

**Algebra 2 Review Handout: Solving Equations with Factoring**  
**Book reference: Section 5.2**

**Dec 13-14, 2009**

1. Factor each of the following into two binomials:

a.  $2x^2 + 7x + 3$

f.  $2x^2 + 5x - 3$

b.  $3x^2 - 10x + 3$

g.  $3x^2 - 5x - 2$

c.  $2x^2 - 7x + 5$

h.  $2x^2 + 3x - 14$

d.  $3x^2 + 5x + 2$

i.  $3x^2 - 2x - 5$

e.  $7x^2 + 15x + 2$

j.  $3x^2 + 7x - 6$

2. Factor. You will need to use a combination of methods.

a.  $2x^3 - 8x$

d.  $4x^3 - 4x^2 - 24x$

b.  $2x^2 + 8x - 10$

e.  $x - 9x^3$

c.  $2x^3 + 7x^2 + 5x$

f.  $10x^2 + 4x - 14$

3. Solve the following equations by factoring:

a.  $x^2 = 9x + 10$

f.  $(x + 2)^2 = 2x + 7$

b.  $x^2 + 4x = 0$

g.  $(x + 1)(x - 4) = 14$

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

h.  $2x^2 + x = 6$

d.  $x^2 = 8x$

i.  $\frac{1}{2}x^2 + 6x + 16 = 0$

e.  $x^2 - 6x - 16 = 0$

j.  $0 = 5x^2 + 11x + 6$

4. Find the zeros of each function. (Hint for f: Should you multiply it out?)

a.  $f(x) = 2x^2 - 8x - 10$

c.  $f(x) = -3x^2 - 12x + 36$

b.  $f(x) = \frac{1}{2}x^2 - x - \frac{3}{2}$

d.  $f(x) = 32 - 2x^2$

e.  $f(x) = 7x^2 - 3x$

f.  $f(x) = 2\left(x - \frac{1}{4}\right)\left(x + \frac{3}{5}\right)$

5. Solve the problems below by factoring or plugging numbers in:

a. For  $f(x) = x^2 - 5x + 7$  find  $f(-2)$  and then solve the equation  $f(x) = 1$

b. For  $f(x) = 2x^2 + 6x + 12$  find  $f(-1)$  and then solve the equation  $f(x) = 48$ .

c. For  $f(x) = \frac{1}{2}(x - 2)(x + 6)$  find  $f(1)$  and then solve the equation  $f(x) = 4.5$ .

6. More equation solving.

a.  $3(x+7)(x-5) = 0$

b.  $(x+23)(x-19) = 0$

c.  $-\frac{3}{4}\left(x - \frac{1}{7}\right)\left(x - \frac{2}{5}\right) = 0$

d.  $\frac{1}{2}x^2 + 5 = \frac{11}{2}x$

e.  $\frac{x^2}{3} + 2x = \frac{16}{3}$

f.  $\frac{2}{3}x^2 + \frac{8}{3}x = x + 4$

g.  $x^2 = \frac{1}{9}$

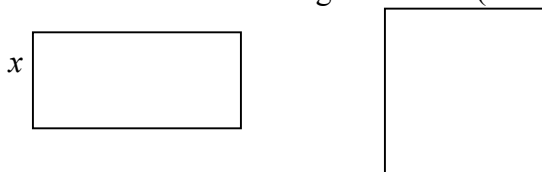
h.  $(x-3)(x+4) = 18$

i.  $(x-3)^2 + (x+4)^2 = (x+5)^2$

j.  $(x-1)^2 + (x+1)^2 = (x+3)^2$

7. A rectangle's length is 5 cm more than its width. If you double its width and reduce its length by 4 then its area increases by 18 square cm.

a. Fill in the dimensions on the diagram below (not to scale). Let  $x$  be its initial width.



b. Write an equation involving  $x$  that can be solved to find  $x$ . Then solve it.

### ANSWERS

1. a.  $(2x+1)(x+3)$  b.  $(3x-1)(x-3)$  c.  $(2x-5)(x-1)$  d.  $(3x+2)(x+1)$  e.  $(7x+1)(x+2)$   
 f.  $(2x-1)(x+3)$  g.  $(3x+1)(x-2)$  h.  $(2x+7)(x-2)$  i.  $(3x-5)(x+1)$  j.  $(3x-2)(x+3)$

a.  $2x(x+2)(x-2)$  d.  $4x(x-3)(x+2)$

2. b.  $2(x+5)(x-1)$  e.  $x(1-3x)(1+3x)$

c.  $x(2x+5)(x+1)$  f.  $2(5x+7)(x-1)$

3. a. 10, -1 b. 0, -4 c. 2, 3 d. 0, 8  
 e. 8, -2 f. 1, -3 g. 6, -3 h. -2, 3/2  
 i. -8, -4 j. -1, -6/5

4a. 5 and -1 b. -1 and 3 c. 2 and -6 d. 4 and -4 e. 0 and 3/7 f. 1/4 and -3/5

5a.  $f(-2) = 21$ ; solutions are  $x=2, x=3$  b.  $f(-1) = 8$ ; solutions are  $x=3, x=-6$

c.  $f(1) = -3.5$ ; solutions are  $x=3, x=-7$

6a. -7, 5 b. -23, 19 c.  $\frac{1}{7}, \frac{2}{5}$  d. 10, 1 e. -8, 2 f.  $\frac{3}{2}, -4$  g.  $\frac{1}{3}, -\frac{1}{3}$  h. -6, 5 i. 0, 8 j. -1, 7

7a. Original is  $x$  and  $x+5$ ; new is  $2x$  and  $x+1$

b.  $x(x+5) + 18 = 2x(x+1)$  so  $x=6$  ( $x=-3$  makes no sense because can't have negative length).