Pg 230-231 7-14

#7 a) $(x+3)(x+4)=0$
$x+3=0 \quad x+4=0$
$x=-3 \quad x=-4$

b) $(x-2)(x+\frac{1}{2})=0$
$x-2=0 \quad x+\frac{1}{2}=0$
$x=2 \quad x=-1/2$

c) $(x+7)(x-8)=0$
$x+7=0 \quad x-8=0$
$x=-7 \quad x=8$

d) $x(x+5)=0$
$x=0 \quad x=-5$

e) $(3x+1)(5x-4)=0$
$3x+1=0 \quad 5x-4=0$
$3x=-1 \quad 5x=4$
$x=-1/3 \quad x=4/5$

f) $2(x-4)(7-2x)=0$
$(x-4)(7-2x)=0$
$x-4=0 \quad 7-2x=0$
$x=4 \quad -2x=-7$
$x=7/2$

#8 a) $10n^2-40=0$
$n^2-4=0$
$(n+2)(n-2)=0$
$n=-2 \quad n=2$

b) $\frac{1}{4}x^2+\frac{5}{4}x+1=0$
$x^2+5x+4=0$
$(x+1)(x+4)=0$
$x=-1 \quad x=-4$

c) $3w^2+28w+9=0$ p 27 #28
$3w^2+27w+w+9=0$
$3w(w+9)+1(w+9)=0$
$(w+9)(3w+1)=0$
$w=-9 \quad w=-1/3$

d) $8y^2-22y+15=0$
$8y^2-12y-10y+15=0$
$4y(2y-3)-5(2y-3)=0$
$(4y-5)(2y-3)=0$
$y=5/4 \quad y=3/2$

e) $d^2+\frac{5}{2}d+\frac{3}{2}=0$
$2d^2+5d+3=0$
$(2d+3)(d+1)=0$
$d=-\frac{3}{2} \quad d=-1$

f) $4x^2-12x+9=0$
$(2x-3)(2x-3)=0$
$x=3/2$

#9 a) $k^2-5k=0$
$k(k-5)=0$
$k=0 \quad k=5$

b) $9x^2-x-8=0$
$9x^2-9x+8x-8=0$
$9x(x-1)+8(x-1)=0$
$(x-1)(9x+8)=0$
$x=1 \quad x=-8/9$

c) $\frac{1}{3}t^2+\frac{8}{3}t+5=0$
$t^2+8t+15=0$
$(t+5)(t+3)=0$
$t=-5 \quad t=-3$

d) $\frac{25}{49}y^2-9=0$
$(\frac{5}{7}y-3)(\frac{5}{7}y+3)=0$
$\frac{5}{7}y=3 \quad \frac{5}{7}y=-3$
$y=\frac{21}{5} \quad y=-\frac{21}{5}$

e) $25^2-45-70=0$
$5^2-25-35=0$
$(5-7)(5+5)=0$
$5=7 \quad 5=-5$

f) $4q^2-28q+49=0$
$(2q-7)(2q-7)=0$
$q=7/2$

Hilroy

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10a) $x^2 - x - 42 = 0$

$(x-7)(x+6) = 0$

$x = 7 \quad x = -6$

b) $g^2 + 7g - 30 = 0$

$(g+10)(g-3) = 0$

$g = -10 \quad g = 3$

c) $y^2 + 4y - 21 = 0$

$(y+7)(y-3) = 0$

$y = -7 \quad y = 3$

d) $6p^2 - 7p - 3 = 0$

$(2p-3)(3p+1) = 0$

$p = 3/2 \quad p = -1/3$

e) $3x^2 + 9x - 30 = 0$

$x^2 + 3x - 10 = 0$

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

$x = -5 \quad x = 2$

f) $2z^2 + 5z - 3 = 0$

$(2z-1)(z+3) = 0$

$z = 1/2 \quad z = -3$

11. a) $(2x-3)(x+10) = 54$

OR $2x^2 + 17x - 30 = 54$

OR $2x^2 + 17x - 84 = 0$

b) $(2x-7)(x+12) = 0$

$x = 7/2 \quad x = -12$

↑ gives negative lengths

$\therefore x = 7/2$

$x = 3.5\text{ cm}$

12. a) $20 = 5t^2 - 30t + 45$

$0 = 5t^2 - 30t + 25$

$0 = t^2 - 6t + 5$

$0 = (t-5)(t-1)$

$t = 5 \quad t = 1$

1 second, 5 seconds

13. water, $h = 0$ $\quad 0 = 150t - 5t^2$

$0 = 5t(30 - t)$

↑ ↑

$t = 0 \quad t = 30$ $\quad$ 30 seconds

14. $x, x+2$ $\quad x(x+2) = 8x + 16$

$x^2 + 2x - 8x - 16 = 0$

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

$(x-8)(x+2) = 0$

$x = 8 \quad x = -2$

↓ ↓

$8, 10 \quad -2, 0$

Hilroy

15-30 pgs 231-233

15. 

$A_2 = 3A_1$

$x^2+22x+120 = 3x^2$

$-2x^2+22x+120 = 0$

$x^2-11x-60 = 0$

$(x-15)(x+4) = 0$

$x=15 \quad x=-4$

15 cm

16. $3 = 3+48t-16t^2$

$0 = -16t^2+48t$

$0 = t^2-3t$

$0 = t(t-3)$

$t=0 \quad t=3$ 3 seconds

17 $(9-2x)(7-2x) = 35$

$4x^2-32x+63 = 35$

$4x^2-32x+28 = 0$

$x^2-8x+7 = 0$

$(x-1)(x-7) = 0$

$x=1 \quad x=7$

↑ can't cut 7 cm from each end of 9 cm long paper

a) 1 cm

b) 7 cm x 5 cm

18. a) $x-5$ is not a factor of $x^2-5x-36$ since 5 is not a factor of 36 (and $x=5$ does not give 0)

b) $x+3$ is $(x-5)(x+3)$ (and -3 gives 0)

c) $4x+1 \rightarrow x=-1/4$ does not give 0 for $6x^2+11x+4$

d) $2x-1$ is $(2x-1)(2x+3)$ ($x=1/2$ gives 0)

Hilroy

19a) $2x^2 - 3x - 6 - 4x = -4x - 4$

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

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

$x = -1/2 \quad x = 2$

b) $3(x^2 - x - 2) - 4 = 2(x^2 - 2x + 1)$

$3x^2 - 3x - 6 - 4 = 2x^2 - 4x + 2$

$x^2 + x - 12 = 0$

$(x+4)(x-3) = 0$

$x = -4 \quad x = 3$

20. $x^2 + (x-1)^2 = 29^2$

$x^2 + x^2 - 2x + 1 = 841$

$2x^2 - 2x - 840 = 0$

$x^2 - x - 420 = 0$

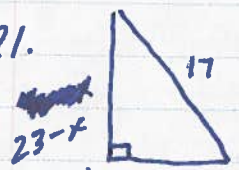
$(x-21)(x+20) = 0$

$x = 21 \quad x = -20$

discard

$x = 21$ ∴ sides 21cm, 20cm

21.



3 sides = 40

∴ 2 sides = 23

$x^2 + (23 - x)^2 = 17^2$

$x^2 + x^2 - 46x + 529 = 289$

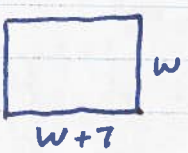
$2x^2 - 46x + 240 = 0$

$x^2 - 23x + 120 = 0$

$(x-15)(x-8) = 0$

$x = 15 \quad x = 8$ 15cm, 8cm (or 8m, 15m)

22.



a) $w(w+7) = 690$

$w^2 + 7w - 690 = 0$

$(w+30)(w-23) = 0$

$w = -30 \quad w = 23$

discard b) width 23 cm length 30 cm

23 total area − garden = walkway

$(40+2x)(20+2x) - (40)(20) = 700$

$4x^2 + 120x + 800 - 800 = 700$

$4x^2 + 120x - 700 = 0$

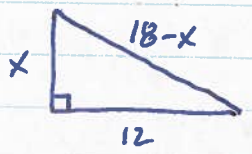
$x^2 + 30x - 175 = 0$

$(x+35)(x-5) = 0$

$x = -35 \quad x = 5$

discard

walkway width 5m

24. 

$x^2 + 12^2 = (18-x)^2$

$x^2 + 144 = x^2 - 36x + 324$

$36x = 180$

$x = 5$ 5m

25. $P = \frac{1}{2}dV_1^2 - \frac{1}{2}dV_2^2$

$P = \frac{1}{2}d(V_1^2 - V_2^2)$

$p = \frac{1}{2}d(V_1 - V_2)(V_1 + V_2)$

26. Carlos final answer $(x-2)(6x-4)$ could be factored further

$2(x-2)(3x-2)$

27. a) $3(2z+3)^2 - 9(2z+3) - 30$ let $a = 2z+3$

$3a^2 - 9a - 30$

$3(a^2 - 3a - 10)$

$3(a-5)(a+2)$

$3(2z+3-5)(2z+3+2)$

$3(2z-2)(2z+5)$

$6(z-1)(2z+5)$

b) diff of squares $[4(m^2-4) + 2(3n)][4(m^2-4) - 2(3n)]$

$[4m^2 - 16 + 6n][4m^2 - 16 - 6n]$

$4(2m^2 - 8 + 3n)(2m^2 - 8 - 3n)$

c) $\frac{1}{9}y^2 - \frac{1}{3}yx + \frac{1}{4}x^2$

$\frac{1}{36}(4y^2 - 12yx + 9x^2)$ prod 36, sum -12 $-6, -6$

$\frac{1}{36}(4y^2 - 6yx - 6yx + 9x^2)$

$\frac{1}{36}(2y(2y-3x) - 3x(2y-3x))$

$\frac{1}{36}(2y-3x)(2y-3x)$ OR $\frac{1}{36}(2y-3x)^2$

Hilroy

27d) $-28\left(w^2+\frac{4}{3}w+\frac{4}{9}\right)+7\left(9w^2-2w+\frac{1}{9}\right)$

$35w^2-\frac{154}{3}w-\frac{35}{3}$

$\frac{1}{3}(105w^2-154w-35)$

$\frac{7}{3}(15w^2-22w-5)$

$\frac{7}{3}(15w^2+25w-3w-5)$

$\frac{7}{3}(5w(3w+5)-1(3w+5))$

$\frac{7}{3}(3w+5)(5w-1)$

$7\left(w-\frac{5}{3}\right)(5w+1)$

$5w^2-\frac{22}{3}w-\frac{5}{3}$

p 75

5 −22

25, −3

28. $9x^2+30xy+25y^2$ square

$(3x+5y)(3x+5y)$

↑ side perimeter $= 4(3x+5y)$ cm

30 (root / factor)

a) $-3, 3$ $(x+3)(x-3)$ $y=x^2-9$

b) 2 $(x-2)(x-2)$ $y=x^2-4x+4$

c) $\frac{2}{3}, 4$ $\left(x-\frac{2}{3}\right)(x-4)$

or $(3x-2)(x-4)$ $y=3x^2-14x+8$

d) $\frac{3}{5}, -\frac{1}{2}$ $\left(x-\frac{3}{5}\right)\left(x+\frac{1}{2}\right)$

or $(5x-3)(2x+1)$ $y=10x^2-x-3$

29. $1125(t-1)^2-10125=0$

$1125(t-1)^2=10125$

$(t-1)^2=9$

$(t-1)=\pm 3$

$t=1\pm 3$

$t=4, -2$

$t=4$ years