7, x = 10$

c. $x = -7, x = -10$

d. $x = -7, x = -8$

e. $x = 7, x = -10$

f. None of the above

6. Find all complex solutions to the equation: $2x^2 + 3x + 2 = 0$

- a. $x = -\frac{3}{4} \pm \frac{\sqrt{7}}{4}i$
- b. $x = -\frac{3}{2} \pm \frac{\sqrt{7}}{4}i$
- c. $x = -3 \pm \frac{\sqrt{7}}{4}i$
- d. $x = -\frac{3}{4} \pm \frac{7}{4}i$
- e. None of the above

7. Use substitution to find all solutions to the following equation:

$$x^4 - 32x^2 - 144 = 0$$

- a. $\{-2, 2, -6i, 6i\}$
- b. $\{-2, 2\}$
- c. $\{-6, 6, -2, 2\}$
- d. $\{-6, 6\}$
- e. $\{-2i, 2i, -6, 6\}$
- f. $\{-36, 4\}$
- g. None of the above

8. Find all solutions to the following equation: $\sqrt{x + 64} + 8 = x$

- a. $x = 15$
- b. $x = 17$
- c. $x = 0, x = 17$
- d. $x = 15, x = 17$
- e. $x = 0, x = 8, x = 128$
- f. $x = 64, x = 8$
- g. None of the above

9. Express the solution to the inequality in interval notation:

$$35 < 5x - 5\left(\frac{x-7}{2}\right) \leq 70$$

- a. $(-\infty, 7] \cup [21, \infty)$
- b. $(7, 21)$
- c. $(7, 21]$
- d. $[7, 21]$
- e. $(-\infty, 7) \cup [21, \infty)$
- f. None of the above

10. Solve the inequality:

$$\frac{x-6}{(x-2)(x-8)} < 0$$

- a. $(-\infty, -6) \cup (6, 8)$
- b. $(-\infty, -2) \cup (6, 8)$
- c. $(-\infty, 2) \cup (6, 8)$
- d. $(-\infty, 2) \cup (6, \infty)$
- e. $(-\infty, 6) \cup (6, \infty)$

11. Solve the following inequality and give the answer in interval notation:

$$12 - 2|x + 4| > 6$$

- a. (-7, -1)
- b. $(-\infty, -7) \cup (-1, \infty)$
- c. No Answer
- d. $(-\infty, -\frac{23}{5}) \cup (-\frac{17}{5}, \infty)$
- e. $(-\frac{23}{5}, -\frac{17}{5})$

12. Solve the inequality for x and express in interval notation: $5x^2 - 18 > x^2 + 21x$

- a. $(-6, \frac{3}{4})$
- b. $[-\frac{3}{4}, 6]$
- c. $(-\infty, -6) \cup (\frac{3}{4}, \infty)$
- d. $(-\infty, -\frac{3}{4}) \cup (6, \infty)$
- e. $(-\infty, -\frac{3}{4}] \cup [6, \infty)$

13. Solve the following for x: $|4 - 2x| \geq -6$

- a. No Solution
- b. $(-\infty, \infty)$
- c. $[5, \infty)$
- d. $[-1, 5]$
- e. $(-\infty, -1] \cup [5, \infty)$

14. Solve the following by substitution: $(x + 5)^2 + (x + 5) - 12 = 0$

- a. $x = -5$
- b. $x = 0, x = 2, x = -9$
- c. $x = -2, x = -9$
- d. $x = 2, x = 3$
- e. $x = 8, x = -5$
- f. None of the above

15. Write the following in a + bi form:

$$\frac{2i+7}{5+i}$$

- a. $\frac{-11}{8} - \frac{1}{8}i$
- b. $\frac{37}{26} - \frac{3}{26}i$
- c. $\frac{37}{26} + \frac{3}{26}i$
- d. $\frac{-37}{26} + \frac{3}{26}i$
- e. $\frac{-37}{26} - \frac{3}{26}i$
- f. None of the above

16. Given the following function, calculate $f(6)$.

$$f(x) = \begin{cases} x^2, & x < -8 \\ 2, & x = -8 \\ -3x, & x > -8 \end{cases}$$

- a. -18
- b. -8
- c. 36
- d. 24
- e. 6
- f. None of the above

17. Find the domain of the function. Give answer in interval notation:

$$f(x) = \sqrt{-11x + 7}$$

- a. $[\frac{7}{11}, \infty)$
- b. $(\frac{7}{11}, \infty)$
- c. $(-\infty, \frac{7}{11})$
- d. All real numbers
- e. $(-\infty, \frac{7}{11}]$
- f. None of the above

18. Find the domain of the following function. Express your answer in interval notation.

$$f(x) = \frac{x + 1}{x^2 - 1}$$

- a. $(-\infty, -1) \cup (-1, 1) \cup (1, \infty)$
- b. $[1, \infty)$
- c. $(-\infty, 1) \cup (1, \infty)$
- d. $(-\infty, -1) \cup (-1, \infty)$
- e. All real numbers
- f. None of the above

19. Find the domain of the function. Express your answer in interval notation.

$$f(x) = \frac{\sqrt{x - 3}}{x + 5}$$

- a. $(3, \infty)$
- b. $[3, \infty)$
- c. $[3, -5) \cup (-5, \infty)$
- d. $(3, -5] \cup [-5, \infty)$
- e. $[3, -5] \cup [-5, \infty)$
- f. None of the above

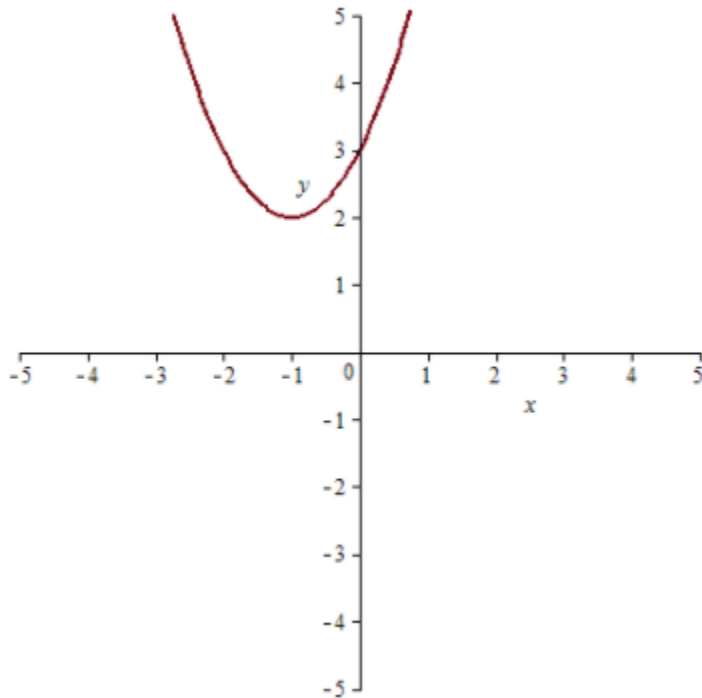
20. What transformation is needed to go from the graph of the basic function $f(x) = x^2$ to the graph of $g(x) = (x - 1)^2$?

- a. Shift left 1 unit
- b. Shift up 1 unit
- c. Shift right 1 unit
- d. Shift down 1 unit
- e. Reflect across the y-axis
- f. None of the above.

21. What transformation is needed to go from $f(x) = \sqrt{x}$ to the graph of $g(x) = -\sqrt{x - 11}$?

- a. Reflect across the x-axis and then shift up 11 units
- b. Reflect across the y-axis and then shift left 11 units
- c. Reflect across the y-axis and then shift right 11 units
- d. Reflect across the x-axis and then shift left 11 units
- e. Reflect across the x-axis and then shift right 11 units
- f. None of the above

22. Which of the following functions matches the graph below?



- a. $f(x) = (x + 1)^2 - 2$
- b. $f(x) = (x + 1)^2 + 2$
- c. $f(x) = (x - 2)^2 + 1$
- d. $f(x) = (x - 1)^2 + 2$
- e. $f(x) = (x + 2)^2 + 1$
- f. None of the above

23. Write the function $f(x) = x^2 + 14x + 19$ in the standard form, $f(x) = a(x - h)^2 + k$

- a. $f(x) = (x + 7)^2 - 68$
- b. $f(x) = (x - 7)^2 - 49$
- c. $f(x) = (x + 7)^2 + 30$
- d. $f(x) = (x + 7)^2 - 30$
- e. $f(x) = (x - 7)^2 + 68$
- f. None of the above

24. Find the vertex of the graph: $f(x) = 6x^2 - 12x + 23$

- a. (1, 17)
- b. (-1, -17)
- c. (-1, 17)
- d. (0, 1)
- e. (1, -17)
- f. None of the above

25. Find $(g \circ f)(x)$, given the following functions: $f(x) = 9x - 7$
 $g(x) = \sqrt{x}$

- a. $3x - 7$
- b. $\sqrt{9x - 7}$
- c. $9\sqrt{x} - 7$
- d. $3\sqrt{x} - 7$
- e. $\sqrt{9x + 7}$
- f. None of the above

26. Let $g(x)$ be the inverse of $f(x)$. Find $g(x)$, given that: $f(x) = \frac{6}{x-10}$

- a. $g(x) = \frac{-10x+6}{x}$
- b. $g(x) = \frac{-10x-6}{x}$
- c. $g(x) = \frac{10x-6}{x}$
- d. $g(x) = \frac{-10}{x+6}$
- e. $g(x) = \frac{10x+6}{x}$
- f. None of the above

27. Suppose that $f(x)$ is an odd function that passes through (5, -2). What other point must $f(x)$ pass through?

- a. (-5, -2)
- b. (5, 2)
- c. (-5, 2)
- d. (-2, 5)
- e. (2, -5)
- f. None of the above

28. Suppose $f(x)$ and $g(x)$ are inverse functions, and $f(2) = -3$, $f(-3) = 6$. Determine the value of $g(-3)$.

- a. 6
- b. -3
- c. -6
- d. 2
- e. -2
- f. None of the above

29. Given $f(x) = \sqrt[3]{x - 5}$ find its inverse, if possible.

- a. $f^{-1}(x) = -x^3 + 5$
- b. $f^{-1}(x) = x^3 + 5$
- c. $f^{-1}(x) = x^3 - 5$
- d. No inverse
- e. $f^{-1}(x) = x^3 + 25$
- f. None of the above

30. Find the quadratic whose vertex is $(-7, 6)$ and y -intercept is 4.

- a. $f(x) = -\frac{2}{49}(x + 7)^2 + 6$
- b. $f(x) = \frac{10}{49}(x + 7)^2 - 6$
- c. $f(x) = \frac{10}{49}(x - 7)^2 - 6$
- d. $f(x) = \frac{-2}{49}(x - 7)^2 + 6$
- e. $f(x) = \frac{2}{49}(x + 7)^2 + 6$