

Math 1022 - Beginning of Semester Review

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

a) $(2a^{-3}b^2)^{-2}$ b) $\left(\frac{x^2}{y^4}\right)^{-3}$ c) $\frac{4x^{-3}y^{-5}}{6x^{-4}y^3}$ d) $\left(\frac{m^{-3}m^3}{n^{-2}}\right)^{-2}$ e) $\left(\frac{x^4y^{-1}}{x^{-2}y^3}\right)^2$
f) $(27x^3)^{2/3}$ g) $(16x^8y^{-4})^{1/4}$ 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) $(2x^3 - 3x^2 + x + 5) + (2x^2 + x - 1)$ b) $(2x^3 - 3x^2 + x + 5) - (2x^2 + x - 1)$
c) $(2x^3 - 3x^2 + x + 5)(2x^2 + x - 1)$ d) $(2x + 3y)^2$ e) $(2x - 3y)^2$
f) $(2x + 3y)(2x - 3y)$ g) $(3x + 2)(4x - 3)$ h) $2x^2 + x - 1 \overline{)2x^3 - 3x^2 + x + 5}$
i) Find the quotient and remainder when $3x^3 + x + 1$ is divided by $x + 1$.

3. Factor the following expressions by integers.

a) $6x^4 - 8x^3 - 2x^2$ b) $5x(x+1) - 3(x+1)$ c) $2x^2 - 4xy - 3x + 6y$
d) $x^2 + 5x - 6$ e) $m^2 - 6m + 8$ f) $2x^2 + 5x - 3$
g) $25x^2 - 16y^2$ h) $x^2 + 10xy + 25y^2$ i) $9x^2 - 6x + 1$ j) $x^2 + 81$

4. Perform the indicated operations and simplify your answers.

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

5. Simplify the following radicals:

a) $\sqrt{12x^3y^5z^2}$ b) $\sqrt[3]{\frac{8a^7}{27b^3}}$

6. Express the following using radical notation:

(a) $m^{2/3}$ (b) $(7x^2y)^{2/7}$

Express the following in terms of rational exponents:

c) $\sqrt[4]{x^3}$ d) $7m^5\sqrt{m^2}$ e) $\left(\sqrt{(x+1)^3}\right)^5$

7. Rationalize the denominator in each of the following.

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

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

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

In 8–21, solve the equations for x .

8. $3x+11-(6x-11)=0$

9. $5(x-2)+3(3x-1)=4(x-3)+7x$

10. $11x=2x^2+12$

11. $4u^2=8u$

12. $25x^2-9=0$

13. $x^3-3x^2+2x=0$

14. $x^5=7$

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

16. $2x^2+1=4x$

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

18. $\frac{x}{x-2}-3=0$

19. $\sqrt{x-4}-5=0$

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

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

In 22–24, solve the inequalities and graph the solutions. Express the solutions in interval notation.

22. $-4x-5 \leq 0$

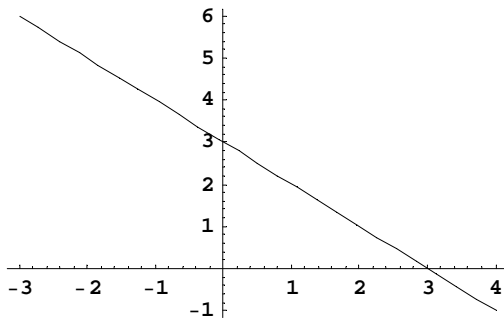
23. $\frac{x+2}{x-3} \leq 0$

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

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

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

27. Find an equation of the line whose graph is



In 28 & 29, 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.

28. $y=-x^2-2x+3$

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

30. Solve the following systems of equations:

(a) $2x-3y=7$
 $3x-y=1$

(b) $7x-5y=-1$
 $3x+2y=12$

31. By completing the square, express the following quadratic expressions as a constant times a perfect square plus a constant: (a) x^2-x+2 (b) $2x^2+8x+3$

32. Solve the following equation and inequalities:

(a) $|x+2|=5$

(b) $|x+2|<5$

(c) $|x+2|\geq 5$