Borough of Manhattan Community College

MAT56.5 Final Exam Practice Problems

MAT56 Problem Set

The actual final examination will have 20 questions. Your final exam will be in two parts:
1. **Part 1** of the final does **NOT** allow the use of a calculator.
2. **Part 2** of the final DOES allow the use of a scientific calculator. You may not use a graphing calculator or your phone.

MAT56 Final Exam Practice with *Solution Videos*, www.helpyourmath.com/56.5

= More Advanced Problem

Part 1

Problem #1 Solve for t.

1. $v + at = s$

2. $\frac{w + t}{a} = P$

3. $Vi - at = PS$

4. $2v^2p - atr^2 = HL$

5. $\frac{wp^3 - rts^2}{ax} = w$

Problem #2 Use properties of exponents to simplify the following completely. Express your answer using only positive exponents.

1. $x^4 \cdot x^{-6}$

2. $(x^2y)^2$

3. $(3x^4y^{-2})^3$

4. $(2x^2y^{-4})^2(3x^{-2}y^3)^{-3}$

5. $\left(\frac{5x^2y^{-3}}{2x^6y^5}\right)^{-2}$

6. $\left(\frac{5xy}{2xy^3}\right)^{-2}\left(\frac{6xy^3}{5y^4}\right)^3$

7. $\frac{(2x^3y^{-4})^{-2}}{(3x^{-2}y^5)^3}$

8. $\frac{(2x^{-3}y^5)^2(x^2y^{-3})^3}{(x^{-4}y^6)^3}$

Problem #3 Perform the indicated operation. Simplify completely.

1. $\frac{x}{x^2+4x+3} - \frac{2}{x+1}$

2. $\frac{2x}{x^2-16} - \frac{4}{x+4}$

3. $\frac{2x}{x^2-5x-14} + \frac{3}{x+2}$

4. $$\frac{5x}{4x^2+12x+8}-\frac{4}{x+1}$$

5. $$\frac{7x}{3x^2-10x+8}-\frac{2}{x-2}$$

Problem #4 Use properties of exponents to simplify completely.

1. $(x^2y^3)^4$
2. $(2x^{-2}y^3)^3$
3. $(16x^{-8}y^6)^{\frac{1}{2}}$
4. $\left(\frac{x^{-12}y^9}{8}\right)^{-\frac{1}{3}}$

Problem #5 Solve the following problems.

1. For the equation $4x+2y=8$,
   a. find both x-intercept and y-intercept
   b. graph the equation
   c. determine the equation of the line that is parallel to the equation and passes through (4, 8)
   d. determine the equation of the line that is perpendicular to the equation and passes through (4, 8)

2. For the equation $-6x+9y=18$,
   e. find both x-intercept and y-intercept
   f. graph the equation
   g. determine the equation of the line that is parallel to the equation and passes through (6, 3)
   h. determine the equation of the line that is perpendicular to the equation and passes through (6, 3)

Problem #6 Rationalize the denominator. Simplify your answer completely.

1. $\dfrac{\sqrt{15}-12}{\sqrt{3}}$
2. $\dfrac{2}{\sqrt{3}+1}$
3. $\dfrac{7+\sqrt{3}}{8-\sqrt{3}}$
4. $\dfrac{2\sqrt{5}-3}{2-\sqrt{7}}$
5. $\dfrac{5+\sqrt{11}}{\sqrt{2}+\sqrt{3}}$

Problem #7 Solve for x.

1. $log_4 x = 3$
2. $log x = -3$
3. $log_x 1000 = 3$
4. $log_x\left(\dfrac{81}{16}\right) = 4$
5. $2log_x\left(\dfrac{4}{25}\right) = -4$

Problem #8 Use the properties of logarithms to expand completely for question 1, 2 and 3. Condense to a single logarithm for question 4, 5 and 6.

1. $log_b\left(\frac{8x^5}{y^3}\right)$
2. $log\left(\frac{100x^5}{\sqrt{z}}\right)$
3. $log_a\left(\frac{x^2\sqrt[3]{y^2}}{z^8\sqrt{w}}\right)$
4. $6log_aX - 2log_aY + \frac{1}{4}log_aZ$
5. $\frac{2}{3}log_aY - 3log_aZ - \frac{1}{2}log_aX$
6. $3log_aX - 4log_a(YZ) + 3$

Problem #9 Find exact value.

1. $tan(135°)$
2. $sin(210°)$
3. $cos(-60°)$
4. $cot(300°)$

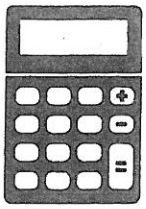
Problem #10 Find exact value.

1. If $cos(\theta) = \frac{5}{7}$, and if θ terminates in Quadrant IV, find $sin(\theta)$.

2. If $tan(\theta) = \frac{-2}{5}$, and if θ terminates in Quadrant II, find $cos(\theta)$.

Part 2

A scientific calculator may be used



Problem #11 Solve the absolute value inequality, graph the solution set and express the solution in interval notation.

1. **a.** $|5x - 1| \geq -2$

   b. $|6x + 2| \leq -1$

2. $|3x - 3| > 9$

3. $|2x + 3| \leq 6$

4. $-2|4x + 6| \leq -12$

5. $3 + 2|2x - 3| \geq 7$

Problem #12 Solve the following word problem.

1. Marie wants to invest a total of \$20,000 in two separate accounts. One of the accounts has an interest rate of 3%, while the second account has an interest rate of 7%. Marie would like to earn a total interest of \$1080. How much should she invest in each account?

Problem #13 Simplify your answer completely.

1. $$\frac{x^2 - x - 12}{9x^2 - 16} \times \frac{3x^2 - 13x + 12}{4x^2 - 16x}$$

2. $$\frac{2x^2 - 3x - 5}{x^2 + x - 6} \div \frac{2x^2 - 5x}{x^2 - 4}$$

Problem #14 Use long division to find the quotient and remainder.

1. $\dfrac{x-1}{x+1}$

2. $\dfrac{2x+3}{x+1}$

3. $\dfrac{x^2-1}{x+1}$

4. $\dfrac{9x^3+4x^2-3x-5}{x-2}$

5. $\dfrac{-4x^5+5x^4-2x^2-6x-7}{x^2-1}$

Problem #15 Simplify and write as a single (simple) fraction.

1. $\dfrac{1+\dfrac{1}{x-3}}{1-\dfrac{2}{x-3}}$

2. $\dfrac{a+b}{\dfrac{1}{b}+\dfrac{1}{a}}$

3. $\dfrac{1+\dfrac{4}{x-3}}{\dfrac{2x}{x+3}-\dfrac{4}{x-3}}$

4. $\dfrac{\dfrac{1}{2x}-\dfrac{1}{5}}{\dfrac{1}{4x^2}-\dfrac{1}{25}}$

Problem #16 Solve the following rational equations.

1. $\frac{4}{x^2+x}-\frac{1}{x}=\frac{3}{x+1}$

2. $2-\frac{6}{x^2-x}=\frac{3}{x-1}$

3. $\frac{2}{x-4}-\frac{x}{x^2-16}=\frac{6}{x+4}$

4. $\frac{4}{x-2}+\frac{2}{x+3}=\frac{20}{x^2+x-6}$

5. $\frac{1}{2x^2-x-3}+\frac{3}{2x-3}=\frac{1}{2x+2}$

Problem #17 Solve for x.

1. $\sqrt{x+3}=4$

2. $\sqrt{2x+2}=\sqrt{x+7}$

3. $\sqrt{x+5}=x-1$

4. $-2\sqrt{x+1}=x+1$

5. $\sqrt{x+8}-\sqrt{x}=2$

Problem #18 Express your answer in standard complex number form.

1. $(2 + 3i) + (4 - 2i)$

2. $(4 - 2i) - (7 + 3i)$

3. $(-7 - 2i) - (-4i^2)$

4. $(-2i)^2$

5. $(1 + 3i)(1 - 4i)$

6. $(2 - 5i)^2$

7. $\frac{3}{i}$

8. $\frac{4}{5i}$

9. $\frac{4 - 5i}{5i}$

10. $\frac{2}{3 + 2i}$

11. $\frac{2 - i}{2 + i}$

Problem #19 Solve for x and express your solution in simplified radical form.

1. $x^2 - 4x + 4 = 0$

2. $x^2 - 4x = 7$

3. $2x^2 - 3x - 4 = 0$

4. $3x^2 - 5x + 1 = 0$ (Real Number Solutions)

5. $x^2 - 4x + 4 = 0$ (Complex Number Solutions)

Problem #20 Solve the following word problems.

1. At a point 30 feet from the base of a tree, the angle formed with the ground looking to the top measures 88 degree. Find, to the nearest foot, the height of the tree.

2. An observation tower is 75m high. A support wire is attached from the ground to the top of the tower, forming a 55 degree angle. What is the length of the support wire, to the nearest tenth?

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