# BOROUGH OF MANHATTAN COMMUNITY COLLEGE
## DEPARTMENT OF MATHEMATICS
### Practice for MAT 012/051 Department Final
## FORM K

The actual final has 10 multiple choice questions (4 points each) and 12 short answer questions (5 points each).   Please do not assume that the content or difficulty level of these practice questions is exactly the same as the actual examination.

1.  Find the value of $x^2 - 2y^2$ when $x = 2$ and $y = -2$.

    (a)  0       (b)  2       (c)  4       (d)  $-4$       (e)  $-12$

2.  Simplify $\frac{(x^2)^4 x^2}{x^6}$.

    (a) $x^2$       (b) $x^4$       (c) $6x$       (d) $2x^2$

3.  Find $x$ if $\frac{x}{3} + 1 = \frac{x}{6}$.

    (a)  0       (b)  1       (c)  $-3$       (d)  $-6$       (e)  $-18$

4.  Multiply and simplify:   $(x + 4)(x^2 - 5x - 2)$

    (a) $6x^2 - 20x - 8$       (b) $x^3 - x^2 - 22x - 8$       (c) $2x^3 + 9x^2 - 20x - 8$

    (d) $x^3 - 20x - 8$

5.  If $\frac{x-2}{5} = \frac{x-4}{2}$, then $x =$

    (a) $\frac{16}{3}$       (b) 4       (c) 8       (d) 10       (e) $\frac{3}{16}$

6.  If $y = 9x - 5$ , then $x =$

    (a) $\frac{y-5}{9}$       (b) $\frac{y-5}{-9}$       (c) $\frac{5-y}{9}$       (d) $\frac{y+5}{9}$       (e) $\frac{y+5}{-9}$

7.  Factor $6a^2b - 27ab$ completely.

(a) $3(2a^2b - 9ab)$       (b) $6(a^2b - 27ab)$       (c) $3ab(2a - 9ab)$       (d) $3ab(2a - 9)$

(e) $3a^2b(2 - 9ab)$

8. A teller earns $70 in 8 hours. How much will she earn in 12 hours?

    (a) $74        (b) $100        (c) $105        (d) $60        (e) $46.67

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

    (a) $\dfrac{x-1}{x-2}$        (b) $\dfrac{x-1}{x+2}$        (c) $-3x-2$        (d) $\dfrac{x-2}{x+2}$        (e) $\dfrac{x+1}{x-2}$

10. Solve for $b$: $16ab - c = 32$

    (a) $\dfrac{2+c}{a}$        (b) $\dfrac{16+c}{a}$        (c) $\dfrac{2c}{a}$        (d) $\dfrac{16c}{a}$        (e) $\dfrac{32+c}{16a}$

11. Simplify $\sqrt{32}$.

12. Find the equation of the line that goes through the points $(-2,5)$ and $(4,-7)$

13. What is the slope of the line given by the equation $2x - 3y = 24$?

14. Simplify: $\sqrt{2}(\sqrt{12} + \sqrt{10})$

15. Solve for $x$: $\quad -3 + 2(9x - 5) = 5(3x + 2)$

16. A club sells tickets to a event for $8 for children and $10 for adults. If the total number of tickets sold for the event was 220 and the total amount received from tickets sales was $2030, how many children's tickets and how many adult tickets were sold?

17. Simplify for all $x \neq -3$: $\dfrac{6x^2-54}{5x+15}$

18. Simplify: $-12x^5 + 3x^4(6x^7 - 7x)$

19. Solve for $x$: $\qquad x^2 = 5x - 6$

20. Solve for $x$ and $y$: $\begin{cases} 2x - 3y = 7 \\ 5x + 2y = 8 \end{cases}$

21. Solve the following equation using the Zero-Factor Property: $x^2 - 6x - 16 = 0$

22. Solve for $y$ and show how to represent the solution on a number line: $10 - 2(3 + y) \leq -2 - 5y$

23. Simplify the following completely, express all answers using only positive exponents:
$(3x^{-3}y^4z^5)^2$

24. The sum of two numbers is 60. One number is 3 times the other. Find the numbers.

25. Mr. Wilson invested money in two accounts. His total investment was $14,000. If one account pays

5% in interest and the other pays 8% in interest, how much did he invest in each account if he earned a total of $880 in interest in 1 year?

26. Find the sum, simplify your answer completely.   $7\sqrt{8} + 4\sqrt{50} - 10\sqrt{2}$

27. Perform the indicated operation.   Simplify your answer completely:   $(2x - 3)^2$

28. Find the quotient:   $\dfrac{12x^5 - 24x^3 + 64x^2}{-4x^2}$

29. Factor completely:  $5x^4 + 25x^3 + 20x^2$

30. Factor completely:  $8x^2 + 10x - 3$
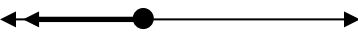
31. Solve for  $x$:  $2x^3 + 16x^2 + 32x = 0$

32. Solve for  $x$  and  $y$:   $\begin{cases} x = y - 6 \\ 2x + y = 12 \end{cases}$

33. Solve for x:  $x^2 - 2x - 35 = 0$

34. Perform the operation and simplify:  $(3x + 5)^2$

35. Diane has $1.10 in dimes and nickels. She has a total of 14 coins. How many of each kind does she have?

1. D
2. B
3. D
4. B
5. A
6. D
7. D
8. C
9. B
10. E
11. $4\sqrt{2}$
12. $y = -2x + 1$
13. $m = \frac{2}{3}$
14. $2\sqrt{6} + 2\sqrt{5}$
15. $x = \frac{23}{3}$ or $7\frac{2}{3}$
16. 85 children and 135 adults tickets
17. $\frac{6(x-3)}{5}$
18. $18x^{11} - 33x^5$
19. $x = 3, \; x = 2$
20. $x = 2, \; y = -1$
21. $x = 8 \; or \; x = -2$
22. $y \leq -2$ , 
23. $\frac{9y^8 z^{10}}{x^6}$
24. 15, 45
25. \$6000 @8% and \$8000 @ 5%
26. $24\sqrt{2}$
27. $4x^2 - 12x + 9$
28. $-3x^3 + 6x - 16$
29. $5x^2(x + 4)(x + 1)$
30. $(2x + 3)(4x - 1)$
31. $x = 0, -4$
32. $x = 2, y = 8$
33. $x = -5, x = 7$
34. $9x^2 + 30x + 25$
35. 6 nickels and 8 dimes