Algebra Review 2
CP Pre-Calculus

Name: Key

Directions: Be sure to show ALL work for each problem. Leave answers as fractions.

Solve for x

1) $\frac{5}{6}x - \frac{4}{3} = x - \frac{1}{4} + \frac{7}{2}x$ · 12

$10x - 16 = 12x - 3 + 42x$
$10x - 16 = 54x - 3$
$-13 = 44x$
$x = \frac{-13}{44}$

Solve each system of equations algebraically

2) $y + 2x = 10 + 4y$
$4(x + y) = 42 - y$

$2x - 3y = 10$
$4x + 5y = 42$

x top eq by 2
$-4x + 6y = -20$
$4x + 5y = 42$
$11y = 22$
$y = 2$
$x = 8$

To find x:
$2 + 2x = 18$
$2x = 16$

3) $\frac{1}{4}x = 1 - .5y$
$-\frac{5}{3}x - 3 = \frac{21}{3}y$

$\frac{1}{4}x + \frac{1}{2}y = 1$
$-\frac{5}{3}x - \frac{21}{3}y = 3$

* top eq by 4
* bottom eq by 3
$5[x + 2y = 4]$
$-5x - 21y = 9$

$5x + 10y = 20$
$-5x - 21y = 9$
$-11y = 29$
$y = \frac{-29}{11}$

4) You are opening a tea shop. Your signature tea is a mixture of lavender and rose hips. Lavender costs $20 a pound, while rose hips cost $14 a pound. You want to charge $15.75 per pound for the blend, ad you want to produce it in 20 pound batches. How many pounds of each should you mix?

let x = # pounds lavendar 5.83 lb.
y = # pounds rose hips 14.16 lb.

$x + y = 20$
$20x + 14y = 15.75(20)$

$x + y = 20$
$20x + 14y = 315$
$-20x - 20y = -400$
$-6y = -85$
$y = 14.16$

Factor each expression completely

7) $6x^2+13x-15$

$(6x-5)(x+3)$

8) $125y^3-81y$

25

$y(25y^2-81)$

$=y(5y+9)(5y-9)$

GCF

9) $72x^2+50x^4-60x^3$

-120

$2x^2(36+25x^2-60x)$

$=2x^2(5x-6)(5x-6)$

10) $x^3+7x-3x^2-21$

$=x^2(x-3)+7(x-3)$

$=(x-3)(x^2+7)$

Solve the following equations by **factoring**. If prime, use the quadratic formula.

11) $7x^2-1=3x$

$7x^2-3x-1=0$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$=\frac{3\pm\sqrt{9+28}}{14}$, $\frac{3\pm\sqrt{37}}{14}$

12) $200x^3-32x=0$

$2x(100x^2-16)=0$

$2x(10x+4)(10x-4)=0$

$x=0$

$x=-2/5$

$x=2/5$

FOIL set=0

13) $(2x-3)(x-7)=2$

$2x^2-14x-3x+21=2$

$2x^2-17x+19=0$

$(2x-19)(x-1)=0$

$\therefore$ Use QF

14) $(4x-1)^2+1=50$

$(4x-1)^2=49$

$4x-1=\pm 7$

$4x-1=7$ $\quad 4x-1=7$

$4x=8$ $\quad 4x=-6$

$x=2$ $\quad x=-3/2$

15. You have developed a hot new product! At its current selling price of $80, you are selling 200 per week. Your market research shows that if you drop the price by $5, you will sell 20 more each week. What price would maximize revenue?

let x = # price drops

P	q	= R
80	200	
75	220	

$Y_1=(80-5x)(200+20x)$

window

xmin = 0

xmax = 16

ymin = 0

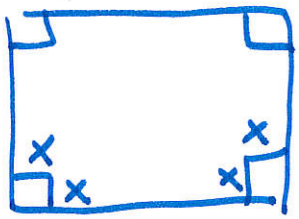
ymax = 20,000?

calc max: (3, 16900)

$\therefore x=3$ so price $=80-5(3)$

$=\$65$

16. You would like to maximize the volume of the box that holds your product. If you are using rectangular sheets of cardboard that measure 24 inches by 20 inches, what should the height of the box be that would maximize the number of cubic inches that the box could hold?



$V = (24-2x)(20-2x)x$

x min $= 0$

x max $= 10$

y min $= 0$

y max $= 20(24)(2) = 960$

calc max

$x = 3.62$ inches

Solve the following example algebraically or using your graphing calculator. Round all answers to the **nearest hundredth** where applicable.

15)

The following function models the height of a toy rocket (in feet) as time passes (in seconds) is as follows:

$$h(t) = -16t^2 + 60t + 20$$

a) How long will it take the rocket to hit the ground? ~4 seconds

calc zero or set = 0, solve

b) How long will it take for the arrow to reach its max height? What is the max height?

calc max

1.87 seconds / 76.25 feet

c) 1 second after launch, the rocket hits a power line. How high was the power line off the ground?

calc value $x = 1$ or sub in 1 for x

64 feet.

d) 3 seconds after launch, the rocket hits a balloon. How high was the balloon?

calc value $x = 3$ 56 feet