

BOROUGH OF MANHATTAN COMMUNITY COLLEGE
DEPARTMENT OF MATHEMATICS
Practice Problems for the MAT 056 Departmental Final

Form B

The actual final exam will have 20 questions. Please do not assume that the content or difficulty level of these practice questions is exactly the same as the actual examination. We suggest that you study the range of topics described on the syllabus as well as the types of problems on this sample test.

1. Simplify: $3x - 2[4x - 6(x - 7) + 3]$
2. Solve for r: $s = p s^2 - prs$
3. Solve the following equation: $\frac{2}{3}x - \frac{1}{5}(2x + 1) - 3 = \frac{1}{3}(2x - 1) - 3$
4. Solve for a) $|4x - 1| = 6$ b) $|3x - 1| = 4$ c) $-2 - |5x - 3| = -1$
5. Solve the following absolute value inequality and graph your solution set:
a) $5|x - 1| \geq 30$ b) $6 - |2 + 3x| > 1$ Write solutions in interval notation.
6. Solve the following equation be sure to check the solutions: $\frac{2}{x^2 - 4} + \frac{5}{x + 2} = \frac{-1}{x - 2}$
7. Solve for: $\frac{1}{x^2} - \frac{2}{x} = 4$
8. Write down a quadratic equation that has roots: $\{-1, -\frac{3}{4}\}$. It may be more than one correct answer!
9. Find the x and y- intercepts of the line $-2x - 3y - 6 = 0$, then graph the line.
10. Find the equation of the line that passes through the origin and is perpendicular to the line $x - 2y + 4 = 0$
11. Find the equation of the line that passes through the point (0, 2) and is parallel to the line $2x + 3y = 7$
12. What is the slope of the line expressed by the equation $\frac{-x}{3} + \frac{y}{4} = -\frac{1}{6}$?
13. Subtract and then write the answer in standard form a + bi :
 $(-2 + 5i) - (-5 + 3i)$ (Hint: leave answer in a + bi form)
14. Multiply and then write the answer in standard form a + bi: $(-3 - 5i)(7 - 6i)$
15. Simplify and express the following as a single fraction in simplified form:
a) $\frac{\frac{b}{a}}{\frac{3}{ab} - \frac{2}{a}}$ b) $\frac{\frac{1}{x} - \frac{x}{y^2}}{\frac{1}{x} - \frac{1}{y}}$ $\frac{1 - \frac{x}{x+1}}{1 + \frac{x}{x-1}}$
16. Solve for x. Express the answer in simplified radical form if possible:
a) $3x^2 - 10x = 8$ b) $2x^2 = -4x + 3$
17. Simplify the following. Express your answer using only positive exponents.
a) $\left(\frac{4p^{-9}q^{-6}}{p^3q^{-7}}\right)^{-3}$ b) $\frac{(4x^3y^{-6})^{-3}}{(5x^{-3}y)^{-4}}$
18. Solve the inequality $-(3b - 2) - 1 < 5b + 2$. Graph solution on the number line.

19. Solve the system of equations $\begin{cases} -5x + 3y = 2 \\ 3x + 5y = 1 \end{cases}$

20. George has \$4.15 in quarters and dimes only. He has a total of 22 coins. How many of each does he have?

21. Simplify the following completely:

a) $64^{\frac{-2}{3}}$

b) $(625x^{-8})^{\frac{3}{4}}$

22. Solve for x:

a) $8\sqrt{x-1} = 4x$

b) $\sqrt{x+3} = x-1$

23. Express $\frac{6}{\sqrt{5}+3}$ as an equivalent fraction with a rational denominator in simplified form.

24. Rationalize the denominator in the expression: a) $\frac{1-\sqrt{6}}{3+\sqrt{10}}$

b) $\frac{\sqrt{5}}{\sqrt{x+1}}$

25. Find the quotient. Express your answer in a + bi form: $\frac{1-2i}{3+i}$

26. Find the sum or difference and simplify your answer completely:

a) $\frac{2}{x-1} - \frac{3}{x}$

b) $\frac{3}{x^2+2x-3} - \frac{x}{x^2-1}$

c) $\frac{2}{x-3} - \frac{x+2}{x-3}$

27. Divide and simplify your answer completely:

$$\frac{3x^2-14x+8}{x^2-8x+15} \div \frac{3x^2+4x-4}{x^2-x-6}$$

28. Write the expression $2 \log_c x + \frac{3}{2} \log_c y - 5 \log_c z$ as a single logarithm.

29. Find the exact value of $\cot(330^\circ)$

30. Find the length of side b in a triangle labeled ΔABC , if $c = 6$ cm, $a = 10$ cm and $B = 45^\circ$

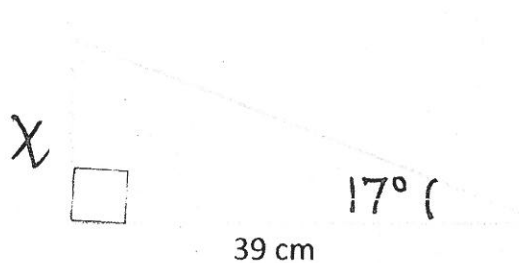
31. A student stands at ground level, 300 feet away from a building. When she looks up to the top of the building, she finds that the angle of elevation is 45° . What is the height of the building? Express your answer in the simplest radical form.

32. Simplify $y = \log_{100} \frac{1}{10}$ by writing it in exponential form first.

33. Solve the following logarithmic equation: $\log_x \frac{1}{25} = 2$

34. $\cos(\theta) = \frac{-2}{3}$ and θ terminates in quadrant III, find $\csc(\theta)$.

35. Given that $\sin(17^\circ) \approx 0.29237$, $\cos(17^\circ) \approx 0.95630$, and $\tan(17^\circ) \approx 0.30573$, find the length of the side labeled x in the triangle below:



ANSWER KEY for MAT 056 Practice Final Exam Form B

1. $7x - 90$

2. $\frac{ps-1}{p}$

3. $\frac{1}{3}$

4a. $\frac{7}{4}, \frac{-5}{4}$

4b. $\frac{5}{3}, -1$

4c. No solutions

5a. $x \leq -5$ or $x \geq 7$; or in intervals notation $x \in (-\infty, -5] \cup [7, \infty)$

5b. $x > \frac{-7}{3}$ and $x < 1$ or in intervals notation $x \in (\frac{-7}{3}, 1)$

6. $x = 1$

7. $x = \frac{-1+\sqrt{5}}{4}$ or $x = \frac{-1-\sqrt{5}}{4}$

8. $4x^2 + 7x + 3 = 0$

9. x-int: $(-3, 0)$ and y-int: $(0, -2)$

10. $y = -2x$

11. $y = \frac{-2}{3}x + 2$

12. $y = \frac{4}{3}x - \frac{2}{3}$

13. $3 + 2i$

14. $-51 - 17i$

15a. $\frac{b^2}{3-2b}$

15b. $\frac{x+y}{y}$

15c. $\frac{-2x^2+x+1}{x+1}$

16a. $x = 4$ or $x = \frac{-2}{3}$

16b. $x = \frac{-2+\sqrt{10}}{2}$ or $x = \frac{-2-\sqrt{10}}{2}$

17a. $\frac{p^{36}}{64q^3}$

17b. $\frac{625y^{22}}{64x^{21}}$

18. $x > \frac{-1}{8}$; or in interval notation $x \in (\frac{-1}{8}, \infty)$

19. $(x, y) = (\frac{-7}{34}, \frac{11}{34})$

20. Number of dimes=9 and number of quarters = 13

21a. $\frac{1}{16}$

21b. $\frac{125}{x^6}$

22a. $x = 2$

22b. $x = \frac{1+\sqrt{17}}{2}$

23. $\frac{9-3\sqrt{5}}{2}$

24a. $-3 + \sqrt{10} + 3\sqrt{6} - 2\sqrt{15}$

24b. $\frac{\sqrt{5x+5}}{x+1}$

$$25. \frac{13}{34} - \frac{1}{34}i$$

$$26a. \frac{3-x}{x(x-1)}$$

$$27. \frac{x-4}{x-5}$$

$$28. \log_c \frac{x^2 y^2}{z^5}$$

$$29. \cot(330) = -\sqrt{3}$$

$$30. b = 51.147$$

$$31. 300 \text{ ft}$$

$$32. y = -\frac{1}{2}$$

$$33. x = \frac{1}{5}$$

$$34. \csc(\theta) = \frac{-3}{\sqrt{5}}$$

$$35. x = 11.9234$$

$$26b. \frac{-x^2+3}{(x+3)(x-1)(x+1)}$$

$$26c. \frac{-x}{x-3}$$