ASSIGNMENT #2 SOLUTIONS 943-DW FALL 2011

(9th EDITION TEXT BOOK #'S)

SECTION 5.4

#14 $3A+3B=-1$ ①
$5A=-6B-1$ ②

ISOLATE A IN FIRST EQU^n

$3A=-1-3B$

$A=\frac{-1-3B}{3}$

SUBSTITUTE INTO 2ND EQU^n

$5\left(\frac{-1-3B}{3}\right)=-6B-1$

$5(-1-3B)=3(-6B-1)$

$-5-15B=-18B-3$

$3B=2$

$B=2/3$

$A=\frac{-1-3(2/3)}{3}$

$=-3/3=-1$

$\boxed{(A,B)=(-1,2/3)}$

#36 $30P=55-Q$ ①
$19P+14Q+32=0$ ②

ISOLATE Q IN ①:

$Q=55-30P$

SUB IN ②:

$19P+14(55-30P)+32=0$

$19P+770-420P+32=0$

$802=401P$

$P=2$

$Q=55-30(2)$

$=-5$

$\boxed{(P,Q)=(2,-5)}$

SECTION 5.6

#16 $3x+2y-4z+2t=3$ ①
$5x-3y-5z+6t=8$ ②
$2x-y+3z-2t=1$ ③
$-2x+3y+2z-3t=-2$ ④

ISOLATE y IN EQUATION ③ : $y = 2x+3z-2t-1$

SUB IN ①, ② & ④

① $3x+2(2x+3z-2t-1)-4z+2t=3$
$3x+4x+6z-4t-2-4z+2t=3$
$7x+2z-2t=5$ (N1)

② $5x-3(2x+3z-2t-1)-5z+6t=8$
$5x-6x-9z+6t+3-5z+6t=8$
$-x-14z+12t=5$ (N2)

③ $-2x+3(2x+3z-2t-1)+2z-3t=-2$
$-2x+6x+9z-6t-3+2z-3t=-2$
$4x+11z-9t=1$ (N3)

WE NOW HAVE A SYSTEM OF 3 EQUNS WITH 3 UNKNOWNS
(N1), (N2) & (N3)

ISOLATE x in (N2)
$x=-14z+12t-5$
SUB IN (N1) & (N3)

(N1) $7(-14z+12t-5)+2z-2t=5$
$-98z+84t-35+2z-2t=5$
$-96z+82t-40=0$ (N1.1)

(N3) $4(-14z+12t-5)+11z-9t=1$
$-56z+48t-20+11z-9t=1$
$-45z+39t-21=0$ (N2.2)

WE NOW HAVE A SYSTEM OF 2 EQUNS & 2 UNKNOWNS
(N1.1) & (N2.2)

THIS LEADS TO THE SOLN $\boxed{(x,y,z,t)=(1,2,3,4)}$

SECTION 1.12 #15, 30, 31

#15 LET C_1, C_2 & C_3 be THE THREE CURRENTS

$$C_1 + C_2 + C_3 = 0 \quad (1)$$
$$C_2 = 2C_1 \quad (2)$$
$$C_3 = C_1 + 9.2\mu A \quad (3)$$

$$C_1 + C_2 + C_3 = 0$$
$$C_1 + 2C_1 + C_1 + 9.2 = 0$$
$$4C_1 = -9.2$$

$$\boxed{\begin{aligned} C_1 &= -2.3\mu A \\ C_2 &= -4.6\mu A \\ C_3 &= 6.9\mu A \end{aligned}}$$

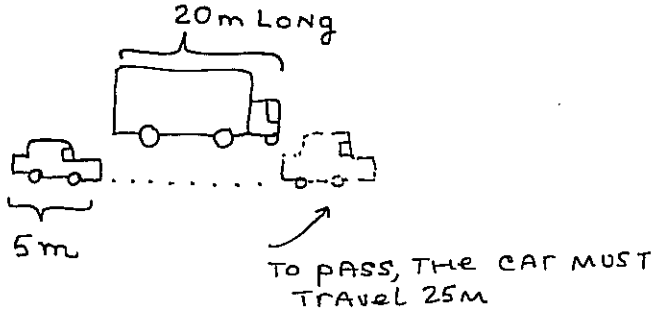
#30 LET x REPRESENT THE QUANTITY OF SAND TO be ADDED

$$0.22(250) + x = 0.25(x + 250)$$

AMOUNT OF SAND in original 250 Kg bAg + AMOUNT OF SAND Added = AMOUNT OF SAND in Final Mix

$$55 + x = 0.25x + 62.5$$
$$0.75x = 7.5$$
$$\boxed{x = 10 \text{ kg}}$$

#31



TRUCK TRAVELS HOW FAR in 10s? : DISTANCE $= 70\frac{\text{KM}}{\text{h}} \cdot 10\text{s} \cdot \frac{1\text{h}}{3600\text{s}}$

$= 0.19444$ Km

or 194.44 m

TOTAL AMOUNT CAR MUST TRAVEL : $19.444 + 25\text{m}$

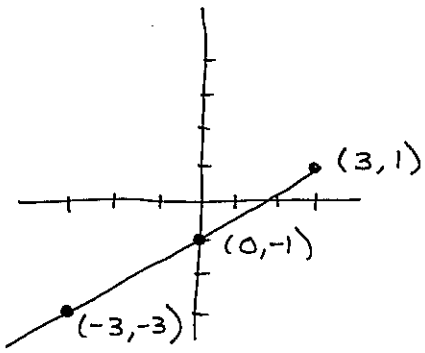
$= 44.444$

SPEED OF CAR $= \frac{219.444\text{m}}{} \cdot \frac{1\text{KM}}{} \cdot \frac{3600\text{s}}{} =$ **79 KM/hr**

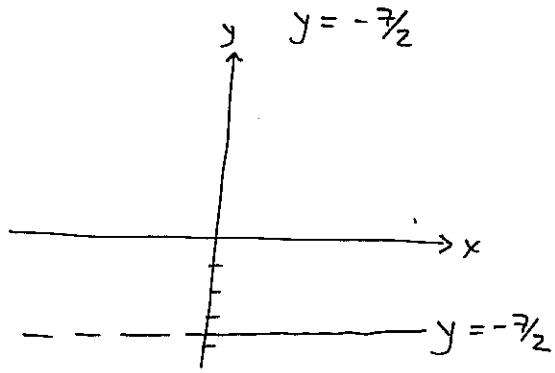
SECTION 5.2

#12 $m = \frac{4.2-3.4}{1.2-(-2.8)} = \boxed{0.2}$

#18 $m = 2/3$ PT $(0,-1)$



#26 GRAPH $-2y = 7$



#36 GRAPH WITH x & y INTERCEPT

$y = 0.25x + 4.5$

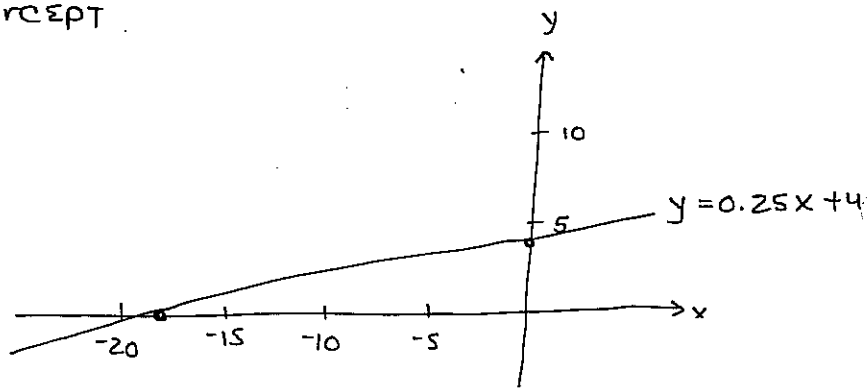
x-INTERCEPT $y = 0$

$0.25x = -4.5$

$x = -18$

y-INTERCEPT $x = 0$

$y = 4.5$



SECTION 6.2

#12 $5a^2 - 20ax$

$= \boxed{5a(a-4x)}$

#20 $27a^2b - 24ab - 9a$

$= \boxed{3a(9ab-8b-3)}$

#38 $28x^2 - 700y^2$

$= 28(x^2 - 25y^2)$

$= \boxed{28(x+5y)(x-5y)}$

#40 $a(x+2)^2 - ay^2$

$= a[(x+2)^2 - y^2]$

$= a[(x+2)-y][(x+2)+y]$

$= \boxed{a(x+2-y)(x+2+y)}$

#42 $y^4 - 81$

$= (y^2+9)(y^2-9)$

$= \boxed{(y^2+9)(y+3)(y-3)}$

SECTION 6.3

#14 $D^2+8D+16$

$= \boxed{(D+4)(D+4)}$

#16 $b^2-12bc+36c^2$

$= \boxed{(b-6c)(b-6c)}$

#22 $7y^2-12y+5$

$= 7y^2-7y-5y+5$

$= 7y(y-1)-5(y-1)$

$= \boxed{(y-1)(7y-5)}$

#32 $4r^2+11rs-3s^2$

$= 4r^2+12rs-rs-3s^2$

$= 4r(r+3s)-s(r+3s)$

$= \boxed{(r+3s)(4r-s)}$

#36 $3a^2c^2-6ac+3$

$= 3a^2c^2-3ac-3ac+3$

$= 3ac(ac-1)-3(ac-1)$

$= (ac-1)(3ac-3)$

$= (ac-1)3(ac-1)$

$= \boxed{3(ac-1)^2}$

SECTION 6.4

#4 R^3+27

$= \boxed{(R+3)(R^2-3R+9)}$

#12 $8s^9-64$

$= (2s^3-4)(4s^6+8s^3+16)$

$= 2(s^3-2)4(s^6+2s^3+4)$

$= \boxed{8(s^3-2)(s^6+2s^3+4)}$

#18 x^6-81y^2

$= \boxed{(x^3+9y)(x^3-9y)}$

#24 $125+(2x+y)^3$

$= \boxed{(5+2x+y)(5^2-5(2x+y)+(2x+y)^2)}$

SECTION 6.6

#22 $\dfrac{4R^2-36}{R^3-25R} \times \dfrac{7R-35}{3R^2+9R}$

$= \dfrac{(2R+6)(2R-6)}{R(R^2-25)} \times \dfrac{7(R-5)}{3R(R+3)}$

$= \dfrac{2(R+3)2(R-3)}{R(R+5)(R-5)} \times \dfrac{7(R-5)}{3R(R+3)}$

$= \boxed{\dfrac{28(R-3)}{3R^2(R+5)}}$

#28 $\dfrac{2a^3+a^2}{2b^3+b^2} \div \dfrac{2ab+a}{2ab+b}$

$= \dfrac{a^2(2a+1)}{b^2(2b+1)} \cdot \dfrac{b(2a+1)}{a(2b+1)}$

$= \boxed{\dfrac{a}{b}\left(\dfrac{2a+1}{2b+1}\right)^2}$

SECTION 6.7

#16 $\dfrac{a}{6y} - \dfrac{2b}{3y^4}$

$= \dfrac{ay^3}{6y^4} - \dfrac{4b}{6y^4}$

$= \boxed{\dfrac{ay^3-4b}{6y^4}}$

#28 $\dfrac{2}{x^2+4x+4} - \dfrac{3}{4+2x}$

$= \dfrac{2}{(x+2)^2} - \dfrac{3}{2(2+x)}$

$= \dfrac{4}{2(x+2)^2} - \dfrac{3(x+2)}{2(x+2)^2}$

$= \dfrac{4-3x-6}{2(x+2)^2}$

$= \boxed{\dfrac{-3x-2}{2(x+2)^2}}$

#30 $\dfrac{2a-b}{c-3d} - \dfrac{b-2a}{3d-c}$

$= \left(\dfrac{-2a+b}{-c+3d}\right) - \left(\dfrac{-2a+b}{-c+3d}\right)$

$= \dfrac{0}{-c+3d} = \boxed{0}$

#38 $\dfrac{2}{8-x^3} + \dfrac{1}{x^2-x-2}$

$= \dfrac{-2}{x^3-8} + \dfrac{1}{x^2-x-2}$

$= \dfrac{-2}{(x-2)(x^2+2x+4)} + \dfrac{1}{(x-2)(x+1)}$

$= \dfrac{-2(x+1) + x^2+2x+4}{(x-2)(x+1)(x^2+2x+4)}$

$= \boxed{\dfrac{x^2+2}{(x-2)(x+1)(x^2+2x+4)}}$

#42 $\dfrac{\dfrac{v^2-9}{v}}{\dfrac{1}{v}-\dfrac{1}{3}} = \dfrac{\dfrac{(v+3)(v-3)}{v}}{\dfrac{3-v}{3v}}$

$= \dfrac{(v+3)\cancel{(v-3)}}{\cancel{v}} \cdot \dfrac{3\cancel{v}}{-\cancel{(v-3)}}$

$= \boxed{-3(v+3)}$

SECTION 6.8

#24 $\frac{4}{4-x} + 2 - \frac{2}{12-3x} = \frac{1}{3}$

$\frac{-4}{x-4} + 2 + \frac{2}{3(x-4)} = \frac{1}{3}$

$\frac{-12}{3(x-4)} + \frac{6(x-4)}{3(x-4)} + \frac{2}{3(x-4)} = \frac{(x-4)}{3(x-4)}$

$-12 + 6x - 24 + 2 = x - 4$

$6x - 34 = x - 4$

$5x = 30$

$\boxed{x = 6}$

#28 $\frac{1}{2x+3} = \frac{5}{2x} - \frac{4}{2x^2+3x}$

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

$\frac{2x}{2x(2x+3)} = \frac{5(2x+3)}{2x(2x+3)} - \frac{8}{2x(2x+3)}$

$2x = 10x + 15 - 8$

$-8x = 7$

$\boxed{x = -7/8}$

CHAPTER 7

#26 $x^2 + 3x + 1 = 0$

$x = \frac{-3 \pm \sqrt{9-4}}{2}$

$= \boxed{\frac{-3 \pm \sqrt{5}}{2}}$

#28 $3p^2 = 28 - 5p$

$3p^2 + 5p - 28 = 0$

$3p^2 + 12p - 7p - 28 = 0$

$3p(p+4) - 7(p+4) = 0$

$(p+4)(3p-7) = 0$

$\boxed{p = -4 \text{ \& } p = 7/3}$

#34 $16r^2 = 8r - 1$

$16r^2 - 8r + 1 = 0$

$16r^2 - 4r - 4r + 1 = 0$

$4r(4r-1) - (4r-1) = 0$

$(4r-1)(4r-1) = 0$

$\boxed{r = 1/4}$

#44 $\frac{x-2}{x-5} = \frac{15}{x^2-5x}$

$\frac{x-2}{x-5} = \frac{15}{x(x-5)}$

$\frac{x(x-2)}{x(x-5)} = \frac{15}{x(x-5)}$

$x(x-2) = 15$

$x^2 - 2x - 15 = 0$

$x^2 - 5x + 3x - 15 = 0$

$x(x-5) + 3(x-5) = 0$

$\boxed{x = 5 \text{ \& } x = -3}$

BUT ONLY $x = -3$ IS A SOLUTION

#46 $y = -4x^2 - 1$

y INTERCEPT (0,-1)

x INTERCEPTS $0 = -4x^2 - 1$

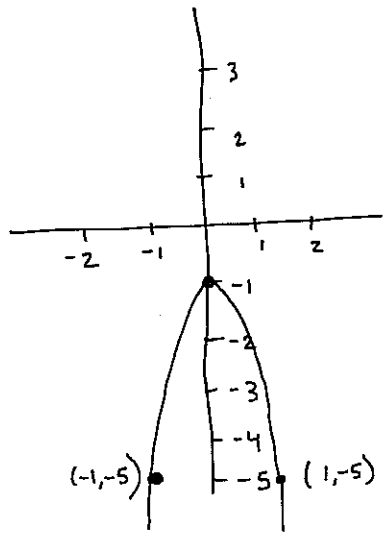
$4x^2 = -1$

$x^2 = -1/4$

NO x-INTERCEPTS

VERTEX $x = -b/2a = 0$

$y = -1$ (0,-1)



#48 $y = 2x^2 + 8x - 10$

y-INTERCEPT (0,-10)

x-INTERCEPTS

$0 = 2x^2 + 8x - 10$

$= 2(x^2 + 4x - 5)$

$= 2(x+5)(x-1)$

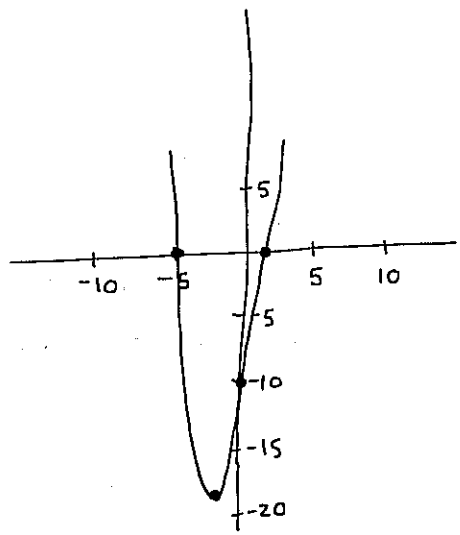
$x = -5$ & $x = 1$

(-5,0) (1,0)

VERTEX $x = \frac{-8}{2(2)} = -2$

$y = -18$

(-2,-18)



SECTION 3.1

#14 $f(x) = 5x - 9$

$f(2) = 5(2) - 9$

$= \boxed{+1}$

$f(-2) = 5(-2) - 9$

$= \boxed{-19}$

#18 $H(q) = \frac{8}{q} + 2\sqrt{q}$

$H(4) = \frac{8}{4} + 2\sqrt{4}$

$= 2 + 4$

$= \boxed{6}$

$H(0.16) = \frac{8}{0.16} + 2\sqrt{0.16}$

$= \boxed{50.8}$

#22 $T(t) = 5t + 7$

$T(-2t) = 5(-2t) + 7$

$= \boxed{-10t + 7}$

$T(t+1) = 5(t+1) + 7$

$= 5t + 5 + 7$

$= \boxed{5t + 12}$

23 $f(x) = 2x + 4$

$f(3x) - 3f(x)$

$= [2(3x)+4)] - [3(2x+4)]$

$= (6x+4) - (6x+12)$

$= \boxed{-8}$

24 $f(x) = 2x^2 + 1$

$= f(x+2) - [f(x)+2]$

$= [2(x+2)^2 + 1] - [2x^2 + 1 + 2]$

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

$= [2x^2+8x+9] - [2x^2+3]$

$= \boxed{8x + 6}$

36 $Y(y) = 2 + \dfrac{5y}{2(y-3)}$

- MULTIPLY THE VARIABLE by 5 divide THIS result by the VARIABLE SUBTRACTED by 3
- DIVIDE THIS RESULT by 2
- ADD 2 TO THIS RESULT

SECTION 3.2

FIND DOMAIN & RANGE

6 $g(u) = 3 - u^2$

DOMAIN $\mathbb{R}$
RANGE: $(-\infty, 3]$

VERTEX $u = 0/2(-1) = 0$

$g(0) = 3$

CONCAVE DOWN

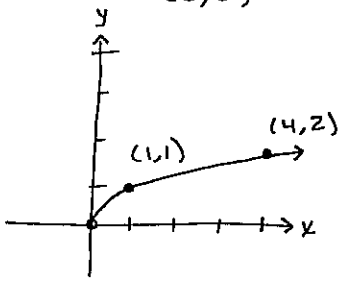
8 $F(r) = \sqrt{r+4}$

DOMAIN $[-4, \infty)$
RANGE $[0, \infty)$

SECTION 3.4

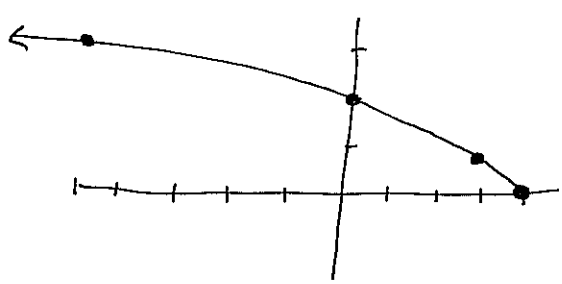
33 $y = \sqrt{x}$

VERTEX (0,0)



34 $y = \sqrt{4-x}$

VERTEX (4,0)

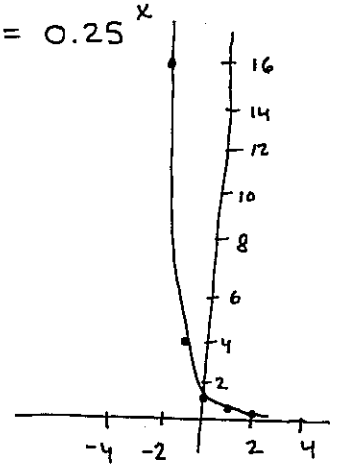


x	y
4	0
3	1
0	2
-5	3

SECTION 13.1

#14 $y = 0.25^x$

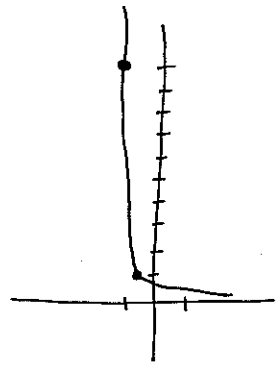
x	y
2	1/16
1	1/4
0	1
-1	4
-2	16



HORIZONTAL ASYMPTOTE AT $y=0$

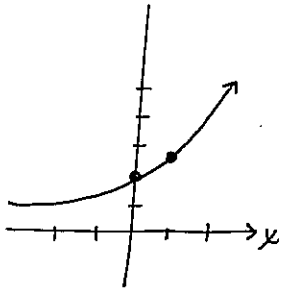
#15 $y = 0.2(10^{-x})$

x	y
1	0.02
0	0.2
-1	2
-2	20



#18 $y = 2e^x$

x	y
-1	2/e
0	2
1	2e



SECTION 13.2

#6 $5^2 = 25$ → $\log_5 25 = 2$

#10 $3^{-2} = \frac{1}{9}$ → $\log_3(1/9) = -2$

#16 $\left(\frac{1}{2}\right)^{-2} = 4$ → $\log_{1/2} 4 = -2$

#18 $\log_{11} 121 = 2$ → $11^2 = 121$

#24 $\log_{32}(1/8) = -0.6$ → $32^{-0.6} = 1/8$

#28 $\log_{\frac{1}{3}} 3 = -1$ → $\left(\frac{1}{3}\right)^{-1} = 3$

SECTION 13.3

#10 $\log_3 14 = \boxed{\log_3 2 + \log_3 7}$

#16 $\log_2\left(\frac{xy}{z^2}\right) = \boxed{\log_2 x + \log_2 y - 2\log_2 z}$

#20 $\log_3 \frac{\sqrt[3]{y}}{7} = \log_3 y^{1/3} - \log_3 7$

$= \boxed{\frac{1}{3}\log_3 y - \log_3 7}$

#22 $\log_2 3 + \log_2 x = \boxed{\log_2 3x}$

#28 $\frac{1}{2}\log_b a - 2\log_b 5$

$= \log_b a^{1/2} - \log_b 5^2$

$= \boxed{\log_b\left(\frac{\sqrt{a}}{25}\right)}$

#30 $\log_3 \frac{1}{81} = \log_3 \frac{1}{3^4}$

$= \boxed{-4}$

#36 $\log_5 \sqrt[3]{25}$

$= \log_5 25^{1/3} = \log_5 (5^2)^{1/3}$

$= \log_5 5$

$= \boxed{2/3}$

#50 $\log_b y = 3\log_b \sqrt{x} + 2\log_b 10$

$\log_b y = \log_b x^{3/2} + \log_b 100$

$\log_b y = \log_b 100x^{3/2}$

$\boxed{y = 100x^{3/2}}$

#58 $2\log_2 2x - \log_2 x^2$

$= \log_2 (2x)^2 - \log_2 x^2$

$= \log_2\left(\frac{4x^2}{x^2}\right)$

$= \boxed{2}$

THIS EXPRESSION IS VALID FOR ALL VALUES OF $x > 0$

SECTION 13.4

#24 $\dfrac{(126000)^{20}}{2.63^{2.5}}$

Let $N = \dfrac{(126000)^{20}}{(2.63)^{2.5}}$

Then $\log N = \log\left(\dfrac{126000^{20}}{2.63^{2.5}}\right)$

$= \log 126000^{20} - \log 2.63^{2.5}$

$= 20 \log 126000 - 2.5 \log 2.63$

(use calculator) $=$

$= 100.95752$

So $\log N = \log 100.95752$

$N = 10^{100.95752}$

$= 10^{100} \times 10^{0.95752}$

$= \boxed{9.068 \times 10^{100}}$

SECTION 13.5

#44 $\ln y + 2\ln x = 1 + \ln 5$

$\ln y = -2\ln x + 1 + \ln 5$

$\ln y = \ln x^{-2} + \ln e + \ln 5$

$\ln y = \ln(x^{-2} \cdot e \cdot 5)$

$\boxed{y = \dfrac{5e}{x^2}}$

SECTION 13.6

#8 $e^{-x} = 17.54$

$\ln e^{-x} = \ln 17.54$

$-x = \ln 17.54$

$\boxed{x = -2.86}$

#11 $3(14^x) = 400$

$14^x = \frac{400}{3}$

$\ln 14^x = \ln\left(\frac{400}{3}\right)$

$x \ln 14 = \ln\left(\frac{400}{3}\right)$

$$\boxed{x = \frac{\ln\left(\frac{400}{3}\right)}{\ln 14} \approx 1.84}$$

#14 $15.6^{x+2} = 23^x$

$\ln 15.6^{x+2} = \ln 23^x$

$(x+2)\ln 15.6 = x \ln 23$

$x \ln 15.6 + 2\ln 15.6 = x \ln 23$

$x \ln 15.6 - x \ln 23 = -2\ln 15.6$

$x(\ln 15.6 - \ln 23) = -2\ln 15.6$

$$\boxed{x = \frac{-2\ln 15.6}{\ln 15.6 - \ln 23} \approx 13.69}$$

#16 $5 \log_{32} x = -3$

$\log_{32} x^5 = -3$

$32^{-3} = x^5$

$x = \sqrt[5]{32^{-3}}$

$= 32^{-3/5}$

$= 2^{-3}$

$\boxed{= \frac{1}{8}}$

#27 $\frac{1}{2}\log(x+2) + \log 5 = 1$

$\log(x+2)^{1/2} + \log 5 = 1$

$\log\sqrt{x+2} \cdot 5 = 1$

$5\sqrt{x+2} = 10$

$\sqrt{x+2} = 2$

$x+2 = 4$

$\boxed{x = 2}$

#29 $\log(2x-1) + \log(x+4) = 1$

$\log(2x-1)(x+4) = 1$

$(2x-1)(x+4) = 10$

$2x^2 - x + 8x - 4 = 10$

$2x^2 + 7x - 14 = 0$

$x = \frac{-7 \pm \sqrt{49 - 4(2)(-14)}}{4}$

$= \frac{-7 \pm \sqrt{161}}{4}$

ONLY is a soln

$$\boxed{x = \frac{-7 + \sqrt{161}}{4} \approx 1.42}$$