**Math 1022 - Beginning of Semester Review**

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

a) $\left(2a^{-3}b^{2}\right)^{-2}$ 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) $\left(\frac{x^{4}y^{-1}}{x^{-2}y^{3}}\right)^{2}$

f) $\left(27x^{3}\right)^{2/3}$ g) $\left(16x^{8}y^{-4}\right)^{1/4}$ 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) $\left(2x^{3}-3x^{2}+x+5\right)+\left(2x^{2}+x-1\right)$ b) $\left(2x^{3}-3x^{2}+x+5\right)-\left(2x^{2}+x-1\right)$

c) $\left(2x^{3}-3x^{2}+x+5\right)\left(2x^{2}+x-1\right)$ 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) $x^{2}+81$

k) $9(x+1)^{2}(3x-2)^{2}+2(x+1)(3x-2)^{3}$

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) $\frac{\frac{x}{x-1}-\frac{1}{1-x}}{\frac{x+1}{x-1}}$ f) $\frac{(x-1)^{2}-2(x+2)(x-1)}{(x-1)^{4}}$

5. Simplify the following radicals:

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

6. Express the following using radical notation:

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

Express the following in terms of rational exponents:

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

7. Rationalize the denominator in each of the following.

(a) $\dfrac{5}{\sqrt{5x}}$ (b) $\dfrac{1}{\sqrt{x}-1}$ (c) $\dfrac{1}{\sqrt{x+2}+1}$

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. $\dfrac{2}{x^2-9}-\dfrac{3}{x-3}=\dfrac{1}{x+3}$ 18. $\dfrac{x}{x-2}-3=0$

19. $\sqrt{x-4}-5=0$ 20. $\sqrt{2x+1}-\sqrt{x+4}=1$ 21. $x^4-7x^2+10=0$

22. $\dfrac{x-2}{2x+7}=3$ 23. $x-\dfrac{27}{\sqrt{x}}=0$

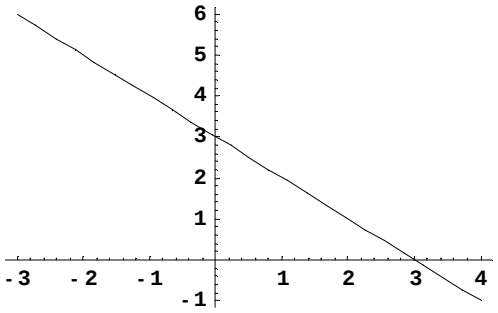
In 24 – 26, solve the inequalities and graph the solutions. Express the solutions in interval notation.

24. $-4x-5\le 0$ 25. $\dfrac{x+2}{x-3}\le 0$ 26. $x^2+21>10x$

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

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

29. Find an equation of the line whose graph is




In 30 & 31, 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. 30. $y=-x^2-2x+3$ 31. $y=x^2-2x-3$

32. Solve the following systems of equations:

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

33. Solve the following equation and inequalities:

(a) $|x+2|=5$ (b) $|x+2|<5$ (c) $|x+2|\ge 5$