

Math 1021 Review for Final

NOTE THIS REVIEW IS NOT ALL ENCOMPASSING. All the general topics that will be covered on the final are included here. BUT THERE MIGHT BE TYPES OF PROBLEMS ON THE TEST THAT ARE NOT ON THIS REVIEW. You must know how to do any of the homework problems that were assigned on these general topics and you should review similar problems on the tests.

1. Simplify the following. Express answers in terms of positive exponents.

$$(a) (2a^{-3}b^2)^{-2} \quad (b) \left(\frac{x^2}{y^4}\right)^{-3} \quad (c) \frac{4x^{-3}y^{-5}}{6x^{-4}y^3} \quad (d) \left(\frac{m^{-3}m^3}{n^{-2}}\right)^{-2} \quad (e) \left(\frac{x^4y^{-1}}{x^{-2}y^3}\right)^2$$
$$(f) (27x^3)^{2/3} \quad (g) (16x^8y^{-4})^{1/4} \quad (h) \left(\frac{x^{-1/3}y^{1/2}}{x^{-1/4}y^{1/3}}\right)^6$$

2. Perform the indicated operations and simplify when needed.

$$(a) (2x^3 - 3x^2 + x + 5) + (2x^2 + x - 1) \quad (b) (2x^3 - 3x^2 + x + 5) - (2x^2 + x - 1)$$
$$(c) (2x^3 - 3x^2 + x + 5)(2x^2 + x - 1) \quad (d) (2x^2 + x - 1)\sqrt{2x^3 - 3x^2 + x + 5}$$
$$(e) (2x + 3y)^2 \quad (f) (2x - 3y)^2 \quad (g) (2x + 3y)(2x - 3y) \quad (h) (3x + 2)(4x - 3)$$

3. Perform the indicated operations and simplify your answers.

$$(a) \frac{x}{x-3} + \frac{3}{3-x} \quad (b) \frac{y-3}{y^2-4} - \frac{y+2}{y^2-4y+4} - \frac{2}{2-y} \quad (c) \frac{x+1}{x-x^2} \cdot \frac{x^2-2x+1}{x^2-1}$$
$$(d) \frac{4x^2-4x+1}{2x^2+5x-3} \div \frac{2x^2-3x-2}{2x^2+7x+3}$$

4. Simplify the following radicals expressions:

$$(a) \sqrt{12x^3y^5z^2} \quad (b) \sqrt[3]{\frac{8a^7}{27b^3}} \quad (c) \frac{6x - \sqrt[4]{32x^8}}{2x}$$

5. Express the following in terms of rational exponents.

$$(a) \left(\sqrt{(x+1)^3}\right)^5 \quad (b) \sqrt{\frac{x-1}{x-2}} \left(\sqrt{(x-1)(x-2)}\right)^3$$

6. Rationalize the denominator in each of the following.

(a) $\frac{5}{\sqrt{5x}}$

(b) $\frac{1}{\sqrt{x-1}}$

(c) $\frac{1}{\sqrt{x-3}+2}$

In 7–17, solve the equations for x .

7. $3x+11-(6x-11)=0$

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

9. $11x=2x^2+12$

10. $4x^2=8x$

11. $25x^2-9=0$

12. $x^2-10x-3=0$

13. $2x^2+1=4x$

14. $\frac{2}{x^2-9}-\frac{3}{x-3}=\frac{1}{x+3}$

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

16. $\sqrt{2x+1}-\sqrt{x+4}=1$ (**check required**)

17. $x^4-7x^2+10=0$

18. $x^5=7$

In 19–21, solve the inequalities and graph the solutions. Express the solutions in interval notation.

19. $-4x-5 \leq 0$

20. $\frac{x+2}{x-3} \leq 0$

21. $x^2+21 > 10x$

22. The sales price on a camera after a 20% discount is \$72. What was the price before the discount?

23. A boat cruises 36 mi against a 3-mph current and 36 mi back in the direction of the same current. The round trip takes 5 hours. What is the speed of the boat in still water?

24. Ann can clean a pool in 3 hours and Mary can clean it in 2 hours. How long will it take the girls to clean the pool together?

25. One number is 5 more than another, and the difference of their squares is 30. What are the two numbers?

26. Find an equation of the line passing through the points $P_1(-4,-4)$ and $P_2(-5,2)$.

27. What is the distance between points P_1 and P_2 from the previous problem.

28. Graph the lines $y=2x-3$, $y=-2x+3$, $y=-4$, and $x=2$. Clearly label any intercepts.

In 29 & 30, find the axis of symmetry and vertex of the parabola. Find the x -intercepts and the y -intercept of the parabola. Graph the parabola clearly labeling the vertex, the axis of symmetry and the intercepts.

29. $y = -x^2 - 2x + 3$ 30. $y = x^2 - 2x - 3$

31. Solve the following systems of equations:

(a)
$$\begin{aligned} 2x - 3y &= 7 \\ 3x - y &= 1 \end{aligned}$$
 (b)
$$\begin{aligned} 7x - 5y &= -1 \\ 3x + 2y &= 12 \end{aligned}$$

32. Find the domain of the following functions:

(a) $f(x) = \frac{15}{x-3}$ (b) $g(x) = 16 + 3x - x^2$ (c) $h(x) = \sqrt{x-5}$ (d) $F(x) = \frac{1}{\sqrt{x-5}}$

33. For $f(x) = 2x - 3$, find (a) $f(2a)$ (b) $\frac{f(x+h) - f(x)}{h}$.

34. For $f(x) = x^3$, $g(x) = \frac{1}{x}$, find $f + g$, $f - g$, fg , f/g .

35. For $f(x) = \sqrt{9-x}$, $g(x) = x^2$, find $f \circ g$ and $g \circ f$. Simplify your answers if possible.