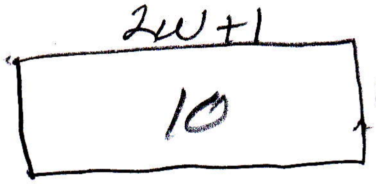
5.8 Problems Odd Numbered Problems P.1



coffee Table

(87) Let w = width
then $2w+1$ = length
Area = 10 ft^2
Find the coffeetable's length and width.

$w(2w+1) = 10$

$2w^2 + w = 10$

$2w^2 + w - 10 = 0$

$2(-10) = -20$

$-4(5) = -20 \quad -4+5 = (1)$

$2w^2 - 4w + 5w - 10 = 0$

$(2w^2 - 4w) + (5w - 10) = 0$

$2w(w-2) + 5(w-2) = 0$

$(w-2)(2w+5) = 0$

$w - 2 = 0$ or $2w + 5 = 0$

$w = 2$ $\qquad 2w = -5$

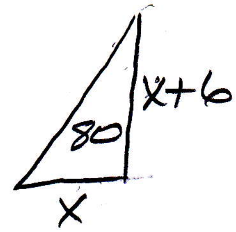
$w = -\frac{5}{2} = -2\frac{1}{2}$

can't Be negative.

$w = 2ft$

$2w+1 = 2(2)+1 = 4+1 = 5ft$

The width is 2ft. The length is 5ft



89 $A = \frac{1}{2}(\text{base})(\text{height})$

$80 = \frac{1}{2}x(x+6)$

$80 = \frac{1}{2}x^2 + \frac{1}{2}x \cdot 6$

$80 = \frac{1}{2}x^2 + 3x$

$0 = \frac{1}{2}x^2 + 3x - 80$

$2(0) = 2\left(\frac{1}{2}x^2\right) + 2(3x) + 2(-80)$

$0 = x^2 + 6x - 160$

$x^2 + 6x - 160 = 0$

$(x-10)(x+16) = 0$

$x - 10 = 0$ or $x + 16 = 0$

$\boxed{x = 10}$ or $\boxed{x = -16}$

The base is 10ft.
The height is
$x + 6 = 10 + 6 = 16$ ft

-160

$\sqrt{160}$ is between 12 and 13

MY TRICK

$$\begin{array}{r} 13 \\ \underline{13} \\ 39 \\ \underline{13} \\ 169 \end{array} \qquad \begin{array}{r} 12 \\ \underline{12} \\ 24 \\ \underline{12} \\ 144 \end{array}$$

try ↑ We need a difference of $\underline{6}$

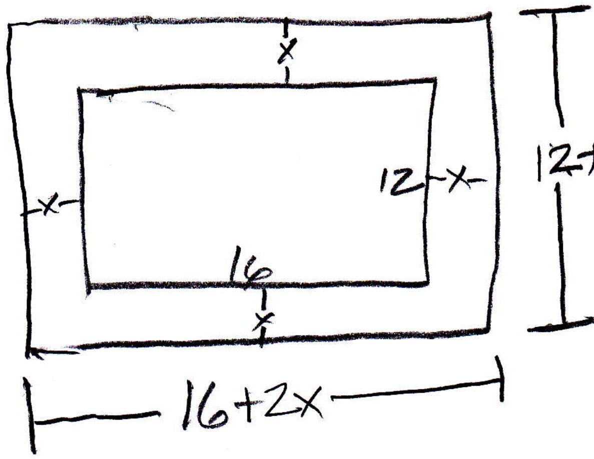
so try $13 + 3 = 16$
$13 - 3 = 10$

$10(16) = 160$

so -160

$-10(16) = -160$

$-10 + 16 = 6$



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$$(12+2x)(16+2x)=320$$
$$2(6+x)\cdot 2(8+x)=320$$
$$4(x+6)(x+8)=320$$
$$(x+6)(x+8)=\frac{320}{4}$$
$$(x+6)(x+8)=80$$
$$x^2+8x+6x+48=80$$
$$x^2+14x+48=80$$
$$\quad -80 \quad -80$$
$$x^2+14x-32=0$$
$$(x-2)(x+16)=0$$
$$x-2=0 \text{ or } x+16=0$$
$$x=2 \qquad x=-16$$

can't be negative

factors of -32

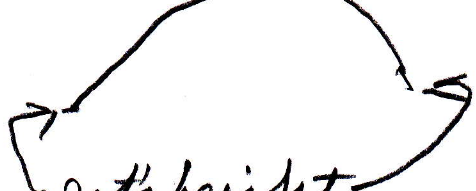
$-2(16)=-32$

$-2+16=14$

You can use the bigger numbers and get the correct answer, but if you factor out the GCF of each binomial, it make the problem a little easier.

(95) Spurts of water

h = height of water above the jet.



Jet's height

The height of a spurt of water, above the jet, t seconds after "start" is $h(t) = -16t^2 + 32t$

Find the time it takes the spurt to return to the jets' height.

$$h(t) = -16t^2 + 32t$$

Let $h(t) = 0$

$$-16t^2 + 32t = 0$$

$$\frac{-16t^2}{-16} + \frac{32t}{-16} = \frac{0}{-16}$$

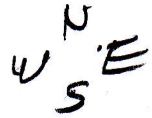
$$t^2 + 2t = 0$$

$$t(t+2) = 0$$

$t = 0$ or $t + 2 = 0$

$t = -2$ sec.

The spurt returns to the jets height at $t = 2$ seconds



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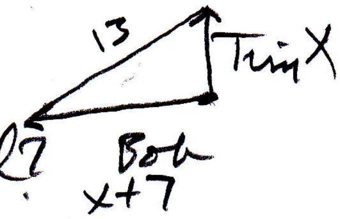
Let x = Tim Distance

then x+7 = Bob's Distance

How far did each person travel?



$$x^2+(x+7)^2=13^2$$

$$x^2+x^2+14x+49=169$$

$$2x^2+14x+49=169$$

$$\underline{\quad -169 \quad -169}$$

$$2x^2+14x-120=0$$

$$2(x^2+7x-60)=0$$

$$x^2+7x-60=0$$

$$(x-5)(x+12)=0$$

$x-5=0$ or $x+12=0$

$x=5$ $\quad$ $x=-12$ can't be neg.

$$\begin{array}{r} -169 \\ +49 \\ \hline -120 \end{array}$$

-60

$-1(60)$

$-2(30)$

$-3(20)$

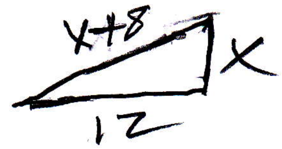
$-4(15)$

$-5(12)$ $\quad -5+12=7$

Tim traveled 5 miles

Bob traveled $x+7=5+7=12$ miles

(99) Let x be height of wire above ground of attachment point to tent. How long is wire?



$$x^2 + 12^2 = (x+8)^2$$

$$x^2 + 144 = x^2 + 16x + 64$$

$$-x^2 \qquad -x^2$$

$$144 = 16x + 64$$

$$-144 \qquad -144$$

$$0 = 16x - 80$$

$$\begin{array}{r} -144 \\ +64 \\ \hline -80 \end{array}$$

$$16x - 80 = 0$$

$$16(x-5) = 0$$

$$\frac{16(x-5)}{16} = \frac{0}{16}$$

$$x - 5 = 0$$

$x = 5$ ft ← height of Point where wire is attached.

$$\boxed{\text{Length of wire is } x+8 = 5+8 = 13 \text{ feet}}$$

#101 Break even point is where

$R(x) = C(x)$

$70x - x^2 = 17x + 150$ add x^2 to each side

$70x = x^2 + 17x + 150$

$-70x \qquad -70x$

$0 = x^2 - 53x$

-70
$+17$
-53

$x^2 - 53x = 0$

$x(x-53) = 0$

$x = 0$ or $x - 53 = 0$

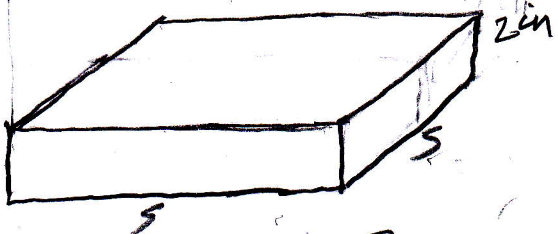
Given in problem $x \geq 10$ in order to break even

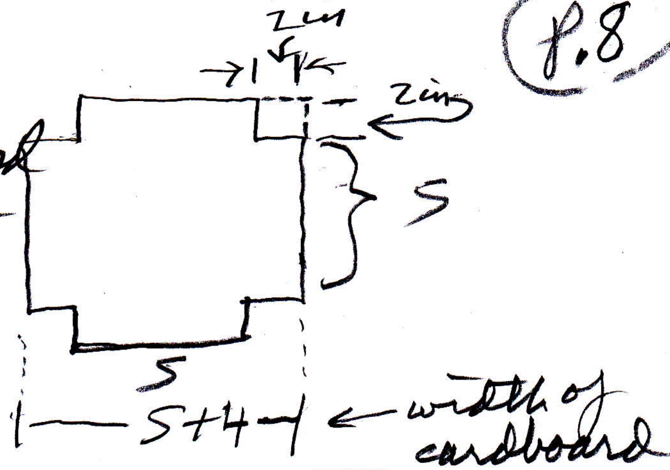
$x = 53$ bicycles must be sold to break even

(103) Volume = lwh

a **Square** piece of cardboard

So $l = w$ Let $s = l = w$





$162 = 2 \cdot s \cdot s$

$162 = 2s^2$

$\frac{2s^2}{2} = \frac{162}{2}$

$s^2 = 81$

$s^2 - 81 = 0$

$s^2 - 9^2 = 0$

$(s+9)(s-9) = 0$

$s+9=0$ or $s-9=0$

$s=-9$ $s-9=0$

can't be neg $s=9$

Monique needs a piece of cardboard that is $s+4$ $= 9+4 = 13$ inches on each side

or a 13 in. by 13 in piece of cardboard

The Box has a width and length of 9 inches.

So

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(a) $V = a^3 - ab^2$

(b) $V = a(a^2 - b^2) = \boxed{a(a+b)(a-b)}$

(c) $V = a(a+b)(a-b)$

$1620 = 12(12+b)(12-b)$

$\frac{1620}{12} = \frac{12(12+b)(12-b)}{12}$

$$\begin{array}{r} 135 \\ 12\overline{)1620} \\ -12 \\ \hline 42 \\ -36 \\ \hline 60 \end{array}$$

$135 = (12+b)(12-b)$

$135 = 144 - b^2$

$+b^2 \qquad +b^2$

$b^2 + 135 = 144$

$-144 = -144$

$$\begin{array}{r} -144 \\ +135 \\ \hline 9 \end{array}$$

$b^2 - 9 = 0$

$b^2 - 3^2 = 0$

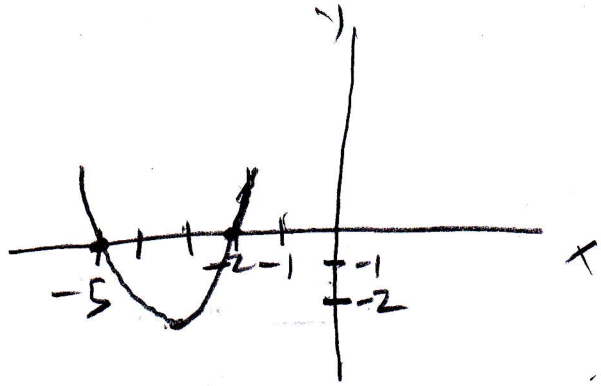
$(b+3)(b-3) = 0$

$b+3=0$ or $b-3=0$

$b=-3$ or $\boxed{b = 3 \text{ inches}}$

can't Be negative

T07



(a) $x = -5$ or $x = -2$

$\Rightarrow$ factors are $(x+5)$ and $(x+2)$

so we have $\boxed{f(x) = (x+5)(x+2)}$

$\Rightarrow \boxed{f(x) = x^2 + 7x + 10}$

(b) $\boxed{x^2 + 7x + 10 = 0}$

(c) Infinite number, any function of form $f(x) = a(x^2 + 7x + 10)$ has x-intercepts of -2 and -5, where a is a real number not equal to 0.

(d) Infinite no. Same reason as part c.

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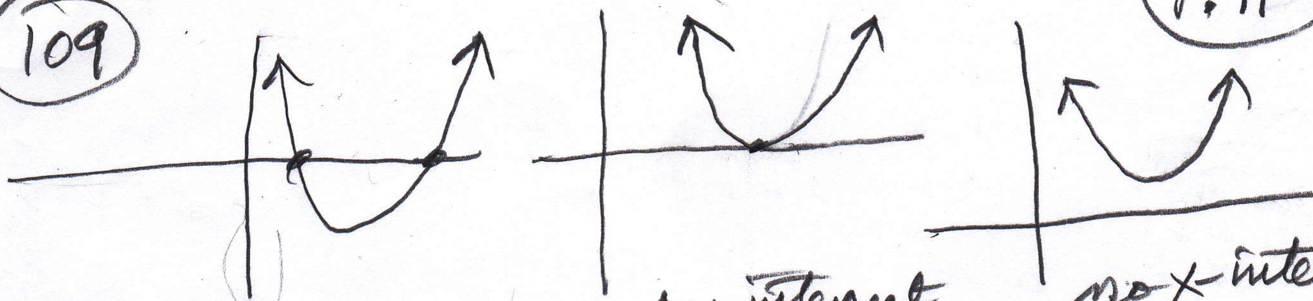
P. 11



2 x-intercepts

1 x-intercept

no x-intercepts

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CANCEL PROBLEM FOR NOW

$D(s) = -0.31s^2 + 59.82s - 2180.22$

D = Distance to stop

$545 = -0.31s^2 + 59.82s - 2180.22$

$-545 \qquad\qquad\qquad\qquad -545$

$0 = -0.31s^2 + 59.82s - 2725.22$

$0 = -31s^2 + 5982s - 272522$

Multiply equation By 100

$a = -31,\ b = 5982,\ c = -272522$

$$s = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-5982 \pm \sqrt{(5982)^2 - 4(-31)(-272522)}}{2(-31)}$$

$S = 73.72194884$

$\boxed{s \approx 74 \text{ miles/hour}}$

Cancel Problem For Now