Math 80 Review Questions
Spring 2006

1. Linear Equations in One Variable (Sect. 2.1-2.7, skip 2.6)

   (a) Solve $-4x - 1 = -5x + 1 + 3x$.

   (b) Solve $9(3k - 5) = 12(3k - 1) - 51$.

   (c) When the smaller of two consecutive integers is added to three times the larger, the result is 43. Find the integers.

   (d) Solve the equation $y = mx + b$ for the variable x.

   (e) Two planes leave an airport at the same time, one eastbound, the other westbound. The eastbound plane flies 150 mph slower than the westbound plane. After 3 hours, they are 2250 miles apart. Find the speed of each plane.

   (f) A cashier has a total of 42 bills, made up of twenties and fifties. The total value of the money is \$1290. How many of each bill is in the till?

2. Linear Equations in Two Variables (Sect. 3.1-3.4)

   (a) Is $(4, 2)$ a solution to the equation $2x - y = 6$?

   (b) For $y = -4x + 4$, complete the following ordered pairs: $(\_\_, 8)$, $(3, \_\_)$

   (c) What is the x-intercept of $x - y = 5$? The y-intercept?

   (d) Graph the following lines: $x - y = 5$, $x = 4$, $y = -2$

   (e) Find the slope between the points $(4, 3)$ and $(-6, 3)$.

   (f) Find the slope between the points $(-\frac{7}{5}, \frac{3}{10})$ and $(\frac{1}{5}, -\frac{1}{2})$.

   (g) What is the slope of $2x + 4y = 5$?

   (h) What are the slopes of the following lines? Are they parallel, perpendicular, or neither? $-4x + 3y = 4$ and $-8x + 6y = 0$

   (i) Write an equation for the line passing through $(0, 6)$ with slope -5.

   (j) Write an equation for the line passing through $(4, 1)$ with slope 2.

   (k) Write an equation for the line passing through $(0, 3)$ perpendicular to $y + 2x = 8$.

3. Exponents and Polynomials (Sect. 4.1-4.7)

   (a) Simplify $(3x^4y^2z)^3(yz^4)^5$.

   (b) $(\frac{1}{3})^{-3}$

   (c) Write the following with only positive exponents: $\frac{p^{-5}q^{-4}}{9r^{-3}}$.

(d) $\frac{0^{12}}{12^0}=$

(e) $(2p^{-2}qr^{-3})(2p)^{-4}=$

(f) $\dfrac{(2xy^{-3})^{-2}}{(3x^{-2}y^4)^{-3}}$

(g) $(4\times10^7)\times(3\times10^3)=$

(h) $\frac{12\times10^-4}{4\times10^3}=$

(i) $(x^2+x)-(3x^2+2x-1)=$

(j) $(-2b^6+3b^4-b^2)+(b^62b^4+2b^2)=$

(k) $4z^2(8z^2+5zy-3y^2)=$

(l) $(2x+3)(6x-4)=$

(m) $(2a+1)^2=$

(n) $(r+8)(r-8)=$

(o) $\frac{120x^6-60x^3+80x^2}{2x}=$

(p) $\frac{5t^8-5t^7+15}{5t}=$

4. Factoring and Applications

(a) Factor out the greatest common factor: $100a^5+16a^3$, $19p^2y-38p^2y^3$

(b) Factor by grouping: $8s^2-4st+6sy-3yt$

(c) Factor the following: $t^2+7t+12$, $x^2-13x+36$, $d^2+4d-45$

(d) Factor $(a+b)x^2+(a+b)x-12(a+b)$ completely.

(e) Factor $k^7-2k^6m-15k^5m^2$ completely.

(f) Factor $5z^2+12z+4$.

(g) Factor x^2-9.

(h) Factor $16a^4-4$.

(i) Solve the following equations: $t^2=9t$, $a^2+a-20=0$, $x^3=3x+2x^2$

(j) The length of a rectangle is 3 inches more than its width. The area of the rectangula is 28 square inches. Find the dimensions of the rectangle.

(k) One leg of a right triangle is 2 inches longer than the other leg. The hypotenuse is 2 inches shorter than twice the length of the shorter leg. What are the dimensions of the triangle?

5. Rational Expressions (Sect. 6.1-6.5)

(a) Find any values for which the following rational expressions are undefined: $\frac{m-2}{m-5}$, $\frac{1}{x^2-1}$, $\frac{3x-1}{2}$

(b) Put in lowest terms: $\frac{20p^2-45}{6p-9}$, $\frac{a^2-b^2}{a-b}$, $\frac{2-k}{k-2}$

(c) $\frac{(t-2)^2}{4t^2} \cdot \frac{2t}{t-4}$, $\frac{8r+16}{24r-24} \cdot \frac{6r-6}{3r+6}$

(d) $\frac{2}{3-x} \div \frac{2x+6}{x^2-9}$, $\frac{2a}{a+4} \div \frac{a^2}{(a+4)^2}$

(e) Find the LCD of $\frac{15}{3a^3}$, $\frac{8}{9a-45}$, $\frac{2}{a+1}$

(f) Find the LCD of $\frac{4}{x-y}$, $\frac{7}{5y-5x}$, $\frac{2}{3xy}$

(g) $\frac{2x}{x-1} - \frac{4}{x^2-1} =$

(h) $\frac{2p}{p-3} + \frac{2+p}{p} - \frac{-6}{p^2-3p} =$

(i) $\frac{-8}{p-q^2} + \frac{3}{q^2-p} =$

(j) $\frac{\frac{1}{a^2}-\frac{1}{b^2}}{\frac{1}{a}-\frac{1}{b}} =$

(k) $\frac{\frac{1}{1+a}}{\frac{2}{a^2-1}} =$

(l) $\frac{2+\frac{1}{5}}{\frac{12}{10}+1} =$

Mini-Guide to Factoring

FIRST: Do all of the terms share a common factor? If so, factor out the GCF.

Ex: $12ab^5 + 8ab^4 - 4ab^3 = 4ab^3(3b^2 + 2b - 1)$ (Sect. 5.1)

SECOND: Do you have any of the following forms?

(a) A trinomial with a variable squared? Then you may be able to factor it into 2 binomials $(\_\pm\_)\cdot(\_\pm\_)$ (Sect 5.2, 5.3) Ex: $3b^2+2b-1 = (3b-1)(b+1)$

(b) Do you have a difference of squares $a^2 - b^2$? Then $a^2 - b^2 = (a + b)(a - b)$.

Ex: $1 - 4x^2 = (1 + 2x)(1 - 2x)$ since $1^2 = 1$ and $(2x)^2 = 4x^2$ (Sect. 5.4)

Ex: $2x^2y - 18y = 2y(x^2 - 9)$ $\leftarrow$ Factor out GCF
$= 2y(x + 3)(x - 3)$

(c) Do you have 4 terms? Then you may be able to factor by grouping....I will tell you specifically if a problem requires factoring by grouping. (Sect. 5.1)

Ex: $m^2 + 2m + mn + 2n = m(m + 2) + n(m + 2) = (m + n)(m + 2)$