

Math at MMA

As you know, all majors at MMA require students to study, and pass, math through Calculus and *at least* one more math course beyond Calculus that relates to their major. If you ask any cadet what their most difficult courses are, they will probably tell you math. Are you ready for math at MMA?

Here's a challenge for you... how many of these problems can you answer correctly? With no calculator? The only problem that requires a calculator is #38. Put that calculator down and give these a try. You should be reasonably comfortable with **all** of these problems.

Evaluate each expression for $x = 3$ and $y = -5$

1. $\frac{x-3y}{2} + xy$

2. $\frac{\frac{14}{x} + \frac{1}{2}}{\frac{-y}{4}}$

Determine the domain for each expression.

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

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

Simplify each expression.

5. $(-4x^2y^3)(7x^3y)$

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

Perform the indicated operations. Write the resulting polynomial in standard form.

7. $(x^3 + 2x^2 - 5x + 3) + (-x^3 + 2x - 4)$

8. $2(5x^2 - x + 3) - 4(3x^2 + 7x + 1)$

9. $(x + 2)(x + 3)$

10. $(x - 5)(2x^2 - 3x + 1)$

11. $(4x + 1)^2$

12. $(2x - y)(3x + 7y)$

Factor each polynomial completely.

13. $5x + 25$

14. $x^3 + 3x^2 + x + 3$

15. $x^2 + 7x + 12$

16. $x^2 - 121$

Perform the indicated operation. Simplify and leave the numerator and denominator of your answer in factored form.

17. $\frac{x-3}{2x+4} \cdot \frac{10x+20}{5x-15}$

18. $\frac{x^2+5x+6}{x^2+6x+9} \div \frac{x^2+3x+2}{x^2+7x+12}$

19. $\frac{5}{x-3} + \frac{2x}{x^2-9}$

20. $\frac{2x}{x+1} - \frac{x}{x+2}$

Simplify each expression. Write any complex numbers in the form $a + bi$, leave final answers in exact form (that is, radicals not decimals).

21. $\sqrt{32}$

22. $\sqrt{6x} \cdot \sqrt{3x}$

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

24. $8^{\frac{2}{3}}$

25. $-16^{\frac{5}{2}}$

26. $(-16)^{\frac{5}{2}}$

27. $-3i(5 - 2i)$

28. $\frac{5i}{2+i}$

Solve each equation.

29. $ax - ab = cx - bc$ for x

30. $\frac{m}{x+y} = \frac{g}{x}$ for x

31. $7x + 7 = 2(x + 1)$

32. $\frac{2x+1}{9} - \frac{x+4}{6} = 1$

33. $\frac{3}{y+2} = \frac{4}{y-1}$

34. $x^2 - 11x = 12$

35. $x^2 + 2x + 2 = 0$

36. $\frac{x}{x-5} - \frac{5}{x+5} = \frac{10x}{x^2-25}$

37. Find the equation of the line that passes through: $(-2, 1)$ and $(1, 7)$

38. Use your calculator to solve the following: Given right triangle ABC where $C = 90^\circ$, $A = 50^\circ$, and $c = 9.2$. Find a , b and B . Round your answers to the nearest whole number.

Answers: 1. -6 2. $\frac{62}{15}$ 3. $x \neq 1$ or $(-\infty, 1) \cup (1, \infty)$ 4. $x \neq -1$ or 1 or $(-\infty, -1) \cup (-1, 1) \cup (1, \infty)$ 5. $-28x^5y^4$
 6. $\frac{8}{x^{15}y^9}$ 7. $2x^2 - 3x - 1$ 8. $-2x^2 - 30x + 2$ 9. $x^2 + 5x + 6$ 10. $2x^3 - 13x^2 + 16x - 5$ 11. $16x^2 + 8x + 1$
 12. $6x^2 + 11xy - 7y^2$ 13. $5(x + 5)$ 14. $(x^2 + 1)(x + 3)$ 15. $(x + 4)(x + 3)$ 16. $(x - 11)(x + 11)$ 17. 1
 18. $\frac{x+4}{x+1}$ 19. $\frac{(7x+15)}{(x-3)(x+3)}$ 20. $\frac{x(x+3)}{(x+1)(x+2)}$ or $\frac{x^2+3x}{x^2+3x+2}$ 21. $4\sqrt{2}$ 22. $3x\sqrt{2}$ 23. $\frac{2\sqrt{3}}{3}$ 24. 4 25. -1024 26. $0 + 1024i$
 27. $-6 - 15i$ 28. $1 + 2i$ 29. $x = b$ 30. $x = \frac{gy}{m-g}$ 31. $x = -1$ 32. $x = 28$ 33. $y = -11$ 34. $x = -1, 12$
 35. $x = -1 \pm i$ 36. \emptyset 37. $y = 2x + 5$ 38. $B = 40^\circ$ $a = 7$ $b = 6$

What does it mean? If there are a few topics you had difficulty with, you could ask your math teacher for help. If there are many problems that caused difficulty, you will really want to strengthen your math skills. Research has shown that the students who arrive at MMA with the strongest math skills, are the most successful students.