Solve all exercises. Staple them to this sheet.

1. Perform the indicated operations and simplify:

   (a) $-5(7-2)+6(-1)^3-7(-6+4)^2-6-(5-8)$

   (b) $6x\left(7+x^2\right)+\left(3x\right)\left(x+1\right)-3\left(x+1\right)(x-1)+(x^2+2)^2$

   (c) $\left(-\dfrac{1}{3}\right)+3\left(\dfrac{2}{4}-\dfrac{1}{2}\right)^2-\dfrac{3}{5}\left(\dfrac{2}{4}\div\dfrac{3}{5}\right)+\dfrac{7}{6}\left(-\dfrac{1}{2}\right)^3$

   (d) $3(-7)+\left(-\dfrac{1}{6}\right)\left(\dfrac{9}{2}\right)-\left(\dfrac{2}{3}-\dfrac{4}{2}\right)+4\left(3\right)^3+\left(\dfrac{1}{2}\div\dfrac{2}{3}\right)$

   (e) $4x^2\left(x^2+3\right)-5x\left(x+1\right)+2x-4+3x^2$

2. Factor completely:

   (a) $2x^2-6x-8$ (d) $x^2+6x-27$

   (b) $x^2+7x+10$ (e) $4x^3-20x^2-24x$

   (c) x^3+9x^2-10x

3. Factor and simplify:

   (a) $\dfrac{x^2-x-2}{2x^3+4x^2-6x}\cdot\dfrac{x^2+4x-5}{x^2-1}\div\dfrac{x^2+3x-10}{3x^2+18x+27}$

   (b) $\dfrac{x^2+3x-4}{x^2-3x+2}\cdot\dfrac{3x^3-12x}{2x^2+2x}\div\dfrac{9x^2-36}{x^2-x-2}$

4. Simplify:

   (a) $\left(\dfrac{16x^3y^2z^{-3}}{100x^2y^{-2}z^{-4}}\right)^{-3}$ (b) $\left(\dfrac{490x^{-1}y^{-3}z^4}{35x^{-2}y^2z^{-4}}\right)^2$

5. Rewrite the following expressions without using the absolute value symbol and simplify:

   (a) $\left|-3\right|+\left|8\right|\cdot\left|-3-2\right|-\left|3\right|+4\left|-1\right|-\left|-2\right|$ (b) $\left|x-3\right|$ if $x<-3$

   (c) $\left|x+4\right|$ if $x>-4$ (d) $\left|x+5\right|$ if $x<-5$

   (e) $\left|2x-1\right|$ if $x<0$

6. Find the simplest radical form:

   (a) $\dfrac{x-4}{\sqrt{x}-2}$ (b) $\dfrac{2x}{\sqrt{x}-2}$ (c) $\dfrac{x-1}{\sqrt{3x}+1}$ (d) $\sqrt[9]{x^3}$

   (e) $\sqrt[10]{4x^2}$ (f) $\sqrt[3]{\dfrac{240xy}{12xy^2z}}$ (g) $\sqrt[4]{\dfrac{80xy^2z}{45x^2y^4z^3}}$

(h) $5\sqrt{\dfrac{3x}{125x^{6}y^{2}z^{3}}}$ (i) $\dfrac{4x}{\sqrt[3]{xy}}$

7. Solve the following equations:

(a) $-3\left(-3x\right)+3\left(x-2\right)=-3x-5x$

(b) $\dfrac{-12}{3}\left(x+3\right)+4\left(x+1\right)+3x=-2x+43+5x$

(c) $-4x^{2}+400=0$

(d) $x^{2}-11=67$

(e) $2x^{2}-3x-5=0$

(f) $8x^{2}+7-15=-7$

(g) $8x^{2}+4+4x=20-x^{2}$

(h) $2x-\sqrt{2+x}=4x$

(i) $\sqrt{2x}=x-1$

(j) $\dfrac{2x}{x+1}-\dfrac{1}{x-1}=\dfrac{4x}{x^{2}-1}$

(k) $\dfrac{2x}{x-1}=\dfrac{1}{3x-3}$

8. Solve the following inequalities:

(a) $\dfrac{2x+7}{5}>\dfrac{5x-3}{2}$ (b) $\dfrac{1}{2}\le\dfrac{5x-6}{4}$

(c) $\dfrac{1}{2}\le\dfrac{5x-6}{4}<7$ (d) $5x>\dfrac{x+3}{2}$

(e) $-6x+4\le2x+1\le8x+4$ (f) $2x\le3x+4<4x-2$

(g) $8x\ge2x+2-3x\ge2-4x$