

## Practice 1

- 1)  $(-3) + (-6) = -9$
- 2)  $(2) + (-5) = -3$
- 3)  $(-7) + (-1) = -8$
- 4)  $(-3) - (-6) = (-3) + 6 = +3$
- 5)  $(+2) - (+5) = -3$
- 6)  $(-7) - (-4) = (-7) + 4 = -3$
- 7)  $(5)(-4) = -20$
- 8)  $(-3)(-6) = +18$
- 9)  $(-1)(2) = -2$
- 10) negative
- 11) positive
- 12) negative
- 13)  $(-16) \div (-4) = +4$
- 14)  $(-20) \div (5) = -4$
- 15)  $(32) \div (-8) = -4$
- 16)  $(-8)^2 = 64$
- 17)  $-8^2 = -64$
- 18)  $(-8)^2 = -64$
- 19)  $6X - 7Y - 4Y + 11X - 8 = 17X - 11Y - 8$
- 20)  $9X + 2Y + 3X - Y = 12X + Y$
- 21)  $12B + 8A - 9A - 10B = 2B - A$
- 22)  $4C - 3D + 7C - 4 + 3 = 11C - 3D - 1$
- 23) false
- 24) true
- 25) true

## Practice 2

- 1)  $24 = 2 \times 2 \times 2 \times 3$   
 $48 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$   
 $\text{LCM} = 2 \times 2 \times 2 \times 2 \times 3 = 48$
- 2)  $10 = 2 \times 5$   
 $15 = 3 \times 5$   
 $\text{LCM} = 2 \times 3 \times 5 = 30$
- 3)  $9 = 3 \times 3$   
 $11 = 1 \times 11$   
 $\text{LCM} = 3 \times 3 \times 11 = 99$
- 4)  $35 = 5 \times 7$   
 $56 = 2 \times 2 \times 2 \times 7$   
 $\text{LCM} = 2 \times 2 \times 2 \times 5 \times 7 = 280$
- 5)  $36 = 2 \times 2 \times 3 \times 3$   
 $25 = 5 \times 5$   
 $\text{LCM} = 2 \times 2 \times 3 \times 3 \times 5 \times 5 = 900$
- 6)  $54 = 2 \times 3 \times 3 \times 3$   
 $32 = 2 \times 2 \times 2 \times 2 \times 2$   
 $\text{LCM} = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 = 864$
- 7)  $-3^2 \cdot 2 + 2^2 = -9 \cdot 2 + 4 = -18 + 4 = -14$
- 8)  $10 \cdot 3^2 + 18 = 10 + 9 + 18 = 108$
- 9)  $(-5)^2 \cdot 9 \div 3 = 25 \cdot 9 \div 3 = 225 \div 3 = 75$
- 10)  $14(2 + 12) - 4 = 14(3) - 4 = 42 - 4 = 38$
- 11)  $9 + 33 \div 3 - 7^2 = 9 + 11 - 49 = 20 - 49 = -29$
- 12)  $4X - 4Y + 6X + 5Y - 1 = 10X + Y - 1$

## Practice 3

- 1)  $-4A + 3 + 7A - 2 = 8 + 2$   
 $3A + 1 = 10$   
 $3A = 10 - 1$   
 $3A = 9$   
 $A = 3$   
  
Check:  $-4(3) + 3 + 7(3) - 2 = 8 + 2$   
 $-12 + 3 + 21 - 2 = 8 + 2$   
 $10 = 10$
- 2)  $2C - C + 8 + 3C = 16$   
 $4C = 8 = 16$   
 $4C = 8$   
 $C = 2$   
  
Check: to check each equation, substitute the solution for the unknown and simplify.
- 3)  $-5Y + 7 + 8Y + 4 + Y = 15$   
 $4Y + 11 = 15$   
 $4Y = 4$   
 $Y = 1$
- 4)  $B + 2B - 8 + 5B = (3 \cdot 4) + 4$   
 $8B - 8 = 16$   
 $8B = 24$   
 $B = 3$
- 5)  $4K + 2 + 2K + K - 2 = 7^2$   
 $7K + 2 - 2 = 49$   
 $7K = 49$   
 $K = 7$
- 6)  $7Q - 4Q + 10 - 9 + Q = 22 - 1$   
 $4Q + 1 = 21$   
 $4Q = 20$   
 $Q = 5$
- 7)  $6 + 5A = 3A + 18$   
 $5A - 3A = +18 - 6$   
 $2A = 12$   
 $A = 6$
- 8)  $10R + 2R - 9 = 10 - 7$   
 $12R - 9 = 3$   
 $12R = 12$   
 $R = 1$
- 9)  $C = C - 4 + 8C = 2C + 2 \cdot 6$   
 $10C - 4 = 2C + 12$   
 $8C = 16$   
 $C = 2$
- 10)  $12 \div 4 + 6X = 25 + 26$   
 $3 + 6X = 51$   
 $6X = 48$   
 $X = 8$
- 11)  $-2Y - 2 - 5Y + 9Y + 4 = 3 \cdot 4$   
 $2Y + 2 = 12$   
 $2Y = 10$   
 $Y = 5$
- 12)  $-8 + 2E + 5 - E + 5E = 3^2 + 6$   
 $6E - 3 = 9 + 6$   
 $6E - 3 = 15$   
 $6E = 18$   
 $E = 3$
- 13)  $2R - 8R + 3 + 7R = 10$   
 $R + 3 = 10$   
 $R = 7$
- 14)  $8 - 6 + 7Z + 5Z = (100 \cdot 2) \div 4$   
 $12Z + 2 = 200 \div 4$   
 $12Z + 2 = 50$   
 $12Z = 48$   
 $Z = 4$

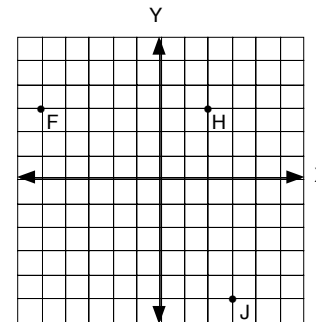
Practice 4

- 1)  $6(3 + 2) = 6(3) + 6(2) = 18 + 12 = 30$
- 2)  $7(3 + 4 + 1) = 7(3) + 7(4) + 7(1) = 21 + 28 + 7 = 56$
- 3)  $5(X + Y) = 5X + 5Y$
- 4)  $2(4M + 2Q) = 8M + 4Q$
- 5)  $3(A + 3B - 2 + 4A) = 3A + 9B - 6 + 12A = 15A + 9B - 6$
- 6)  $4(X + 2Y + 4 + X) = 4X + 8Y + 16 + 4X = 8X + 8Y + 16$
- 7) done
- 8)  $4A - 8B = 4(A - 2B)$
- 9)  $21X + 14Y = 7(3X + 2Y)$
- 10)  $-5M - 10N = -5(M + 2N)$
- 11)  $5B + 15C = 5(B + 3C)$
- 12)  $-5X + 20A = -5(X - 4A)$
- 13) done
- 14)  $8B + 16 = 56$   
 $8(B + 2) = 8(7)$   
 $B + 2 = 7$   
 $B = 5$
- 15)  $12X - 36 + 36X = 60$   
 $48X - 36 = 60$   
 $12(4X - 3) = 12(5)$   
 $4X - 3 = 5$   
 $4X = 8$   
 $X = 2$
- 16)  $6Y - 12 - 3Y = 18$   
 $3Y - 12 = 18$   
 $3(Y - 4) = 3(6)$   
 $Y - 4 = 6$   
 $Y = 10$
- 17)  $5A + 20 = 30$   
 $5(A + 4) = 5(6)$   
 $A + 4 = 6$   
 $A = 2$
- 18)  $2Q - 14 = 24$   
 $2(Q - 7) = 2(12)$   
 $Q - 7 = 12$   
 $Q = 19$

In #15 and #16, terms were combined to simplify before finding the common factor. You could also find the common factor first and then simplify. Either method should yield the same answer.

Practice 5

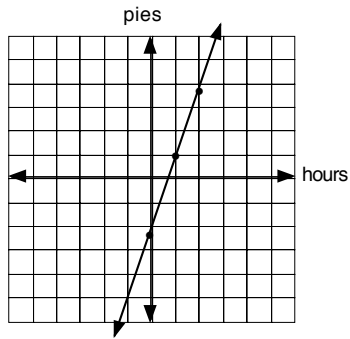
- 1) (-2, 4)
- 2) II
- 3) (6, 3)
- 4) I
- 5) (2, 1)
- 6) I
- 7) (4, -4)
- 8) IV
- 9) (-4, -3)
- 10) III
- 11) on the graph
- 12) II
- 13) on the graph
- 14) I
- 15) on the graph
- 16) IV
- 17) (0, 0)
- 18) negative, positive
- 19) X value
- 20) 4



Practice 6

1) 

hours	pies
0	-2
1	1
2	4

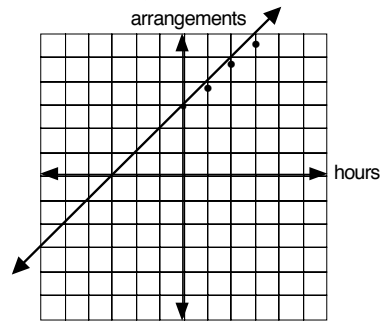


2) on the graph

3)  $P = 3H - 2$

4) 

hours	arr.
0	3
1	4
2	5

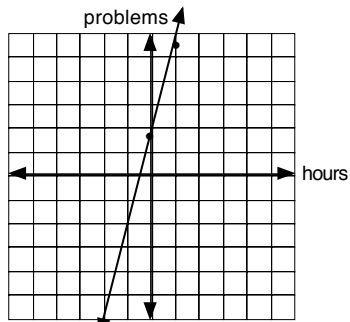


5) on the graph

6)  $A = H + 3$

7) 

hours	problems
0	2
1	6
2	10

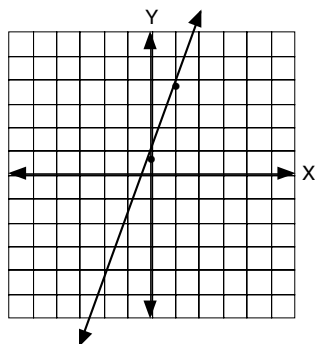


8) on the graph

9)  $P = 4H + 2$

10) 

X	Y
0	1
1	4
2	7



11) on the graph

12) Answers will vary. Your problem should start with a positive amount.

Practice 7A and 7B

Use after lesson 8 if you have 35 lessons.

1) done

2) done

3) slope-intercept

4) 0

5) 4

6) 2

7) answers will vary:  
ex:  $Y = 3X$

8) C

9) E

10) D

11) B

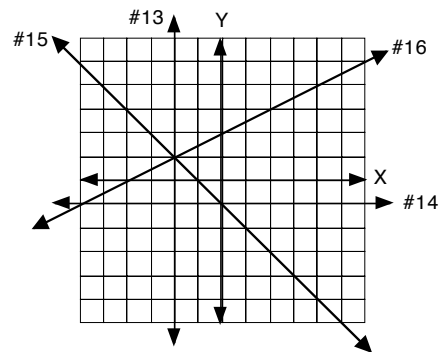
12) A

13) on the graph

14) on the graph

15) on the graph

16) on the graph



Practice 9

1) on the graph

2) slope =  $\frac{-2}{1} = -2$

3) y-intercept = -1

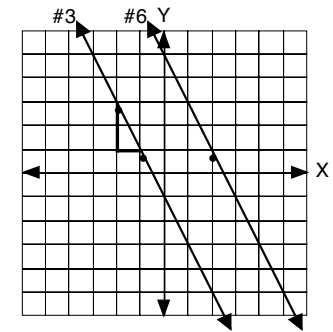
4)  $Y = -2X - 1$

5) A and B

6) on the graph

7)  $Y = -2X + 5$

8)  $2X + Y = 5$



9) on the graph

10) slope =  $\frac{1}{2}$

11) y-intercept = 0

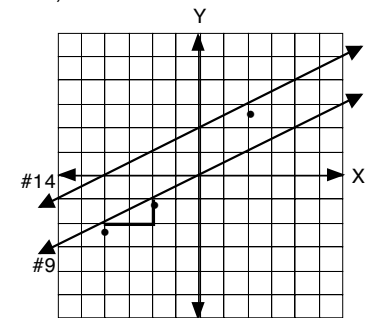
12)  $Y = \frac{1}{2}X$

13) B and C

14) on the graph

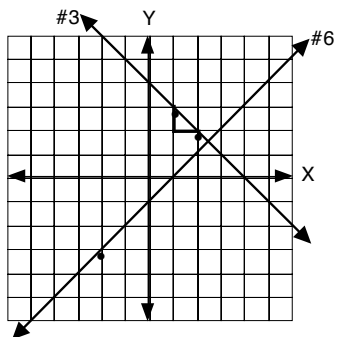
15)  $Y = \frac{1}{2}X + 2$

16)  $X - 2Y = -4$

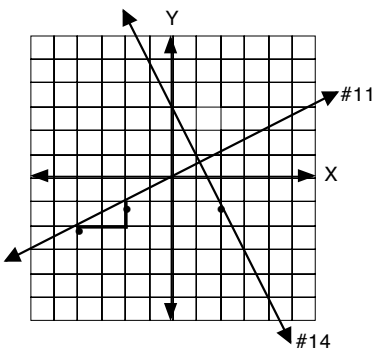


Practice 10

- 1) on the graph
- 2) slope =  $\frac{-1}{1} = -1$
- 3) y-intercept = 4
- 4)  $Y = -X + 4$
- 5) B and C
- 6) on the graph
- 7)  $Y = X - 1$
- 8)  $X - Y = 1$

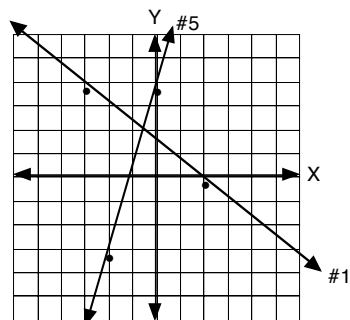


- 9) on the graph
- 10) slope =  $\frac{1}{2}$
- 11) Y-intercept = 0
- 12)  $Y = \frac{1}{2}X$
- 13) C
- 14) on the graph
- 15)  $Y = -2X + 3$
- 16)  $2X + Y = 3$



Practice 11

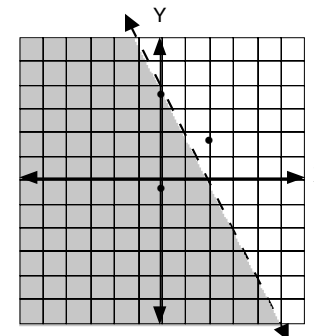
- 1) on the graph
- 2)  $0 = -4/5(2) + b$   
y-intercept =  $1 \frac{3}{5}$
- 3)  $Y = -4/5 X + 1 \frac{3}{5}$
- 4)  $4X + 5Y = 8$



- 5)  $\frac{4 - (-3)}{0 - (-2)} = \frac{7}{2}$  (see graph)
- 6)  $4 = 7/2(0) + b$   
 $4 = 0 + b; \quad 4 = b$
- 7)  $Y = 7/2 X + 4$
- 8)  $-7/2 X + Y = 4; -7X + 2Y = 8; 7X - 2Y = -8$
- 9)  $(3) = 1(0) + b$   
 $3 = b$   
 $Y = X + 3$
- 10)  $(1) = -1/2(-1) + b$   
 $1 = 1/2 + b; \quad b = 1/2$   
 $Y = -1/2X + 1/2$
- 11)  $(2) = -2/3(-1) + b$   
 $2 = 2/3 + b; \quad b = 1 \frac{1}{3}$   
 $Y = -2/3X + 1 \frac{1}{3}$
- 12)  $(3) = 3/4(2) + b$   
 $3 = 3/2 + b; \quad b = 1 \frac{1}{2}$   
 $Y = 3/4X + 1 \frac{1}{2}$
- 13)  $(-3) = 2(-2) + b$   
 $-3 = -4 + b; \quad 1 = b$   
 $Y = 2X + 1$
- 14)  $(0) = 4(2) + b$   
 $0 = 8 + b; \quad -8 = b$   
 $Y = 4X - 8$
- 15)  $\frac{2 - 3}{-1 - 2} = \frac{-1}{-3} = \frac{1}{3} = m$   
 $(3) = 1/3(2) + b$   
 $3 = 2/3 + b; \quad 2 \frac{1}{3} = b$   
 $Y = 1/3 X + 2 \frac{1}{3}$
- 16)  $\frac{0 - (-3)}{2 - (-2)} = \frac{3}{4} = m$   
 $(0) = 3/4(2) + b$   
 $3 = 3/2 + b; \quad -1 \frac{1}{2} = b$   
 $Y = 3/4 X - 1 \frac{1}{2}$

Practice 12

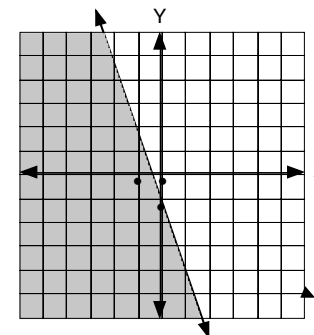
- 1)  $Y = -2X + 4$  see graph



- 2) dotted
- 3)  $(0, 0) \quad 2(0) + (0) < 4, \quad 0 < 4 \quad \text{true}$   
 $(2, 2) \quad 2(2) + (2) < 4, \quad 6 < 4 \quad \text{false}$

- 4) see graph

- 5) see graph

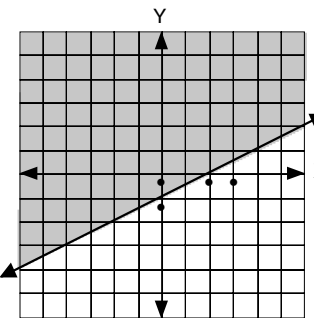


- 6) solid

- 7)  $(0, 0) \quad (0) \leq -3(0) - 1; \quad 0 \leq -1 \quad \text{false}$   
 $(-1, 0) \quad (0) \leq -3(-1) - 1; \quad 0 \leq 2 \quad \text{true}$

- 8) see graph

- 9)  $X - 2Y = 2; \quad Y = 1/2 X - 1$ ; see graph



- 10) solid

- 11)  $(0, 0) \quad (0) - 2(0) \leq 2; \quad 0 \leq 2 \quad \text{true}$   
 $(3, 0) \quad (3) - 2(0) \leq 2, \quad 3 \leq 2 \quad \text{false}$

- 12) see graph

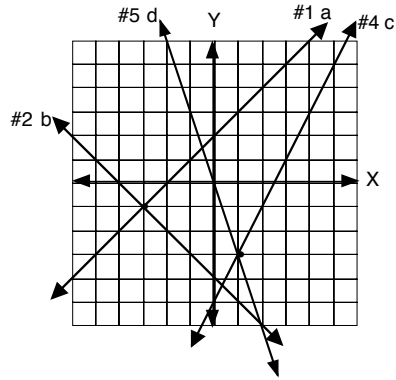
- 13)  $-4Y > -X + 2$   
 $Y < 1/4 X - 1/2$

- 14)  $3Y \leq 2X + 5$   
 $Y \leq 2/3 X + 1 \frac{2}{3}$

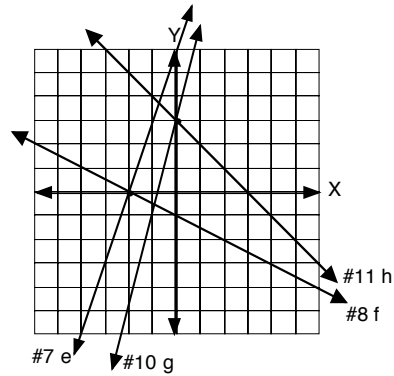
- 15)  $-5Y < -5X - 15$   
 $Y > X + 3$

Practice 13

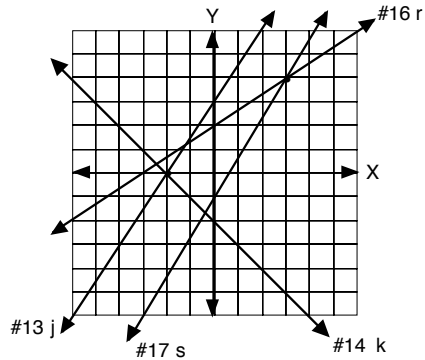
- 1) on the graph
- 2) on the graph
- 3) (-3, -1)
- 4) on the graph
- 5) on the graph
- 6) (1, -3)



- 7) on the graph
- 8) on the graph
- 9) (-2, 0)
- 10) on the graph
- 11) on the graph
- 12) (0, 3)



- 13) on the graph
- 14) on the graph
- 15) (-2, 0)
- 16) on the graph
- 17) on the graph
- 18) (3, 4)



Practice 14

1) (2, 1)

$$\begin{aligned} 2) \quad X + 2(3X - 5) &= 4 \\ X + 6X - 10 &= 4 \\ 7X &= 14, X = 2 \end{aligned}$$

$$\begin{aligned} 3) \quad (2) + 2Y &= 4 \\ 2Y &= 2, Y = 1 \end{aligned}$$

4) (6, 3)

$$\begin{aligned} 5) \quad X - 3(1/2 X) &= -3 \\ X - 1/2 X &= -3 \\ -1/2 X &= -3, X = 6 \end{aligned}$$

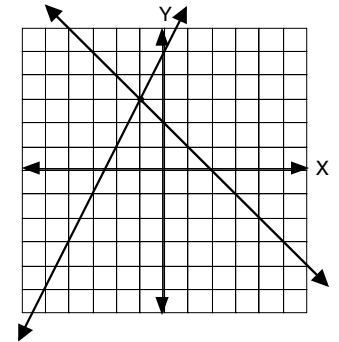
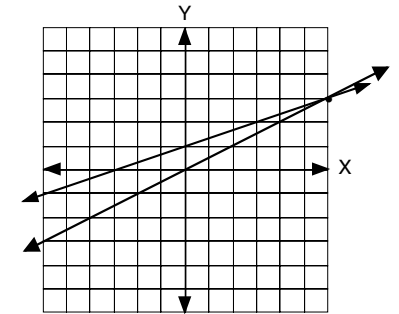
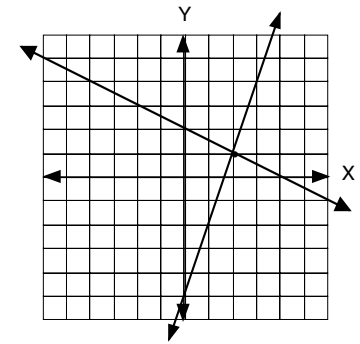
$$\begin{aligned} 6) \quad Y &= 1/2(6) \\ Y &= 3 \end{aligned}$$

7) (-1, 3)

$$\begin{aligned} 8) \quad -2(-Y + 2) + Y &= 5 \\ 2Y - 4 + Y &= 5 \\ 2Y + Y &= 5 + 4 \\ 3Y &= 9, Y = 3 \end{aligned}$$

$$\begin{aligned} 9) \quad X + 3 &= 2 \\ X &= -1 \end{aligned}$$

$$\begin{aligned} 10) \quad 5X - 3(-2/3 X + 3) &= 12 \\ 5X + 2X - 9 &= 12 \\ 7X &= 21, & X = 3 \\ 2(3) + 3Y &= 9 \\ 6 + 3Y &= 9 \\ 3Y &= 3, & Y = 1 \\ (3, 1) & \end{aligned}$$

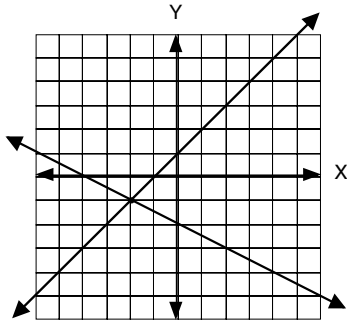


Practice 15

1) (-2, -1)

$$\begin{array}{r} -X + Y = 1 \\ + (X + 2Y = -4) \\ \hline 3Y = -3 \\ Y = -1 \end{array}$$

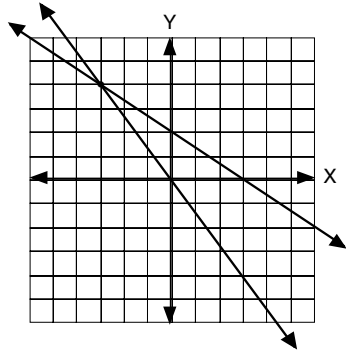
$$\begin{array}{r} -X + (-1) = 1 \\ -X = 2 \\ X = -2 \end{array}$$



4) (-3, 4)

$$\begin{array}{r} 2X + 3Y = 6 \\ -(4X + 3Y = 0) \\ \hline -2X = 6 \\ X = -3 \end{array}$$

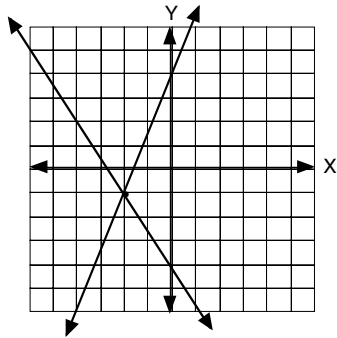
$$\begin{array}{r} 2(-3) + 3Y = 6 \\ -6 + 3Y = 6 \\ 3Y = 12 \\ Y = 4 \end{array}$$



7) (-2, -1)

$$\begin{array}{r} -5X + 2Y = 8 \\ -(3X + 2Y = -8) \\ \hline -8X = 16 \\ X = -2 \end{array}$$

$$\begin{array}{r} 3(-2) + 2Y = -8 \\ -6 + 2Y = -8 \\ 2Y = -2 \\ Y = -1 \end{array}$$



$$\begin{array}{r} 4X - 2Y = 12 \\ + (3X + 2Y = -5) \\ \hline 7X = 7 \\ X = 1 \end{array}$$

$$\begin{array}{r} 4(1) - 2Y = 12 \\ 4 - 2Y = 12 \\ -2Y = 8 \\ Y = -4 \end{array}$$

(1, -4)

Practice 16

1)  $P + N = 65$   
 $.01P + .05N = 1.05$

$$\begin{array}{r} (P + N = 65)(-5) = -5P - 5N = -325 \\ (.01P + .05N = 1.05)(100) = P + 5N = 105 \\ \hline -4P = -220 \\ P = 55 \end{array}$$

3) If  $P = 55$  and  $P + N = 65$ , then nickels = 10.

4)  $Q + N = 17$   
 $.25Q + .05N = \$2.85$

$$\begin{array}{r} (Q + N = 17)(-5) = -5Q - 5N = -85 \\ (.25Q + .05N = 2.85)(100) = 25Q + 5N = 285 \\ \hline 20Q = 200 \\ Q = 10 \end{array}$$

6) If  $Q = 10$  and  $Q + N = 17$ , then nickels = 7

7)  $N + D = 16$   
 $.05N + .10D = 1.05$

$$\begin{array}{r} (N + D = 16)(-10) = -10N - 10D = -160 \\ (.05N + .10D = 1.05)(100) = 5N + 10D = 105 \\ \hline -5N = -55 \\ N = 11 \end{array}$$

9) If  $N = 11$  and  $N + D = 16$ , then  $D = 5$ .

10)  $Q + P = 30$   
 $.25Q + .01P = 2.46$

$$\begin{array}{r} (Q + P = 30)(-1) = -Q - P = -30 \\ (.25Q + .01P = 2.46)(100) = 25Q + P = 246 \\ \hline 24Q = 216 \\ Q = 9 \end{array}$$

12) If  $Q = 9$  and  $Q + P = 30$ , then  $P = 21$

Practice 17

1)  $N, N + 1, N + 2$

2)  $N + (N + 1) = (N + 2) + 9$

3)  $2N + 1 = N + 11$   
 $N = 10$   
10, 11, 12

4)  $10 + (11) = (12) + 9$   
 $21 = 21$  ✓

5)  $N, N + 1, N + 2$

6)  $N + 2(N + 1) + 3(N + 2) = 4(N)$

7)  $N + 2N + 2 + 3N + 6 = 4N$   
 $6N + 8 = 4N$   
 $2N = -8$       $N = -4$   
-4, -3, -2

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

9)  $N, N + 2, N + 4$

10)  $6(N + 2) = 2(N)$

11)  $6N + 12 = 2N$   
 $4N = -12$       $N = -3$   
-3, -1, 1

12)  $6(-1) = 2(-3)$   
 $-6 = -6$  ✓

13)  $N, N + 2, N + 4$

14)  $N + (N + 2) + (N + 4) = 4(N + 2) - 6$

15)  $3N + 6 = 4N + 8 - 6$   
 $3N + 6 = 4N + 2$   
 $4 = N$   
4, 6, 8

16)  $4 + (6) + (8) = 4(6) - 6$   
 $18 = 18$  ✓


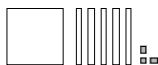


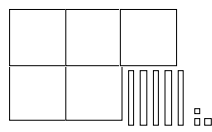
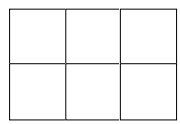
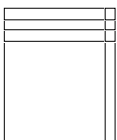
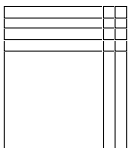
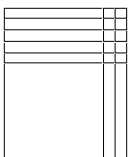
Practice 18

- 1) 196
- 2)  $\pm 11$
- 3) 49
- 4) 125
- 5)  $\pm 18$
- 6) 27
- 7)  $7^2 \cdot 7^4 = 7^{2+4} = 7^6$
- 8)  $9^3 \cdot 7 = 9^{10}$
- 9)  $8^{10-7} = 8^3$
- 10)  $6^4 \cdot 3 = 6^1 = 6$
- 11)  $A^2 \cdot 5^4 = A^{11}$
- 12)  $R^2 \cdot 1 S^3 \cdot 4 = R^3 S^7$
- 13)  $2R+S$
- 14)  $B^6 \cdot X \cdot 2X = B^4 X$
- 15)  $P^{12+3-5} = P^{10}$
- 16)  $A^2 B^2 \cdot 3 C^{2+2} = A^2 B^5 C^4$

Practice 19

- 1)  $3^2$
- 2)  $2^{-3}$
- 3)  $\frac{1}{A^2}$
- 4)  $\frac{1}{3}$
- 5)  $5^{2-6} = 5^{-4}$
- 6)  $4^{-2-5} = 4^{-7}$
- 7)  $2^{-4(5)} = 2^{-20}$
- 8)  $(R^{-3})^{-6} = R^{18}$
- 9)  $7^{-2(2)} = 7^{-4}$
- 10)  $A^{2-2} B^{2+1} = A^0 B^3 = B^3$
- 11)  $R^{-3+1} S^{-2+1} = R^{-2} S^{-1}$
- 12)  $A^2 B^{1+2} C^{-2+1} = A^2 B^3 C^{-1}$
- 13)  $B^{-8+2} \cdot (-6) = B^0 = 1$
- 14)  $R^{12X} \cdot 4X = R^{8X}$
- 15)  $\frac{B^{4-3} C^{2+2}}{B^1 C^{2-3}} = \frac{B^1 C^4}{B^1 C^{-1}} = B^{1-1} C^{4-(-1)} = C^5$
- 16)  $\frac{Q^{2-2} R^4}{R^{3-2} Q^{-1+1}} = \frac{Q^0 R^4}{R^1 Q^0} = \frac{R^4}{R^1} = R^{4-1} = R^3$

Practice 20

- 1)  $X^2 + 9$  
- 2)  $X^2 + 5X - 3$  
- 3)  $2X^2 - 8$  
- 4)  $\frac{X^2 - 2X + 5}{2X^2 + X + 3}$  
- 5)  $\frac{3X^2 - X}{2X^2 + 6X + 3}$  
- 6)  $\frac{4X^2 - 2X - 3}{6X^2}$  
- 7)  $(X + 1)(X + 3) = X^2 + 4X + 3$  
- 8)  $(X + 2)(X + 4) = X^2 + 6X + 8$  
- 9)  $(X + 2)(X + 5) = X^2 + 7X + 10$  

- 10) 
$$\begin{array}{r} 3X + 1 \\ \times \quad X + 5 \\ \hline 15X + 5 \\ 3X^2 + X \\ \hline 3X^2 + 16X + 5 \end{array}$$
- 11) 
$$\begin{array}{r} 2X + 2 \\ \times \quad 3X + 1 \\ \hline 2X + 2 \\ 6X^2 + 6X \\ \hline 6X^2 + 8X + 2 \end{array}$$
- 12) 
$$\begin{array}{r} 4X + 1 \\ \times \quad X + 2 \\ \hline 8X + 2 \\ 4X^2 + X \\ \hline 4X^2 + 9X + 2 \end{array}$$
- 13) 
$$\begin{array}{r} X - 2 \\ \times \quad 2X + 3 \\ \hline 3X - 6 \\ 2X^2 - 4X \\ \hline 2X^2 - X - 6 \end{array}$$
- 14) 
$$\begin{array}{r} 5X - 1 \\ \times \quad X - 2 \\ \hline -10X + 2 \\ 5X^2 - X \\ \hline 5X^2 - 11X + 2 \end{array}$$
- 15) 
$$\begin{array}{r} 6X + 2 \\ \times \quad X - 2 \\ \hline -12X - 4 \\ 6X^2 + 2X \\ \hline 6X^2 - 10X - 4 \end{array}$$
- 16) 
$$\begin{array}{r} X - 1 \\ \times \quad X - 2 \\ \hline -2X + 2 \\ X^2 - X \\ \hline X^2 - 3X + 2 \end{array}$$
- 17) 
$$\begin{array}{r} 3X - 2 \\ \times \quad 4X - 2 \\ \hline -6X + 4 \\ 12X^2 - 8X \\ \hline 12X^2 - 14X + 4 \end{array}$$
- 18) 
$$\begin{array}{r} X - 4 \\ \times \quad 3X + 3 \\ \hline 3X - 12 \\ 3X^2 - 12X \\ \hline 3X^2 - 9X - 12 \end{array}$$

Practice 21

1) 
$$\begin{array}{r} X+3 \\ x \ X+2 \\ \hline 2X+6 \\ X^2+3X \\ \hline X^2+5X+6 \end{array}$$

7) 
$$\begin{array}{r} X+4 \\ x \ X+1 \\ \hline X+4 \\ X^2+4X \\ \hline X^2+5X+4 \end{array}$$

13) 
$$\begin{array}{r} X+8 \\ x \ X+5 \\ \hline 5X+40 \\ X^2+8X \\ \hline X^2+13X+40 \end{array}$$

2) 
$$\begin{array}{r} X+4 \\ x \ X+2 \\ \hline 2X+8 \\ X^2+4X \\ \hline X^2+6X+8 \end{array}$$

8) 
$$\begin{array}{r} X+5 \\ x \ X+1 \\ \hline X+5 \\ X^2+5X \\ \hline X^2+6X+5 \end{array}$$

14) 
$$\begin{array}{r} X+5 \\ x \ X+3 \\ \hline 3X+15 \\ X^2+5X \\ \hline X^2+8X+15 \end{array}$$

Even though we show the drawings, you may not have enough blocks to build some of these.

3) 
$$\begin{array}{r} X+6 \\ x \ X+2 \\ \hline 2X+12 \\ X^2+6X \\ \hline X^2+8X+12 \end{array}$$

9) 
$$\begin{array}{r} X+8 \\ x \ X+3 \\ \hline 8X+24 \\ X^2+3X \\ \hline X^2+11X+24 \end{array}$$

15) 
$$\begin{array}{r} X+9 \\ x \ X+2 \\ \hline 2X+18 \\ X^2+9X \\ \hline X^2+11X+18 \end{array}$$

4) 
$$\begin{array}{r} X+2 \\ x \ X+2 \\ \hline 2X+4 \\ X^2+2X \\ \hline X^2+4X+4 \end{array}$$

10) 
$$\begin{array}{r} X+9 \\ x \ X+7 \\ \hline 7X+63 \\ X^2+9X \\ \hline X^2+16X+63 \end{array}$$

16) 
$$\begin{array}{r} X+5 \\ x \ X+5 \\ \hline 5X+25 \\ X^2+5X \\ \hline X^2+10X+25 \end{array}$$

5) 
$$\begin{array}{r} X+6 \\ x \ X+1 \\ \hline X+6 \\ X^2+6X \\ \hline X^2+7X+6 \end{array}$$

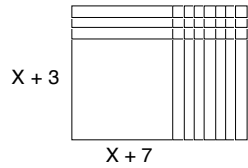
11) 
$$\begin{array}{r} X+6 \\ x \ X+4 \\ \hline 4X+24 \\ X^2+6X \\ \hline X^2+10X+24 \end{array}$$

6) 
$$\begin{array}{r} X+7 \\ x \ X+2 \\ \hline 2X+14 \\ X^2+7X \\ \hline X^2+9X+14 \end{array}$$

12) 
$$\begin{array}{r} X+11 \\ x \ X+3 \\ \hline 3X+33 \\ X^2+11X \\ \hline X^2+14X+33 \end{array}$$

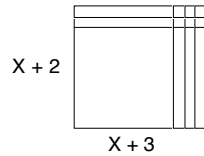
Practice 22

1)  $2(X^2 + 10X + 21)$



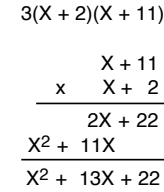
$$\begin{array}{r} X + 7 \\ x \quad X + 3 \\ \hline 3X + 21 \\ X^2 + 7X \\ \hline X^2 + 10X + 21 \end{array}$$

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



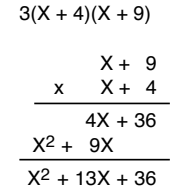
$$\begin{array}{r} X + 2 \\ x \quad X + 3 \\ \hline 3X + 6 \\ X^2 + 2X \\ \hline X^2 + 5X + 6 \end{array}$$

11)  $3(X^2 + 13X + 22)$



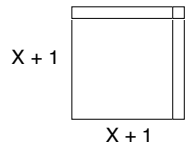
$$\begin{array}{r} X + 11 \\ x \quad X + 2 \\ \hline 2X + 22 \\ X^2 + 11X \\ \hline X^2 + 13X + 22 \end{array}$$

16)  $3(X^2 + 13X + 36)$



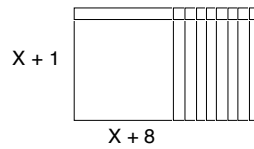
$$\begin{array}{r} X + 9 \\ x \quad X + 4 \\ \hline 4X + 36 \\ X^2 + 9X \\ \hline X^2 + 13X + 36 \end{array}$$

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



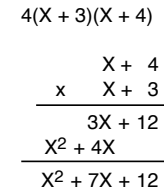
$$\begin{array}{r} X + 1 \\ x \quad X + 1 \\ \hline X + 1 \\ X^2 + X \\ \hline X^2 + 2X + 1 \end{array}$$

7)  $4(X^2 + 9X + 8)$



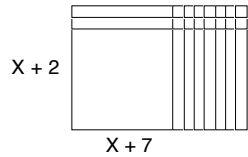
$$\begin{array}{r} X + 8 \\ x \quad X + 1 \\ \hline X + 8 \\ X^2 + 8X \\ \hline X^2 + 9X + 8 \end{array}$$

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



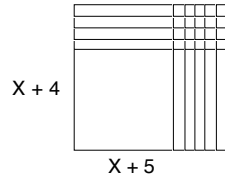
$$\begin{array}{r} X + 4 \\ x \quad X + 3 \\ \hline 3X + 12 \\ X^2 + 4X \\ \hline X^2 + 7X + 12 \end{array}$$

3)  $3(X^2 + 9X + 14)$



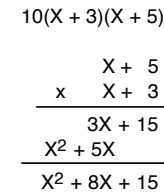
$$\begin{array}{r} X + 7 \\ x \quad X + 2 \\ \hline 2X + 14 \\ X^2 + 7X \\ \hline X^2 + 9X + 14 \end{array}$$

8)  $2(X^2 + 9X + 20)$



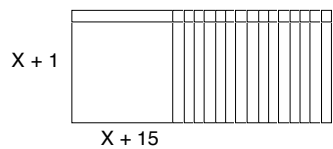
$$\begin{array}{r} X + 5 \\ x \quad X + 4 \\ \hline 4X + 20 \\ X^2 + 5X \\ \hline X^2 + 9X + 20 \end{array}$$

13)  $10(X^2 + 8X + 15)$



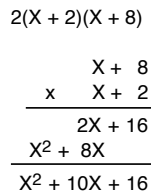
$$\begin{array}{r} X + 5 \\ x \quad X + 3 \\ \hline 3X + 15 \\ X^2 + 5X \\ \hline X^2 + 8X + 15 \end{array}$$

4)  $2(X^2 + 16X + 15)$



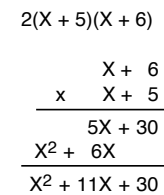
$$\begin{array}{r} X + 15 \\ x \quad X + 1 \\ \hline X + 15 \\ X^2 + 15X \\ \hline X^2 + 16X + 15 \end{array}$$

9)  $2(X^2 + 10X + 16)$



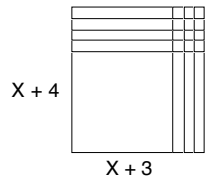
$$\begin{array}{r} X + 8 \\ x \quad X + 2 \\ \hline 2X + 16 \\ X^2 + 8X \\ \hline X^2 + 10X + 16 \end{array}$$

14)  $2(X^2 + 11X + 30)$



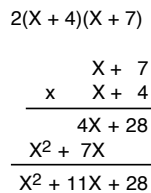
$$\begin{array}{r} X + 6 \\ x \quad X + 5 \\ \hline 5X + 30 \\ X^2 + 6X \\ \hline X^2 + 11X + 30 \end{array}$$

5)  $2(X^2 + 7X + 12)$



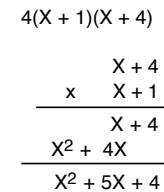
$$\begin{array}{r} X + 3 \\ x \quad X + 4 \\ \hline 4X + 12 \\ X^2 + 3X \\ \hline X^2 + 7X + 12 \end{array}$$

10)  $2(X^2 + 11X + 28)$



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

15)  $4(X^2 + 5X + 4)$

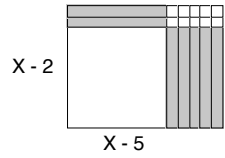


$$\begin{array}{r} X + 4 \\ x \quad X + 1 \\ \hline X + 4 \\ X^2 + 4X \\ \hline X^2 + 5X + 4 \end{array}$$

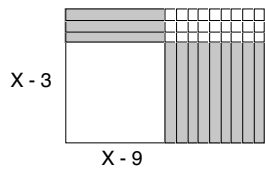
## Practice 23

Continue to check by multiplying.

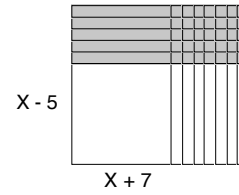
1)  $(X - 2)(X - 5)$



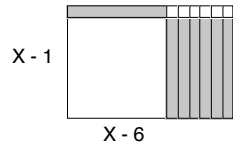
7)  $(X - 3)(X - 9)$



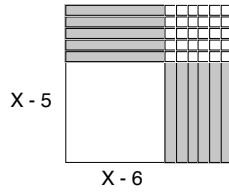
12)  $(X - 5)(X + 7)$



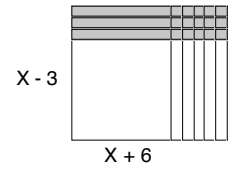
2)  $(X - 1)(X - 6)$



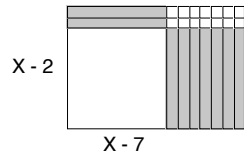
8)  $(X - 5)(X - 6)$



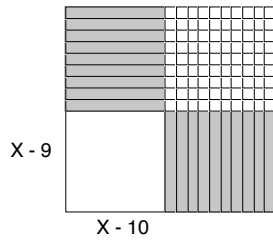
13)  $(X - 3)(X + 6)$



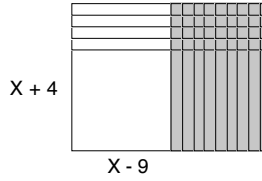
3)  $(X - 2)(X - 7)$



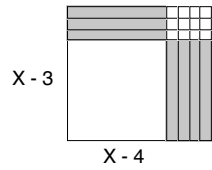
9)  $(X - 9)(X - 10)$



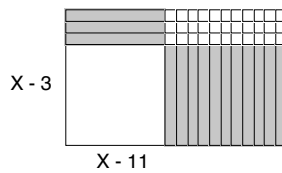
14)  $(X + 4)(X - 9)$



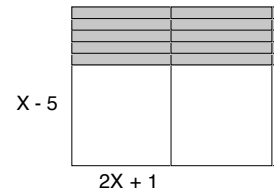
4)  $(X - 3)(X - 4)$



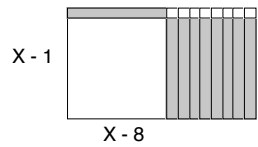
10)  $(X - 3)(X - 11)$



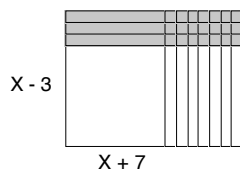
15)  $(X - 5)(2X + 1)$



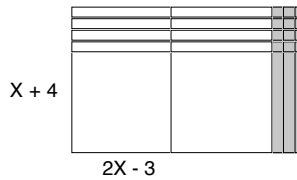
5)  $(X - 1)(X - 8)$



11)  $(X - 3)(X + 7)$



16)  $(X - 5)(2X + 1)$



Practice 24

$$1) \begin{array}{r} X + 4 \\ x \quad X + 4 \\ \hline 4X + 16 \\ X^2 + 4X \\ \hline X^2 + 8X + 16 \end{array}$$

$$2) \begin{array}{r} X + 1 \\ x \quad X + 1 \\ \hline X + 1 \\ X^2 + X \\ \hline X^2 + X + 1 \end{array}$$

$$3) \begin{array}{r} X + 8 \\ x \quad X + 8 \\ \hline 8X + 64 \\ X^2 + 8X \\ \hline X^2 + 16X + 64 \end{array}$$

$$4) \begin{array}{r} X + 3 \\ X + 4 \overline{) X^2 + 7X + 12} \\ \underline{-(X^2 + 4X)} \phantom{+ 12} \\ 3X + 12 \\ \underline{-(3X + 12)} \\ 0 \end{array}$$

Check

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

$$5) \begin{array}{r} X - 12 \text{ R } 70 \\ X + 5 \overline{) X^2 - 7X + 10} \\ \underline{-(X^2 + 5X)} \phantom{+ 10} \\ -12X + 10 \\ \underline{-(-12X - 60)} \\ 70 \end{array}$$

Continue to check by multiplying.

$$6) \begin{array}{r} X + 6 \text{ R } -13 \\ X + 3 \overline{) X^2 + 9X + 5} \\ \underline{-(X^2 + 3X)} \phantom{+ 5} \\ 6X + 5 \\ \underline{-(4X + 18)} \\ -13 \end{array}$$

$$7) \begin{array}{r} X + 5 \text{ R } 21 \\ X - 1 \overline{) X^2 + 4X + 16} \\ \underline{-(X^2 - X)} \phantom{+ 16} \\ 5X + 16 \\ \underline{-(5X - 5)} \\ 21 \end{array}$$

$$8) \begin{array}{r} X + 6 \text{ R } -18 \\ X + 6 \overline{) X^2 + 12X + 18} \\ \underline{-(X^2 + 6X)} \phantom{+ 18} \\ 6X + 18 \\ \underline{-(6X + 36)} \\ -18 \end{array}$$

$$9) \begin{array}{r} 2X + 2 \text{ R } -7 \\ X + 1 \overline{) 2X^2 + 4X - 5} \\ \underline{-(2X^2 + 2X)} \phantom{- 5} \\ 2X - 5 \\ \underline{-(2X + 2)} \\ -7 \end{array}$$

$$10) \begin{array}{r} X^2 - 7X + 19 \text{ R } -86 \\ X + 4 \overline{) X^3 - 3X^2 - 9X - 10} \\ \underline{-(X^3 + 4X^2)} \phantom{- 9X - 10} \\ -7X^2 - 9X \phantom{- 10} \\ \underline{-(-7X^2 - 28X)} \phantom{- 10} \\ 19X - 10 \\ \underline{-(19X + 76)} \\ -86 \end{array}$$

$$11) \begin{array}{r} 2X^2 + 6X - 2 \text{ R } 10 \\ X + 1 \overline{) 2X^3 + 8X^2 + 4X + 8} \\ \underline{-(2X^3 + 2X^2)} \phantom{+ 4X + 8} \\ 6X^2 + 4X \phantom{+ 8} \\ \underline{-(6X^2 + 6X)} \phantom{+ 8} \\ -2X + 8 \\ \underline{-(-2X - 2)} \\ 10 \end{array}$$

Practice 25

$$1) \begin{array}{r} (X - 3)(X + 3) \\ \phantom{X} \phantom{+} \phantom{X} \phantom{+} \phantom{3} \\ \phantom{x} \phantom{X} \phantom{-} \phantom{3} \\ \hline \phantom{X^2} \phantom{+} \phantom{3X} \\ \phantom{X^2} \phantom{+} \phantom{3X} \\ \hline X^2 - 9 \end{array}$$

$$2) \begin{array}{r} (X - 8)(X + 8) \\ \phantom{X} \phantom{+} \phantom{X} \phantom{+} \phantom{8} \\ \phantom{x} \phantom{X} \phantom{-} \phantom{8} \\ \hline \phantom{X^2} \phantom{+} \phantom{8X} \\ \phantom{X^2} \phantom{+} \phantom{8X} \\ \hline X^2 - 64 \end{array}$$

3)  $(X - 6)(X + 6)$  Continue to check by multiplying.

4)  $(Y - 9)(Y + 9)$

5)  $(X - 1)(X + 1)$

6)  $(X - 2)(X + 2)$

7)  $(X - 10)(X + 10)$

8)  $(2X - 11)(2X + 11)$

9)  $(A - 12)(A + 12)$

10)  $(3X - 3Y)(3X + 3Y)$

11)  $(B - 4)(B + 4)$

12)  $(X - 5)(X + 5)$

$$13) \begin{array}{r} 45 \\ \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \hline 45 \\ 2025 \end{array}$$

$$14) \begin{array}{r} 85 \\ \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \hline 85 \\ 7225 \end{array}$$

$$15) \begin{array}{r} 36 \\ \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \hline 34 \\ 1224 \end{array}$$

$$16) \begin{array}{r} 68 \\ \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \hline 62 \\ 4216 \end{array}$$

## Practice 26

- $(Y^2 - 4)(Y^2 + 4)$   
 $(Y - 2)(Y + 2)(Y^2 + 4)$
- $(A^2 - B^2)(A^2 + B^2)$   
 $(A - B)(A + B)(A^2 + B^2)$
- $4X(X^2 - 1)$   
 $4X(X - 1)(X + 1)$
- $(X^3 - Y^3)(X^3 + Y^3)$
- $4X(X^2 + 5X + 6)$   
 $4X(X + 2)(X + 3)$
- $2Y(Y^2 + Y - 6)$   
 $2Y(Y - 2)(Y + 3)$
- $B(2B^2 + 13B + 6)$   
 $B(2B + 1)(B + 6)$
- $6X(X - 3)$
- $4Y(Y^2 - 6)$   
 $4Y(Y - 2)(Y + 2)$
- $2X^2(X^2 - X - 12)$   
 $2X^2(X - 4)(X + 3)$
- $3X(X^2 + 3X - 10)$   
 $3X(X + 5)(X - 2)$
- $4(X^4 - 6)$   
 $4(X - 3)(X + 3)$   
OR  
 $(2X - 6)(2X + 6)$   
 $2(X - 3)2(X + 3) = 4(X - 3)(X + 3)$
- $A(A^2 + 6A + 5)$   
 $A(A + 5)(A + 1)$
- $6X(X^2 + X - 2)$   
 $6X(X + 2)(X - 1)$
- $Y(2Y^2 + 3Y - 9)$   
 $Y(2Y - 3)(Y + 3)$
- $2X(X^2 - 25)$   
 $2X(X - 5)(X + 5)$

## Practice 27

- $(X + 7)(X - 2) = 0$
- $X + 7 = 0$        $X - 2 = 0$   
 $X = -7$            $X = 2$
- $(-7)^2 + 5(-7) - 14 = 0$        $(2)^2 + 5(2) - 14 = 0$   
 $49 - 35 - 14 = 0$                $4 + 10 - 14 = 0$   
 $0 = 0$                                $0 = 0$
- $5(B^2 - 25) = 0$   
 $5(B - 5)(B + 5) = 0$
- $B - 5 = 0$        $B + 5 = 0$   
 $B = 5$            $B = -5$
- $5(5)^2 - 125 = 0$        $5(-5)^2 - 125 = 0$   
 $125 - 125 = 0$            $125 - 125 = 0$   
 $0 = 0$                        $0 = 0$
- $(2X - 3)(X - 2) = 0$
- $2X - 3 = 0$        $X - 2 = 0$   
 $2X = 3$            $X = 2$   
 $X = 3/2$
- $2(3/2)^2 - 7(3/2) + 6 = 0$        $2(2)^2 - 7(2) + 6 = 0$   
 $2(9/4) - 21/2 + 6 = 0$            $8 - 14 + 6 = 0$   
 $4[2(9/4) - 21/2 + 6] = 4(0)$        $0 = 0$   
 $18 - 42 + 24 = 0$   
 $0 = 0$
- $2(X^2 + 4X - 77) = 0$   
 $2(X - 7)(X + 11) = 0$
- $X - 7 = 0$        $X + 11 = 0$   
 $X = 7$            $X = -11$
- $2(7)^2 + 8(7) - 154 = 0$        $2(-11)^2 + 8(-11) - 154 = 0$   
 $98 + 56 - 154 = 0$                $242 - 88 - 154 = 0$   
 $0 = 0$                                $0 = 0$

## Practice 28

- 1 foot = 12 inches
- feet in numerator to remain in final answer inches in denominator so they will cancel
- $108 \cancel{\text{ft}} \times \frac{1 \text{ ft}}{12 \cancel{\text{ft}}} = 9 \text{ ft}$
- 3 feet = 1 yard
- yards in numerator to remain in final answer feet in denominator so they will cancel
- $96 \cancel{\text{ft}} \times \frac{1 \text{ yd}}{3 \cancel{\text{ft}}} = 32 \text{ yd}$
- 16 ounces = 1 pound
- ounces in numerator to remain in final answer pounds in denominator so they will cancel
- $45 \cancel{\text{lb}} \times \frac{16 \text{ oz}}{1 \cancel{\text{lb}}} = 720 \text{ oz}$
- 1 meter = 100 centimeters
- centimeters in numerator to remain in final answer meters in denominator so they will cancel
- $25 \cancel{\text{m}} \times \frac{100 \text{ cm}}{1 \cancel{\text{m}}} = 2,500 \text{ cm}$
- 1 liter = 1000 milliliters
- liters in numerator to remain in final answer milliliters in denominator so they will cancel
- $7.8 \cancel{\text{ml}} \times \frac{1 \text{ liter}}{1000 \cancel{\text{ml}}} = .0078 \text{ litres}$
- 1000 meters = 1 kilometer
- kilometers in numerator to remain in final answer meters in denominator so they will cancel
- $50 \cancel{\text{m}} \times \frac{1 \text{ km}}{1000 \cancel{\text{m}}} = .05 \text{ km}$

## Practice 29

- 1)  $\frac{4\cancel{ft}^2}{1} \times \frac{12\text{ in}}{1\cancel{ft}} \times \frac{12\text{ in}}{1\cancel{ft}} = 576\text{ in}^2$
- 2)  $\frac{5\cancel{m}^2}{1} \times \frac{100\text{ cm}}{1\cancel{m}} \times \frac{100\text{ cm}}{1\cancel{m}} = 50,000\text{ cm}^2$
- 3)  $\frac{2\cancel{ft}^2}{1} \times \frac{12\text{ in}}{1\cancel{ft}} \times \frac{12\text{ in}}{1\cancel{ft}} = 28.8\text{ in}^2$
- 4)  $\frac{2.5\cancel{ft}^3}{1} \times \frac{12\text{ in}}{1\cancel{ft}} \times \frac{12\text{ in}}{1\cancel{ft}} = 360\text{ in}^3$
- 5)  $\frac{4\cancel{m}^3}{1} \times \frac{10\text{ dm}}{1\cancel{m}} \times \frac{10\text{ dm}}{1\cancel{m}} \times \frac{10\text{ dm}}{1\cancel{m}} = 4000\text{ dm}^3$
- 6)  $\frac{2\cancel{km}^3}{1} \times \frac{1000\text{ m}}{1\cancel{km}} \times \frac{1000\text{ m}}{1\cancel{km}} \times \frac{1000\text{ m}}{1\cancel{km}} = 2,000,000,000\text{ m}^3$
- 7)  $\frac{67.5\cancel{ft}^3}{1} \times \frac{1\text{ yd}}{3\cancel{ft}} \times \frac{1\text{ yd}}{3\cancel{ft}} \times \frac{1\text{ yd}}{3\cancel{ft}} = \frac{67.5}{27} = 2.5\text{ yd}^3$
- 8)  $\frac{3456\cancel{in}^3}{1} \times \frac{1\text{ ft}}{12\cancel{in}} \times \frac{1\text{ ft}}{12\cancel{in}} \times \frac{1\text{ ft}}{12\cancel{in}} = \frac{3456}{1728} = 2\text{ ft}^3$
- 9)  $\frac{46,656\cancel{in}^3}{1} \times \frac{1\text{ yd}}{36\cancel{in}} \times \frac{1\text{ yd}}{36\cancel{in}} \times \frac{1\text{ yd}}{36\cancel{in}} = \frac{46,656}{46,656} = 1\text{ yd}^3$
- 10)  $\frac{150\cancel{cm}^3}{1} \times \frac{1\text{ m}}{100\cancel{cm}} \times \frac{1\text{ m}}{100\cancel{cm}} \times \frac{1\text{ m}}{100\cancel{cm}} = \frac{150}{1,000,000} = .00015\text{ m}^3$
- 11)  $\frac{25\cancel{cm}^2}{1} \times \frac{1\text{ m}}{100\cancel{cm}} \times \frac{1\text{ m}}{100\cancel{cm}} = \frac{25}{10,000} = .0025\text{ m}^2$
- 12) 43,560 ft<sup>2</sup>
- 13) 4 ft x 4 ft x 8 ft = 128 ft<sup>3</sup>
- 14) 27 ft<sup>3</sup>
- 15) 9 ft<sup>2</sup>

## Practice 30

- 1) .4
- 2) 1.1
- 3) 2.2
- 4) 1.06
- 5) 2.5
- 6) .9
- 7) 1.6
- 8) 28
- 9)  $\frac{10\cancel{in}}{1} \times \frac{2.5\text{ cm}}{1\cancel{in}} = 25\text{ cm}$
- 10)  $\frac{14\cancel{g}}{1} \times \frac{1\text{ oz}}{28\cancel{g}} = \frac{14}{28} = \frac{1}{2}$  or .5 oz
- 11)  $\frac{21\cancel{yd}}{1} \times \frac{.9\text{ m}}{1\cancel{yd}} = 18.9\text{ m}$
- 12)  $\frac{44\cancel{kg}}{1} \times \frac{2.2\text{ lb}}{1\cancel{kg}} = 96.8\text{ lb}$
- 13)  $\frac{4.1\cancel{mi}}{1} \times \frac{1.6\text{ km}}{1\cancel{mi}} = 6.56\text{ km}$
- 14)  $\frac{40\cancel{qt}}{1} \times \frac{1.06\text{ qt}}{1\cancel{qt}} = 42.4\text{ qt}$
- 15)  $\frac{7\cancel{oz}}{1} \times \frac{28\text{ g}}{1\cancel{oz}} = 196\text{ g}$
- 16)  $\frac{500\cancel{cm}}{1} \times \frac{.4\text{ in}}{1\cancel{cm}} = 200\text{ in}$

## Practice 31

- 1)  $\sqrt{4} = 2$        $2^3 = 8$
- 2)  $3^2 = 9$
- 3)  $\sqrt{25} = 5$
- 4)  $\sqrt[3]{64} = 4$        $4^2 = 16$
- 5)  $X^2$  (fractional exponents cancel to 2)
- 6)  $A^{1/6}$
- 7)  $(Y^9)^{1/3} = Y^3$
- 8)  $\sqrt[4]{81} = 3$        $3^3 = 27$
- 9)  $(9)^{1/2} = 3$
- 10)  $(4)^{1/2} = 2$        $2 \times 5 = 10$
- 11)  $(8)^{1/3} = 2$
- 12)  $(X^{10})^{1/2} = X^5$
- 13)  $(Y^1)^5 = Y^5$
- 14)  $(X^6 \cdot X^2)^{3/4} = (X^8)^{3/4} = X^6$
- 15)  $(A^{5/4})^{2/3} = X^{5/6}$
- 16)  $(M^{9/6})^{2/3} = M^1$

## Practice 32

- 1)  $2 \times 10^5$
- 2)  $4.58 \times 10^8$
- 3)  $9.16 \times 10^7$
- 4)  $3.2 \times 10^{-4}$
- 5)  $1.268 \times 10^{-2}$
- 6)  $2 \times 10^{-7}$
- 7)  $(2 \times 10^5)(5.29 \times 10^9)$   
 $(2 \times 5.29)(10^5 \times 10^9) = 10.58 \times 10^{14} =$   
 $1.058 \times 10^{15} \Rightarrow 1.1 \times 10^{15}$  using significant digits
- 8)  $(6.55 \times 10^5)(2.1 \times 10^7)$   
 $(6.55 \times 2.1)(10^5 \times 10^7) = 13.755 \times 10^{12} =$   
 $1.3755 \times 10^{13} \Rightarrow 1.4 \times 10^{13}$  using significant digits
- 9)  $(4.51 \times 10^4)(8.01 \times 10^5)$   
 $(4.51 \times 8.01)(10^4 \times 10^5) = 36.1251 \times 10^9 =$   
 $3.61251 \times 10^{10} \Rightarrow 3.61 \times 10^{10}$  using significant digits
- 10)  $(6 \times 10^{-4})(3 \times 10^9)$   
 $(6 \times 3)(10^{-4} \times 10^9) = 18 \times 10^5 =$   
 $1.8 \times 10^6 \Rightarrow 2 \times 10^6$  using significant digits
- 11)  $(4.2 \times 10^{-4})(6 \times 10^4)$   
 $(4.2 \times 6)(10^{-4} \times 10^4) = 25.2 \times 10^0 =$   
 $2.52 \times 10^1 \Rightarrow 3 \times 10^1$  using significant digits
- 12)  $(4.68 \times 10^{-1})(3.7 \times 10^{-4})$   
 $(4.68 \times 3.7)(10^{-1} \times 10^{-4}) = 17.316 \times 10^{-5} =$   
 $1.7316 \times 10^{-4} \Rightarrow 1.7 \times 10^{-4}$  using significant digits
- 13)  $(2.11 \times 10^5) \div (9 \times 10^9)$   
 $(2.11 \div 9)(10^5 \div 10^9) = .2344 \times 10^{-4} =$   
 $2.344 \times 10^{-5} \Rightarrow 2 \times 10^{-5}$  using significant digits
- 14)  $(5.28 \times 10^6) \div (1.76 \times 10^5)$   
 $(5.28 \div 1.76)(10^6 \div 10^5) = 3 \times 10^1 \Rightarrow$   
 $3.00 \times 10^1$  using significant digits
- 15)  $(2.75 \times 10^{-1}) \div (2.5 \times 10^{-3})$   
 $(2.75 \div 2.5)(10^{-1} \div 10^{-3}) = 1.1 \times 10^2 \Rightarrow$   
 same using significant digits

## Practice 33

- 1)  $3^3 = 27$   

$$\begin{array}{r} 27 \overline{) 70} \\ \underline{54} \\ 16 \end{array}$$

$$\begin{array}{r} 9 \overline{) 16} \\ \underline{9} \\ 7 \end{array}$$

$$\begin{array}{r} 3 \overline{) 7} \\ \underline{6} \\ 1 \end{array}$$

$$\begin{array}{r} 1 \overline{) 1} \\ \underline{1} \\ 0 \end{array}$$
  
 $2121_3$
- 2)  $5^2 = 25$   

$$\begin{array}{r} 25 \overline{) 70} \\ \underline{50} \\ 20 \end{array}$$

$$\begin{array}{r} 5 \overline{) 20} \\ \underline{20} \\ 0 \end{array}$$

$$\begin{array}{r} 1 \overline{) 0} \\ \underline{0} \\ 0 \end{array}$$
  
 $240_5$
- 3)  $4^3 = 64$   

$$\begin{array}{r} 64 \overline{) 70} \\ \underline{64} \\ 6 \end{array}$$

$$\begin{array}{r} 16 \overline{) 6} \\ \underline{0} \\ 6 \end{array}$$

$$\begin{array}{r} 4 \overline{) 6} \\ \underline{4} \\ 2 \end{array}$$

$$\begin{array}{r} 1 \overline{) 2} \\ \underline{2} \\ 0 \end{array}$$
  
 $1012_4$
- 4)  $6^2 = 36$   

$$\begin{array}{r} 36 \overline{) 200} \\ \underline{180} \\ 20 \end{array}$$

$$\begin{array}{r} 6 \overline{) 20} \\ \underline{18} \\ 2 \end{array}$$

$$\begin{array}{r} 1 \overline{) 2} \\ \underline{2} \\ 0 \end{array}$$
  
 $532_6$
- 5)  $4^5 = 1024$   

$$\begin{array}{r} 1024 \overline{) 1352} \\ \underline{1024} \\ 328 \end{array}$$

$$\begin{array}{r} 256 \overline{) 328} \\ \underline{256} \\ 72 \end{array}$$

$$\begin{array}{r} 64 \overline{) 72} \\ \underline{64} \\ 8 \end{array}$$

$$\begin{array}{r} 16 \overline{) 8} \\ \underline{8} \\ 0 \end{array}$$
  

$$\begin{array}{r} 4 \overline{) 8} \\ \underline{8} \\ 0 \end{array}$$

$$\begin{array}{r} 1 \overline{) 0} \\ \underline{0} \\ 0 \end{array}$$
  
 $111020_4$
- 6)  $5^4 = 625$   

$$\begin{array}{r} 625 \overline{) 1352} \\ \underline{1296} \\ 102 \end{array}$$

$$\begin{array}{r} 125 \overline{) 102} \\ \underline{102} \\ 0 \end{array}$$

$$\begin{array}{r} 25 \overline{) 102} \\ \underline{100} \\ 2 \end{array}$$

$$\begin{array}{r} 5 \overline{) 2} \\ \underline{0} \\ 2 \end{array}$$
  

$$\begin{array}{r} 1 \overline{) 2} \\ \underline{2} \\ 0 \end{array}$$
  
 $20402_5$

$$7) 2 \times 7^2 + 2 \times 7^1 + 5 \times 7^0$$

$$2(49) + 2(7) + 5(1) =$$

$$98 + 14 + 5 = 117$$

$$8) 3 \times 5^2 + 0 \times 5^1 + 2 \times 5^0$$

$$3(25) + 0(5) + 2(1) =$$

$$75 + 0 + 2 = 77$$

$$9) 1 \times 3^3 + 2 \times 3^2 + 1 \times 3^1 + 2 \times 3^0$$

$$1(27) + 2(9) + 1(3) + 2(1) =$$

$$27 + 18 + 3 + 2 = 50$$

$$10) 2 \times 5^3 + 4 \times 5^2 + 4 \times 5^1 + 1 \times 5^0$$

$$2(125) + 4(25) + 4(5) + 1(1) =$$

$$250 + 100 + 20 + 1 = 371$$

$$11) 5 \times (12)^2 + 10 \times (12)^1 + 2 \times (12)^0$$

$$5(144) + 10(12) + 2(1) =$$

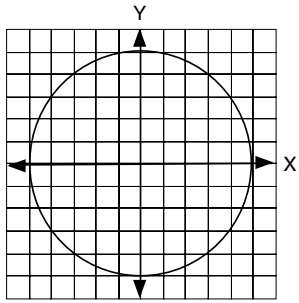
$$720 + 120 + 2 = 842$$

$$12) 11 \times (13)^2 + 7 \times (13)^1 + 3 \times (13)^0$$

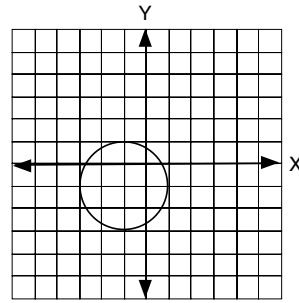
$$11(169) + 7(13) + 3(1) =$$

$$1859 + 91 + 3 = 1953$$

Practice 34



- 1) 5, -5
- 2) 5, -5
- 3) (0, 0)
- 4) 5



$$(Y + 1)^2 = 4$$

$$Y + 1 = \pm 2$$

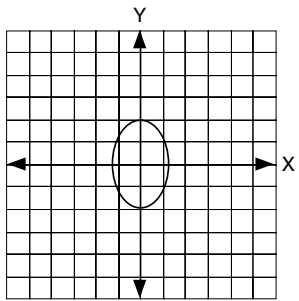
$$Y = 1, Y = -3$$

$$(X + 1)^2 = 4$$

$$X + 1 = \pm 2$$

$$X = 1, X = -3$$

- 5) 1, -3
- 6) 1, -3
- 7) (-1, -1)
- 8) 2



$$2Y^2 = 8$$

$$Y^2 = 4$$

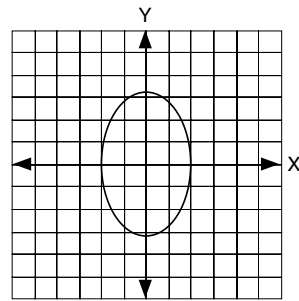
$$Y = \pm 2$$

$$4X^2 = 8$$

$$X^2 = 2$$

$$X = \pm\sqrt{2}$$

- 9) 2, -2
- 13)  $\sqrt{2}, -\sqrt{2}$
- 11) ellipse



$$2Y^2 = 20$$

$$Y^2 = 10$$

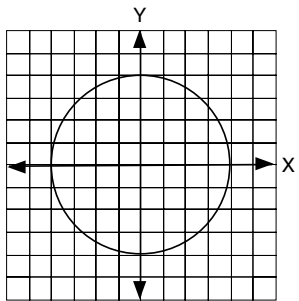
$$Y = \pm\sqrt{10}$$

$$5X^2 = 20$$

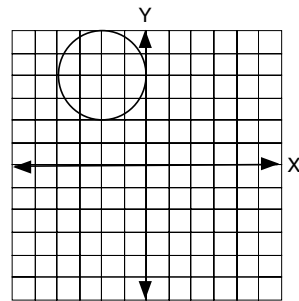
$$X^2 = 4$$

$$X = \pm 2$$

- 12)  $\sqrt{10}, -\sqrt{10}$
- 13) 2, -2
- 14) ellipse



15) on the graph



$$(Y - 4)^2 = 4$$

$$Y - 4 = \pm 2$$

$$Y = 6, Y = 2$$

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

$$X + 2 = \pm 2$$

$$X = 0, X = -4$$

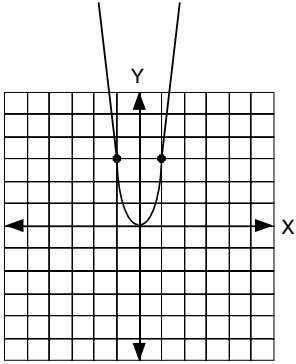
X	Y
-2	6
-2	2
0	4
-4	4

16) on the graph

Practice 35

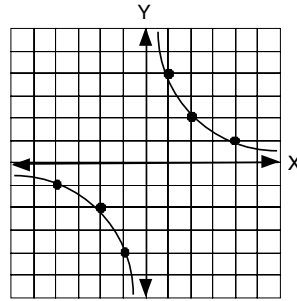
1)

X	Y
0	0
1	3
-1	3
2	12
-2	12



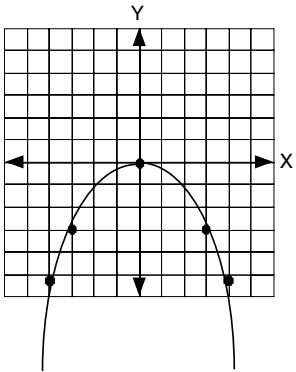
2)

X	Y
2	4
-1	-4
2	2
-2	-2
4	1
-4	-1



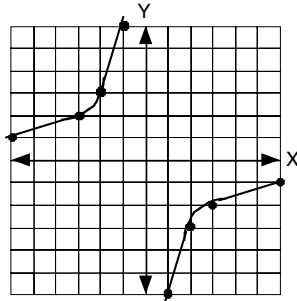
3)

X	Y
0	0
3	-3
-3	-3
4	-16/3
-4	-16/3
2	-4/3
-2	-4/3



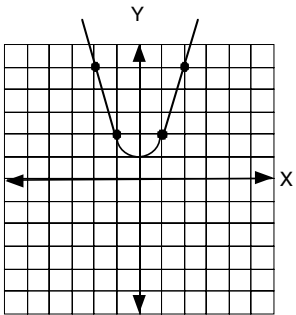
4)

X	Y
1	-6
-1	6
2	-3
-2	3
3	-2
-3	2
6	-1
-6	1



5)

X	Y
0	1
1	2
-1	2
2	5
-2	5



6)

X	Y
1	-5
-1	5
5	-1
-5	1
1 1/4	-4
-1 1/4	4

