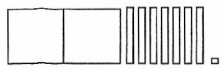
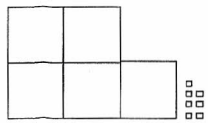
20E

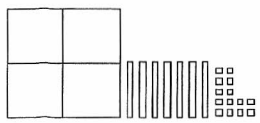
1) $X^2 + 3X - 2$
$X^2 + 4X + 3$
$2X^2 + 7X + 1$



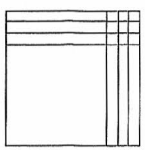
2) $3X^2 + 2X - 1$
$2X^2 - 2X + 8$
$5X^2 + 7$



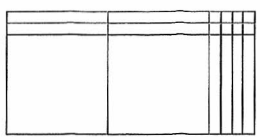
3) $5X^2 + 4X + 7$
$-X^2 + 3X + 7$
$4X^2 + 7X + 14$



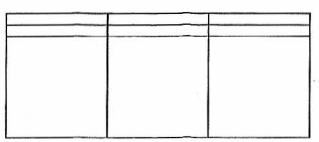
4) $(X + 3)(X + 3) = X^2 + 6X + 9$



5) $(2X + 4)(X + 2) = 2X^2 + 8X + 8$



6) $(3X)(X + 2) = 3X^2 + 6X$



7)
$2X - 3$
$\times \quad X - 2$
$-4X + 6$
$2X^2 - 3X$
$2X^2 - 7X + 6$

8)
$X - 1$
$\times \quad X - 6$
$-6X + 6$
$X^2 - X$
$X^2 - 7X + 6$

9)
$2X + 2$
$\times \quad X - 3$
$-6X - 6$
$2X^2 + 2X$
$2X^2 - 4X - 6$

10) X^{-5}

11) $\frac{1}{Y^2}$

12) $7^{-2+5-(-2)} = 7^5$

13) A^7B^{-3}

14) $5^{2 \cdot 5} = 5^{10}$

15) $(5^3)^4$

16) $+13, -13$

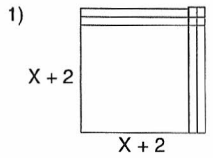
17) $C^{-4+3}D^{-3+8-7} = C^{-1}D^{-2}$

18)
$3N + 4$
$+ \quad 2N + 5$
$5N + 9$

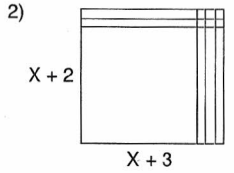
19) $5(10) + 9 = \$59$

20)
$2Y + 7$
$\times \quad 7Y + 5$
$10Y + 35$
$14Y^2 + 49Y$
$14Y^2 + 59Y + 35$

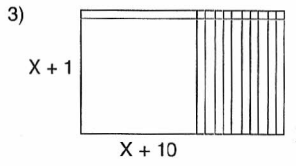
21A

1)


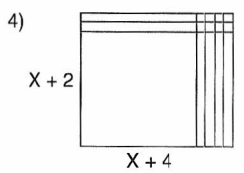
$X + 2$
$\times \quad X + 2$
$2X + 4$
$X^2 + 2X$
$X^2 + 4X + 4$

2)


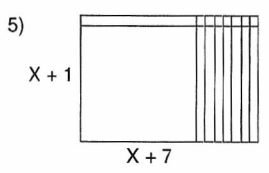
$X + 3$
$\times \quad X + 2$
$2X + 6$
$X^2 + 3X$
$X^2 + 5X + 6$

3)


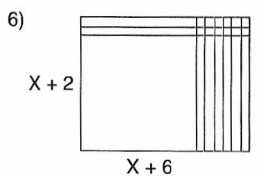
$X + 10$
$\times \quad X + 1$
$X + 10$
$X^2 + 10X$
$X^2 + 11X + 10$

4)


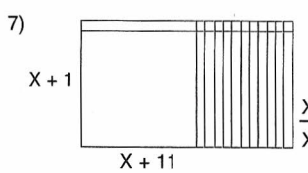
$X + 4$
$\times \quad X + 2$
$2X + 8$
$X^2 + 4X$
$X^2 + 6X + 8$

5)


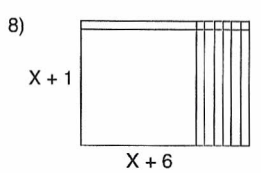
$X + 7$
$\times \quad X + 1$
$X + 7$
$X^2 + 7X$
$X^2 + 8X + 7$

6)


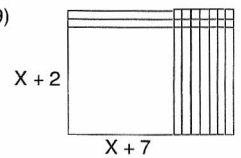
$X + 6$
$\times \quad X + 2$
$2X + 12$
$X^2 + 6X$
$X^2 + 8X + 12$

7)


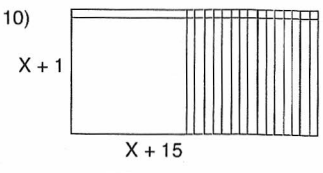
$X + 11$
$\times \quad X + 1$
$X + 11$
$X^2 + 11X$
$X^2 + 12X + 11$

8)


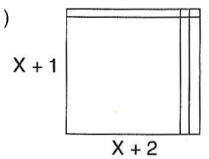
$X + 6$
$\times \quad X + 1$
$X + 6$
$X^2 + 2X$
$X^2 + 7X + 6$

9)


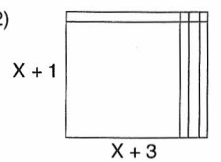
$X + 7$
$\times \quad X + 2$
$2X + 14$
$X^2 + 7X$
$X^2 + 9X + 14$

10)


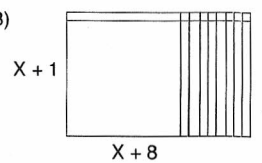
$X + 15$
$\times \quad X + 1$
$X + 15$
$X^2 + 15X$
$X^2 + 16X + 15$

11)


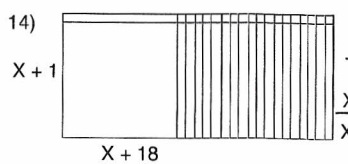
$X + 2$
$\times \quad X + 1$
$X + 2$
$X^2 + 2X$
$X^2 + 3X + 2$

12)


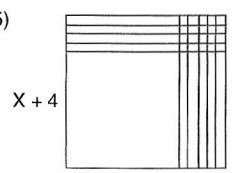
$X + 3$
$\times \quad X + 1$
$X + 3$
$X^2 + 3X$
$X^2 + 4X + 3$

13)


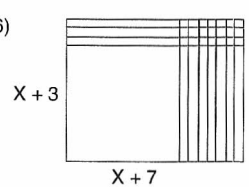
$X + 8$
$\times \quad X + 1$
$X + 8$
$X^2 + 8X$
$X^2 + 9X + 8$

14)


$X + 18$
$\times \quad X + 1$
$X + 18$
$X^2 + 18X$
$X^2 + 19X + 18$

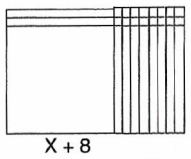
15)


$X + 5$
$\times \quad X + 4$
$4X + 20$
$X^2 + 5X$
$X^2 + 9X + 20$

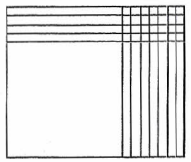
16)


$X + 7$
$\times \quad X + 3$
$3X + 21$
$X^2 + 7X$
$X^2 + 10X + 21$

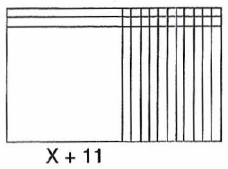
21B

1) 

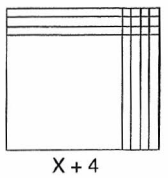
$$\begin{array}{r} X+8 \\ \times\ X+2 \\ \hline 2X+16 \\ X^2+8X \\ \hline X^2+10X+16 \end{array}$$

2) 

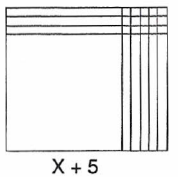
$$\begin{array}{r} X+7 \\ \times\ X+4 \\ \hline 4X+28 \\ X^2+7X \\ \hline X^2+11X+28 \end{array}$$

3) 

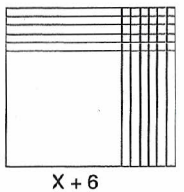
$$\begin{array}{r} X+11 \\ \times\ X+2 \\ \hline 2X+22 \\ X^2+11X \\ \hline X^2+13X+22 \end{array}$$

4) 

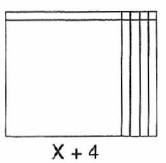
$$\begin{array}{r} X+4 \\ \times\ X+3 \\ \hline 3X+12 \\ X^2+4X \\ \hline X^2+7X+12 \end{array}$$

5) 

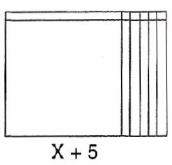
$$\begin{array}{r} X+5 \\ \times\ X+3 \\ \hline 3X+15 \\ X^2+5X \\ \hline X^2+8X+15 \end{array}$$

6) 

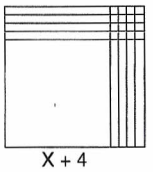
$$\begin{array}{r} X+6 \\ \times\ X+5 \\ \hline 5X+30 \\ X^2+6X \\ \hline X^2+11X+30 \end{array}$$

7) 

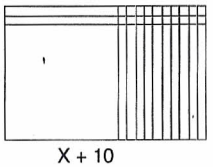
$$\begin{array}{r} X+4 \\ \times\ X+1 \\ \hline X+4 \\ X^2+4X \\ \hline X^2+5X+4 \end{array}$$

8) 

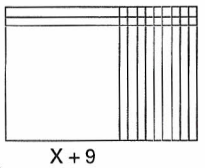
$$\begin{array}{r} X+5 \\ \times\ X+1 \\ \hline X+5 \\ X^2+5X \\ \hline X^2+6X+5 \end{array}$$

9) 

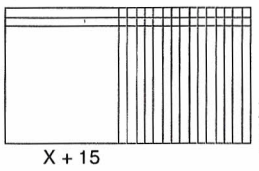
$$\begin{array}{r} X+4 \\ \times\ X+4 \\ \hline 4X+16 \\ X^2+4X \\ \hline X^2+8X+16 \end{array}$$

10) 

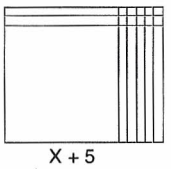
$$\begin{array}{r} X+10 \\ \times\ X+2 \\ \hline 2X+20 \\ X^2+10X \\ \hline X^2+12X+20 \end{array}$$

11) 

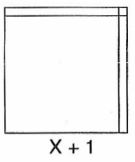
$$\begin{array}{r} X+9 \\ \times\ X+2 \\ \hline 2X+18 \\ X^2+9X \\ \hline X^2+11X+18 \end{array}$$

12) 

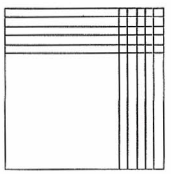
$$\begin{array}{r} X+15 \\ \times\ X+2 \\ \hline 2X+30 \\ X^2+15X \\ \hline X^2+17X+30 \end{array}$$

13) 

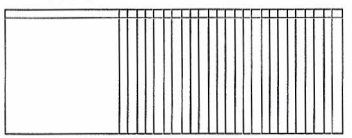
$$\begin{array}{r} X+5 \\ \times\ X+2 \\ \hline 2X+10 \\ X^2+5X \\ \hline X^2+7X+10 \end{array}$$

14) 

$$\begin{array}{r} X+1 \\ \times\ X+1 \\ \hline X+1 \\ X^2+X \\ \hline X^2+2X+1 \end{array}$$

15) 

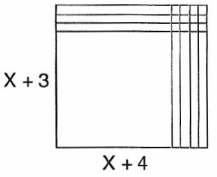
$$\begin{array}{r} X+5 \\ \times\ X+5 \\ \hline 5X+25 \\ X^2+5X \\ \hline X^2+10X+25 \end{array}$$

16) 

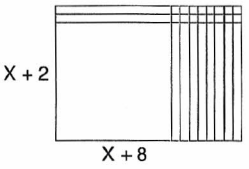
Check using same method as other examples.

21C

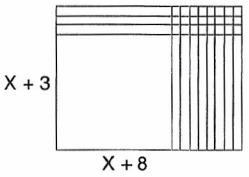
1) $X^2 + 7X + 12 = (X + 4)(X + 3)$



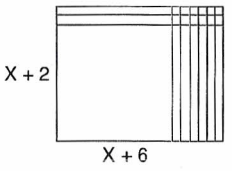
2) $X^2 + 10X + 16 = (X + 8)(X + 2)$



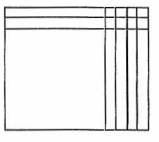
3) $X^2 + 11X + 24 = (X + 8)(X + 3)$



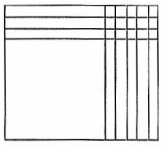
4) $X^2 + 8X + 12 = (X + 6)(X + 2)$



5) $(X + 4)(X + 2) = X^2 + 6X + 8$



6) $(X + 5)(X + 3) = X^2 + 8X + 15$



7) $X^2 + 7X + 6 = (X + 6)(X + 1)$

8)
$$\begin{array}{r} X+6 \\ \times\ X+1 \\ \hline X+6 \\ X^2+6X \\ \hline X^2+7X+6 \end{array}$$

9) $X^2 + 2X + 1 = (X + 1)(X + 1)$

10)
$$\begin{array}{r} X+1 \\ \times\ X+1 \\ \hline X+1 \\ X^2+X \\ \hline X^2+2X+1 \end{array}$$

11)
$$\begin{array}{r} 2X^2-7X-3 \\ X^2+5X+9 \\ \hline 3X^2-2X+6 \end{array}$$

12)
$$\begin{array}{r} 6X^2+2X+1 \\ X^2-4X+3 \\ \hline 7X^2-2X+4 \end{array}$$

13) $P^{-8}P^4 = P^{-4}$

14) $R^{(-2)(-3)}S^{(3)(-3)} = R^6S^{-9}$

15) 225

16) ± 4

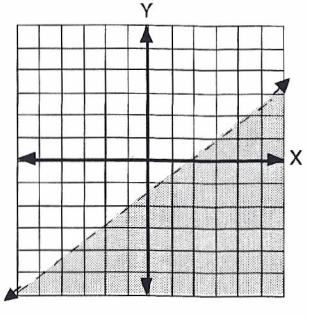
17) $11N + 2(N + 2) = 6(N + 4) + 1$
$11N + 2N + 4 = 6N + 25$
$7N = 25 - 4$
$N = 3$ 3, 5, 7

18) $.10D + .05N = .60$, $D + N = 9$

$10D + 5N = 60$
$-5D - 5N = -45$

$5D = 15$ $(3) + N = 9$
$D = 3$ $N = 6$

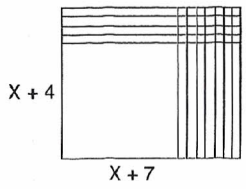
19) $7X - Y = -3$



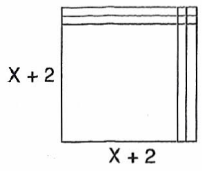
20) $Y < 3/4\ X - 5/4$

21D

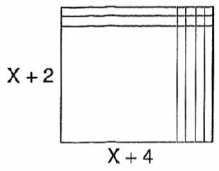
1) $X^2 + 11X = 28 = (X + 7)(X + 4)$



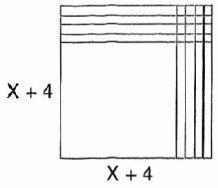
2) $X^2 + 4X = 4 = (X + 2)(X + 2)$



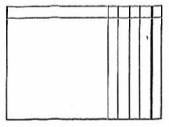
3) $X^2 + 6X + 8 = (X + 4)(X + 2)$



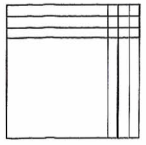
4) $X^2 + 8X + 16 = (X + 4)(X + 4)$



5) $(X + 5)(X + 1) = X^2 + 6X + 5$



6) $(X + 3)(X + 3) = X^2 + 6X + 9$



7) $X^2 + 12X + 32 = (X + 8)(X + 4)$

8)
$$\begin{array}{r} X+8 \\ \times\ X+4 \\ \hline 4X+32 \\ X^2+8X \\ \hline X^2+12X+32 \end{array}$$

9) $X^2 + 20X + 100 = (X + 10)(X + 10)$

10)
$$\begin{array}{r} X+10 \\ \times\ X+10 \\ \hline 10X+100 \\ X^2+10X \\ \hline X^2+20X+100 \end{array}$$

11)
$$\begin{array}{r} X^2+X-4 \\ X^2+3X+3 \\ \hline 2X^2+4X-1 \end{array}$$

12)
$$\begin{array}{r} 2X^2+7X+6 \\ 5X^2-4X+10 \\ \hline 7X^2+3X+16 \end{array}$$

13) $P^{(5)(3)(-2)} = P^{-30}$

14) anything to the "0" power equals 1

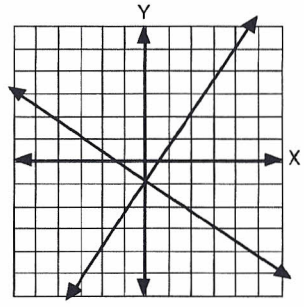
15) 121

16) ± 12

17) $14(N + 2) + 4N = 12(N + 4) - 2$
$18N + 28 = 12N + 46$
$6N = 18$
$N = 3$ 3, 5, 7

18) $.10D + .05N = 1.80$, $D + N = 27$

$10D + 5N = 180$
$-5D - 5N = -135$
$5D = 45$ $(9) + N = 27$
$D = 9$ $N = 18$

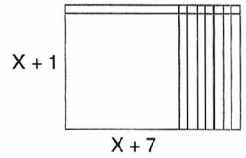


19) on the graph

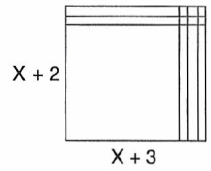
20) $m = -2/3$
$(-3) = -2/3(3) + b$
$b = -1$

21E

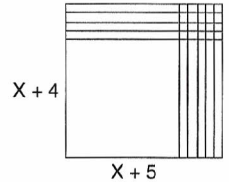
1) $X^2 + 8X + 7 = (X + 7)(X + 1)$



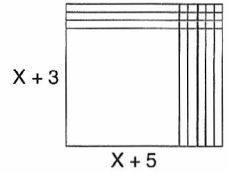
2) $X^2 + 5X + 6 = (X + 3)(X + 2)$



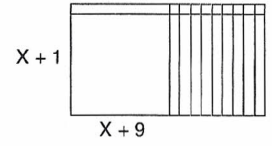
3) $X^2 + 9X + 20 = (X + 5)(X + 4)$



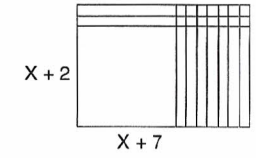
4) $X^2 + 8X + 15 = (X + 5)(X + 3)$



5) $(X + 1)(X + 9) = X^2 + 10X + 9$



6) $(X + 7)(X + 2) = X^2 + 9X + 14$



7) $X^2 + 7X + 12 = (X + 3)(X + 4)$

8)
$$\begin{array}{r} X+3 \\ \times\ X+4 \\ \hline 4X+12 \\ X^2+3X \\ \hline X^2+7X+12 \end{array}$$

9) $X^2 + 10X + 21 = (X + 3)(X + 7)$

10)
$$\begin{array}{r} X+3 \\ \times\ X+7 \\ \hline 7X+21 \\ X^2+3X \\ \hline X^2+10X+21 \end{array}$$

11)
$$\begin{array}{r} 4X^2-4X+1 \\ X^2+2X-1 \\ \hline 5X^2-2X+0 \end{array}$$

12)
$$\begin{array}{r} 2X^2+3X+3 \\ X^2+7X-2 \\ \hline 3X^2+10X+1 \end{array}$$

13) $P^{0+4-1} = P^3$

14) $S^{(2)(-2)}R^5 = S^{-4}R^5$ (R^0 and $S^0 = 1$)

15) 169

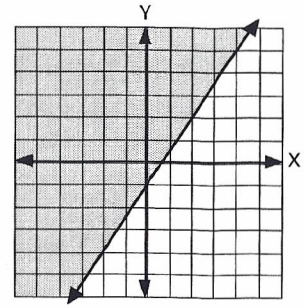
16) ± 5

17) $(N + 1) + 7(N + 2) = 5N$
$N + 1 + 7N + 14 = 5N$
$8N + 15 = 5N$
$N = -5$ -5, -4, -3

18) $.01P + .05N = .76$, $P + N = 20$

$P + 5N = 76$
$-P - N = -20$
$4N = 56$ $P + (14) = 20$
$N = 14$ $P = 6$

19) $Y = -3/4\ X + 4$



20) $Y \geq 3/2\ X - 1$