Honors Solutions

Honors Lesson 1H

1. $1\frac{1}{2} = \frac{3}{2}$

$\frac{2}{3} \times \frac{3}{2} = \frac{6}{6} = 1$ cup shortening

$\frac{3}{4} \times \frac{3}{2} = 1\frac{1}{8}$ cup of sugar

$1 \times \frac{3}{2} = 1\frac{1}{2}$ eggs (rounds to 2)

$1 \times \frac{3}{2} = 1\frac{1}{2}$ tablespoons of milk

$1 \times \frac{3}{2} = 1\frac{1}{2}$ teaspoons vanilla

$\frac{7}{4} \times \frac{3}{2} = \frac{21}{8} = 2\frac{5}{8}$ teaspoons of baking powder

$\frac{1}{2} \times \frac{3}{2} = \frac{3}{4}$ teaspoon of salt

$\frac{3}{4} \times \frac{3}{2} = \frac{9}{8} = 1\frac{1}{8}$ cups of rolled oats

$\frac{1}{4} \times \frac{3}{2} = \frac{3}{8}$ cup of dried fruit

2. original recipe made three dozen, or 36 cookies

$\frac{36}{1} \times \frac{3}{2} = \frac{108}{2} = 54$ cookies from the larger recipe

$54 \div 2 = 27$ cookies from each bowl

3. Total of bills:

$\$35.92 + \$25.26 + \$255.10 + \$798.53 + \$20.00 + \$116.48 + \$398.19 = \$1,649.48$

$\$1,609.00 - 1649.48 = \$ - 40.48$

The negative number indicates that Daniel is "in the hole" or owes that amount.

4. $(-3) \times 6 = -18$ in

$(-18) + 5 = -13$ inches from starting level

5. 1st option

$10 + 20 + 40 + 80 = \$150$

2nd option

$5 + 25 + 625 + 390{,}625 = \$391{,}280$

The second option is definitely the better choice.

6. $4 \times 3 = 12$

$3 \times 4 = 12$

commutative

7. $5 + 6 = 11; 11 + 8 = 19$

$6 + 8 = 14; 14 + 5 = 19$

associative

8. $8 \div 4 = 2$ pizzas per person

$4 \div 8 = \frac{1}{2}$ pizza per person

division is not commutative

Honors Lesson 2H

1. There are 14. They are: 32, 33, 34, 35, 36, 38, 39, 40, 42, 44, 45, 46, 48, and 49.

2. 1, 17, 289

3. $\frac{18}{15} = 1\frac{3}{15} = 1\frac{1}{5} = \$1.20$

4. $\$75.78 - \$45.78 = \$30.00$ labor

$\$30.00 \div 1.5 = \$20.00$/hour

5. $\frac{1}{4} + \frac{7}{12} = \frac{3}{12} + \frac{7}{12} = \frac{10}{12} = \frac{5}{6}$

6. $\frac{5}{6} \times \frac{1}{10} = \frac{5}{60} = \frac{1}{12}$ of a tank used

$\frac{5}{6} - \frac{1}{12} = \frac{10}{12} - \frac{1}{12} = \frac{9}{12} = \frac{3}{4}$

$\frac{3}{4} \times 24 = 18$ gallons left

7. First, figure out how long it would take for him to do the whole job. 30 minutes is $\frac{3}{5}$ of the total time. In equation form:

$30 = \frac{3}{5}T$

$150 = 3T$

$50 = T$, so 50 min for the whole job

$\frac{1}{5}$ of $50 = 10$ min

$\frac{1}{2}$ of $50 = 25$ min

8. $9 + 19 = 28$

$28 \div 4 = 7$

$7 + 5 = 12$

9. $5 \times 4 = 20$
$20 - 1 = 19$
$19 + 8 = 27$ yards

10. $\$ - 20.00 + \$35.00 = \$15.00$
$\$15 + \$70.00 = \$85.00$
$\$85.00 - \$10.00 = \$75.00$
$\$75.00 - \$22.50 = \$52.50$

Honors Lesson 3H

1. yes
2. rational
3. rational
4. $A = \frac{1}{2}bh$
$12 = \frac{1}{2}(6)h$
$12 = 3h$
$4 \text{ in} = h$
5. $P = 2L + 2W$
$30 = 2(10) + 2W$
$30 = 20 + 2W$
$10 = 2W$
$5 \text{ cm} = W$
6. $d = rt$
$11\frac{1}{4} = 4\frac{1}{2}(t)$
$\frac{45}{4} = \frac{18}{4}(t)$
$45 = 18t$
$t = \frac{45}{18} = 2\frac{1}{2}$ hours
using decimals: $11.25 = 4.5t$
$2.5 = t$
7. $p = 0.433d$
$43.3 = .433d$
$43300 = 433d$
$d = 100$ ft

Honors Lesson 4H

1. 2
2. 18
3. 1
4. 4
5. 9
6. Test 2
7. Test 4
8. $100 - 75 = 25$
9. John: $95 + 90 + 95 + 93 + 97 = 470$
$470 \div 5 = 94$
David: $98 + 90 + 90 + 75 + 100 = 453$
$453 \div 5 = 90.6$
You may have slightly different results depending on how you estimated the scores.
John had the highest average score.
10. Joe sold 25.
Jeff sold 20.
The graphs agree.
11. Jeff probably drew the first graph: it is unlikely that he would have presented the data in a way that made it look like he had only sold a fraction of what Joe sold.
Joe probably drew the second graph.
12. Answers will vary.

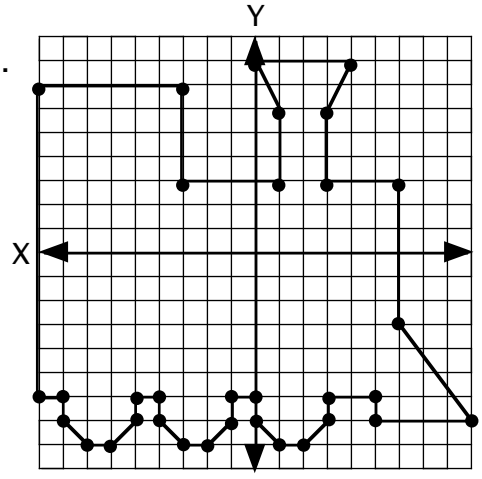
Honors Lesson 5H

1. (6 steps, east)
2. $6 + (-10) = -4$, so (4 steps, west)
3. (4 paces, south)
4. (2, south)
5. (6, north)
6. $A^2 + B^2 = C^2$
$4^2 + 4^2 = C^2$
$32 = C^2$
$C = \sqrt{32}$
7. $(\sqrt{32}$, northeast)

8. $8^2 + 8^2 = C^2$
$128 = C^2$
$C = \sqrt{128}$
$\left(\sqrt{128}, \text{southwest}\right)$

Honors Lesson 6H

1.



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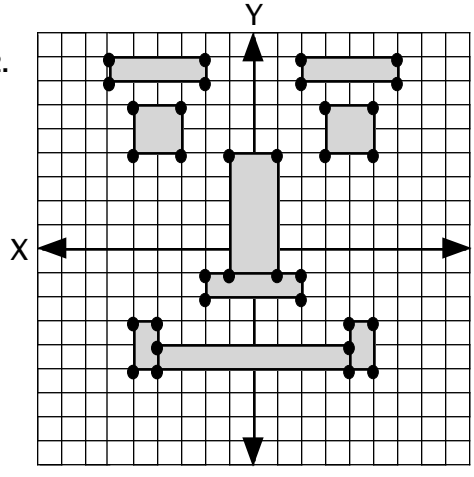
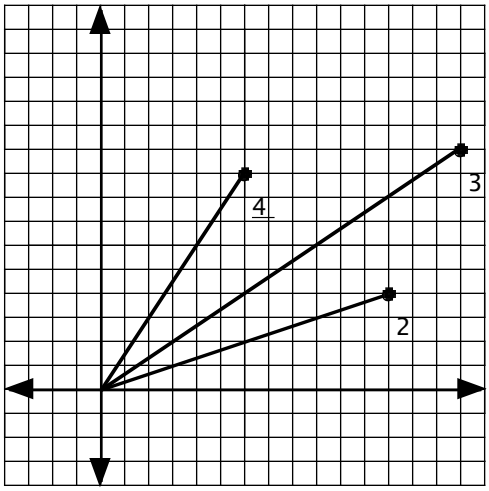


Honors Lesson 7H

1. done
2. done
3. slope is negative; less steep than 1;
Y-intercept is 1.
Line a is the best choice.
4. slope is positive; steeper than 1;
Y-intercept is 1.
Line c is the best choice.
5. slope is positive; less steep than 1;
Y-intercept is -1.
Line b is the best choice.
6. slope is positive; steeper than 1;
Y-intercept is 0.
Line d is the best choice.
7. slope is positive; steeper than 1;
Y-intercept is 0.
Line h is the best choice.
8. slope is positive; less steep than 1;
Y-intercept is 3.
Line f is the best choice.
9. slope is positive; equal to 1;
Y-intercept is 0.
Line g is the best choice.
10. slope is negative; equal to 1;
Y-intercept is –3.
Line e is the best choice.

Honors Lesson 8H

1. done
2. $\frac{4}{12}$ or $\frac{1}{3}$
3. $\frac{10}{15}$ or $\frac{2}{3}$
4. $\frac{9}{6}$ or $\frac{3}{2}$
5. done
6. $\frac{8}{24}$ or $\frac{1}{3}$
7. $\frac{10}{20}$ or $\frac{1}{2}$
8. $\frac{18}{24}$ or $\frac{3}{4}$



Honors Lesson 9H

1. X is greater than 11 and less than 20,

so $C = 2.75X$
$C = 2.75(12)$
$C = \$33.00$

2. X is greater than 0 and less than 10, so

so $C = 3X$
$C = 3(5)$
$C = \$15.00$

3. Cost of 10 reams $= \$3.00 \times 10 = \$30.00$
Cost of 20 reams $= \$2.50 \times 20 = \$50.00$
This shows that we can use the lowest price category.
$\$50.00 \div \$2.50 = 20$ reams

4. Let F = Finance charge, and B = Balance

$F = .008B$ if $B > 1000$
$F = .012B$ if $1000 \geq B \geq 50$
$F = 1$ if $50 > B > 0$
$F = 0$ if $B = 0$

5. $F = .012B$
$F = .012(\$600)$
$F = \$7.20$

6. The lowest possible charge if the balance is over \$1000 is $\$1000.01 \times .008 = \$8.00$ (rounded). If the balance were under \$50, the charge would have been \$1.00, so it must have been between \$50.00 and \$1000.00.

$\$7.00 = .012 \times B$
$\$7.00 \div .012 = B$
$B = \$583.33$(rounded)

7. Let P = Pay and H = Hours.

$P = 10H$ for all hours under 40.
$P = 15H$ for all hours over 40.
$P = 20H$ for holiday hours.

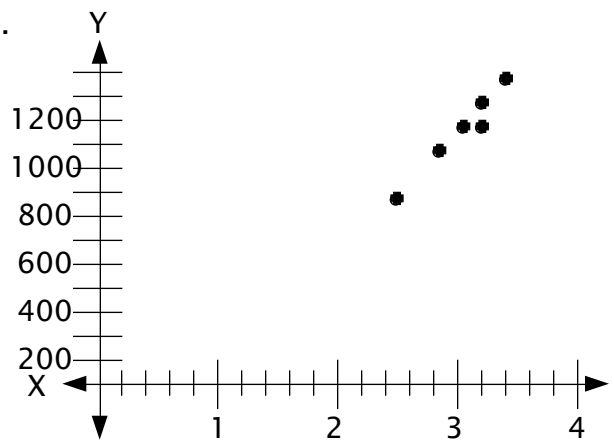
8. $P = 10H$
$P = 10(40)$
$P = \$400$

9. $40(10) + 5(15) + 6(20) =$
$400 + 75 + 120 = \$595$

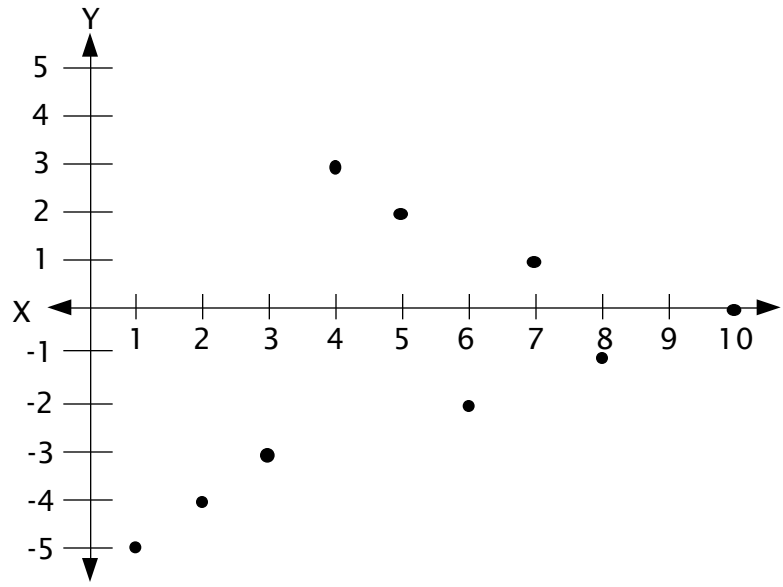
10. $\$580 - \$400 = \$180$ in overtime pay.
$\$180 \div \$15 = 12$ hours overtime;
$12 + 40$ regular $= 52$ hours worked.

Honors Lesson 10H

1.

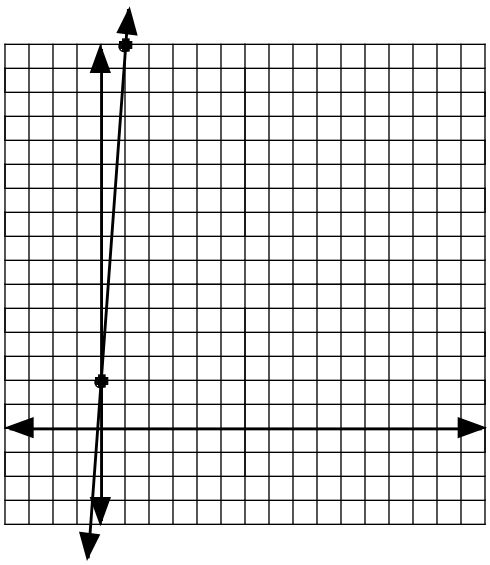


2.



Honors Lesson 11H

1.



2. slope $= \frac{Y_2 - Y_1}{X_2 - X_1}$

$\frac{400-50}{5-0} = \frac{350}{5} = 70$

This is not the slope that you will get from a quick observation of the graph. Remember that you used two different scales for X- and Y-axes.

3. $Y = mX + b$

$50 = 70(0) + b$

$50 = b$

$Y = 70X + 50$

4. $G = 70T + 50$

5. $V = 70(30) + 50$

$V = 2{,}100 + 50$

$V = \$2{,}150$

6. start with points $(10, 50)$ and $(15, 80)$

$$\text{slope} = \frac{80-50}{15-10} = \frac{30}{5} = 6$$

$$Y = mX + b$$
$$(50) = 6(10) + b$$
$$50 = 60 + b$$
$$-10 = b$$
$$Y = 6X - 10$$
$$G = 6T - 10$$

7. $G = 6(12) - 10$
$G = 72 - 10$
$G = 62$

8. $90 = 6T - 10$
$100 = 6T$
$T = 16.67$ (rounded)

Honors Lesson 12H

1. $C = .15M + 20$

2. $C = 0M + 30$ or $C = 30$

3. plan 1: $C = .15(80) + 40(2 \text{ days})$
$C = 12 + 40$
$C = \$52$

plan 2: $C = \$60(2 \text{ days})$

Plan 1 is cheaper.

4. $\frac{5}{100} = \frac{1}{20}$

5. $\frac{Y_2 - Y_1}{X_2 - X_1}$

$\frac{2-0}{X-0} = \frac{1}{20}$
$2(20) = 1(X)$
$X = 40$ ft

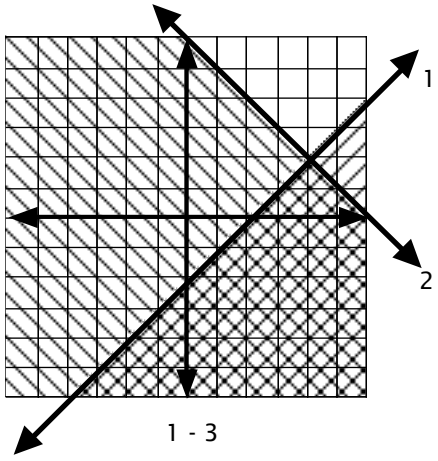
Honors Lesson 13H

1. $X - Y = 2$
$-Y = -X + 2$
$Y = X - 2$

(Try a sample set of points to see which side of the line to shade.)

2. $X + Y = 6$
$Y = -X + 6$

3. yes



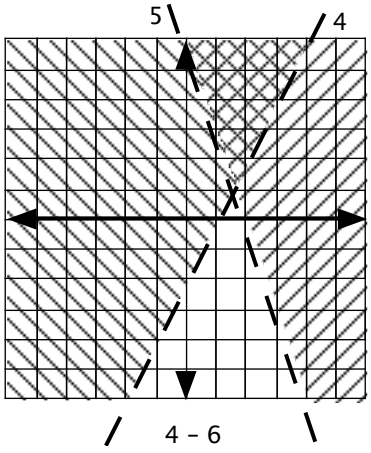
1 - 3

4. $2X - Y = 2$
$-Y = -2X + 2$
$Y = 2X - 2$

Original problem was inequality only, so line is dotted.

5. $3X + Y = 6$
$Y = -3X + 6$

6. no

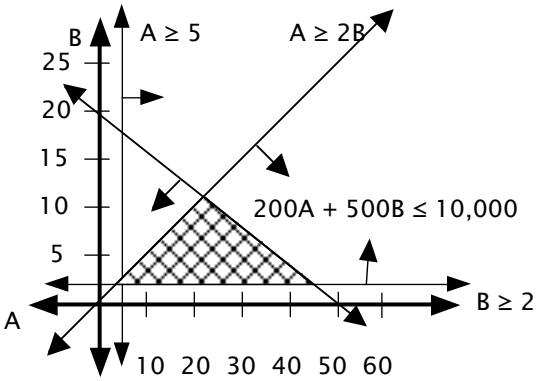


4 - 6

7.
$$A \geq 2B$$
$$200A + 500B \leq 10{,}000$$
$$A \geq 5$$
$$B \geq 2$$

8. See graph; only the final answer has been shaded here. The shaded side of each line is indicated by the small arrows.

9. 20 A's and 5 B's is one possible solution. Answers will vary.



Honors Lesson 14H

1. 8 ft = 96 in $\frac{1}{12}$ can be written as $\frac{8}{96}$.

$\frac{9}{96} > \frac{8}{96}$, so no.

2.
$$\frac{10}{X} = \frac{1}{12}$$
$$X(1) = (10)(12)$$
$$X = 120 \text{ in or } 10 \text{ ft}$$

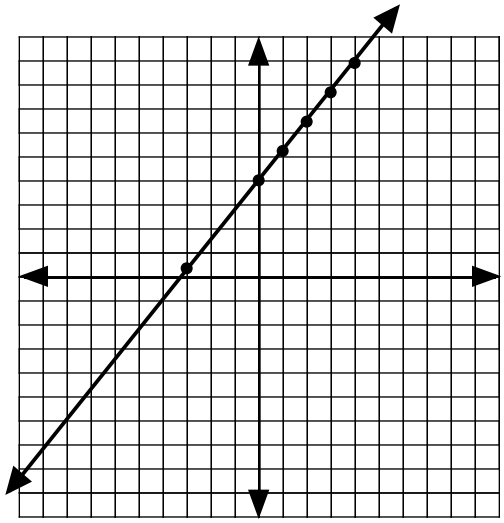
3.
$$L = W + 3$$
$$2L + 2W = 4.5W$$
$$2(W+3) + 2W = 4.5W$$
$$2W + 6 + 2W = 4.5W$$
$$6 = .5W$$
$$12 = W$$
$$L = (12) + 3$$
$$L = 15$$

4.
$$B = 12T + 42$$
$$B = 12(4) + 42$$
$$B = 48 + 42$$
$$B = 90$$
$90,000

5.
$$B = 12T + 42$$
$$B = 12(5) + 42$$
$$B = 60 + 42$$
$$B = 102$$
$102,000

6.
$$B = 12T + 42$$
$$126 = 12T + 42$$
$$84 = 12T$$
$$2000 + 7 = 2007$$

7.



8. Any answer close to $5,000 would be ok.

Honors Lesson 15H

1.
$$T + S = 62.48$$
$$2T + S = 87.98$$

$$S = 62.48 - T$$
$$2T + (62.48 - T) = 87.98$$
$$T + 62.48 = 87.98$$
$$T = 25.50$$

2. $10C + 5P = 85$
$20C + 8P = 158$

$5P = 85 - 10C$
$P = 17 - 2C$
$20C + 8(17 - 2C) = 158$
$20C + 136 - 16C = 158$
$4C = 22$
$C = \$5.50$ per bag

3. $N + P = 2$
$N = 2 - P$
$2(2 - P) + 3P = 4.75$
$4 - 2P + 3P = 4.75$
$4 + P = 4.75$
$P = \$.75$ per pen

4. $180 - 3W = 150 - 2W$
$30 = W$ (weeks)

5. L = number of people working two years or less
M = number of people working more than two years

$L + M = 700$
$10L + 15M = 8500$

$M = 700 - L$
$10L + 15(700 - L) = 8500$
$10L + 10500 - 15L = 8500$
$-5L = -2000$
$L = 400$

6. $3X = \left(\frac{1}{4}\right)2Y$
$12X = 2Y$
$6X = Y$

4, 24
5, 30
6, 36

(Answers will vary. The second number will be six times the first.)

Honors Lesson 16H

1. $C = .12N + \$2000$

2. $R = .62N$

3. $C = R$
$.12N + 2000 = .62N$
$2000 = .62N - .12N$
$2000 = .50N$
$4{,}000 = N$

4. Plan 1: 19.95 a month for any number of hours

Plan 2: $4.95 + 2 \times 2 = \$8.95$
$4.95 + 2 \times 6 = \$16.95$
$4.95 + 2 \times 10 = \$24.95$
$4.95 + 2 \times 14 = \$32.95$

5. $C = \$19.95$; $C = 4.95 + 2H$

6. $19.95 = 4.95 + 2H$
$19.95 - 4.95 = 2H$
$15 = 2H$
$7.5 = H$

If you use the Internet more than 7.5 hours per month, then Plan 1 is better.

Honors Lesson 17H

1. Hometown: $F = 10 + .10(C - 50)$
AmeriBank: $F = 8 + .12(C - 50)$

2. $10 + .10(C - 50) = 8 + .12(C - 50)$
$10 + .10C - 5 = 8 + .12C - 6$
$5 + .10C = 2 + .12C$
$3 = .02C$
$150 = C$

3. Hometown: $F = 10 + .10(60)$
$F = \$16$

AmeriBank: $F = 8 + .12(60)$
$F = \$15.20$

AmeriBank's program would be cheaper.

4. $C = 30{,}000 + 75S$

5. $C = 30{,}000 + 75(2000)$
$C = 30{,}000 + 150{,}000$
$C = 180{,}000$

6. $150{,}000 = 30{,}000 + 75S$
$120{,}000 = 75S$
$1{,}600 = S$

Honors Lesson 18H

1. D = number of dimes
$3D$ = number of nickels
$3D + 4$ = number of quarters

$D + 3D + 3D + 4 = 18$
$7D + 4 = 18$
$7D = 14$
$D = 2$ dimes

$3(2) = 6$ nickels
$(6) + 4 = 10$ quarters

2. C = number of children
$2C$ = number of adults
$4C$ = number of seniors

$4(C) + 8(2C) + 5(4C) = 1120$
$4C + 16C + 20C = 1120$
$40C = 1120$
$C = 28$ children

$2(28) = 56$ adults
$4(28) = 112$ seniors
$28 + 56 + 112 = 196$ people

3. number of business rooms = B
number of coupons rooms = $B + 8$
number of standard rooms = $(B + 8)10 = 10B + 80$
number of senior rooms = $(10B + 80) - 10 = 10B + 70$

$45(B) + 40(B + 8) + 50(10B + 80) + 35(10B + 70) = 8640$
$45B + 40B + 320 + 500B + 4000 + 350B + 2450 = 8640$
$935B + 6770 = 8640$
$935B = 1870$
$B = 2$ business

$(2) + 8 = 10$ coupon
$10(2) + 80 = 100$ standard
$10(2) + 70 = 90$ senior
$2 + 10 + 100 + 90 = 202$ rooms occupied
$250 - 202 = 48$ empty rooms

4. T = number of 20¢ stamps
$T + 5$ = number of 37¢ stamps
$10(T + 5)$ = number of 1¢ stamps

$.20T + .37(T + 5) + .01(10(T + 5)) = 5.70$
$20T + 37(T + 5) + 10(T + 5) = 570$
$20T + 37T + 185 + 10T + 50 = 570$
$67T + 235 = 570$
$67T = 335$

T = five 20¢ stamps
$T + 5$ = ten 37¢ stamps
$T = 100$ one-cent stamps

5. W = number of women
$W + 1$ = number of men
C = number of children

$8(W) + 10(W + 1) + 5C = 112$
$8W + 10W + 10 + 5C = 112$
$18W + 5C = 102$

$W + W + 1 + C = 15$
$2W + 1 + C = 15$
$2W + C = 14$
$C = 14 - 2W$

Substitute $14 - 2W$ for C in 1st equation:

$18W + 5(14 - 2W) = 102$
$18W + 70 - 10W = 102$
$8W = 32$
$W = 4$ women

$W + 1 = 5$ men
$15 - (4 + 5) = 15 - 9 = 6$ children

6. Let X = 1st digit, and Y = 2nd

$X + Y = 10$
$10Y + X = 36 + 10X + Y$
$9Y = 36 + 9X$

$-9X + 9Y = 36$
$+(9X + 9Y = 90)$ 1st eq. multiplied by 9
$18Y = 126$

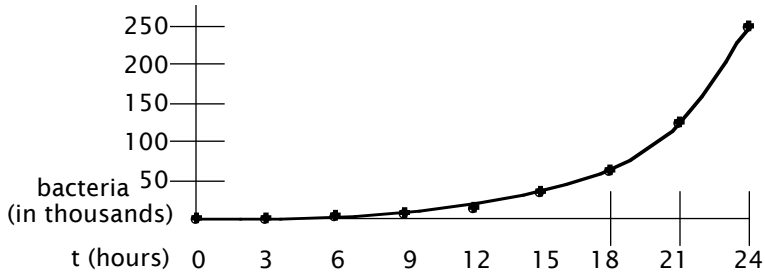
$Y = 7$(second digit)
$10 - 7 = 3$(first digit)
number is 37
$73 - 37 = 36$

Honors Lesson 19H

1. t = hours; b = bacteria in thousands

t	0	3	6	9	12	15	18	21	24
b	1	2	4	8	16	32	64	128	256

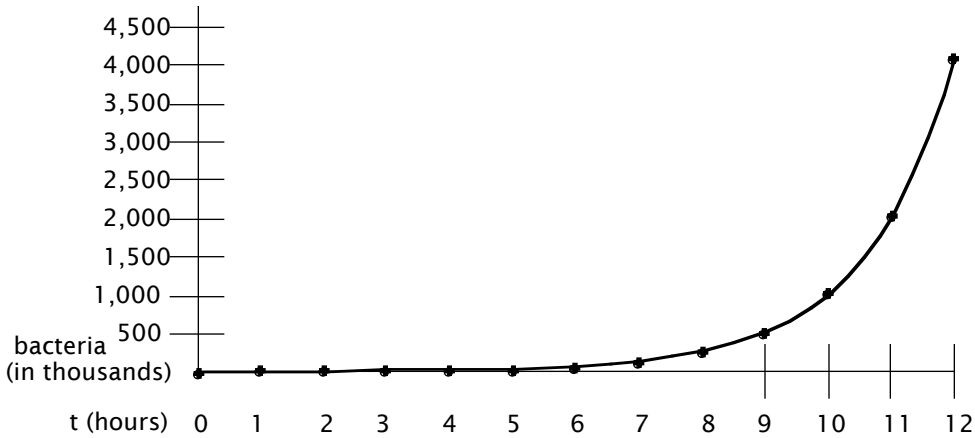
2.



3. t = hours; b = bacteria in thousands

t	0	1	2	3	4	5	6	7	8	9	10	11	12
b	1	2	4	8	16	32	64	128	256	512	1,024	2,048	4,096

4.



5. The rate of increase increases over time.

Honors Lesson 20H

1. x = # of months; m = mass in grams

x	0	1	2	3	4
m	200	100	50	25	12.5

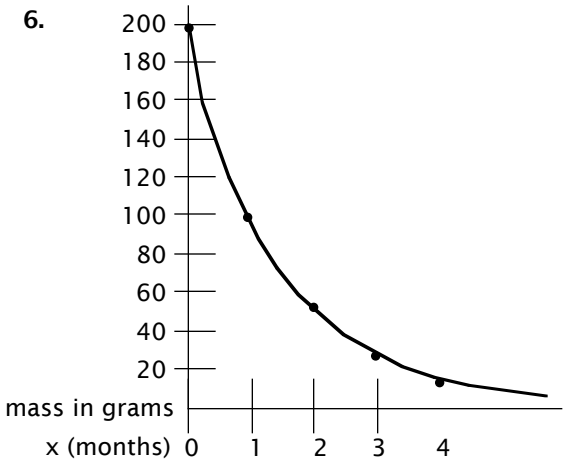
2. 200 g

3. 1 month

4. 2 months

5. 12.5 g

6.



7. $m = 200(.5)^x$

$m = 200(.5)^6$

$m = 200(.0156) = 3.125$ g

Honors Lesson 21H

1. done

2. $B = (A)2^{\frac{x}{D}}$

$B = 10\left(2^{\frac{30}{5}}\right)$

$B = \left(2^6\right)$

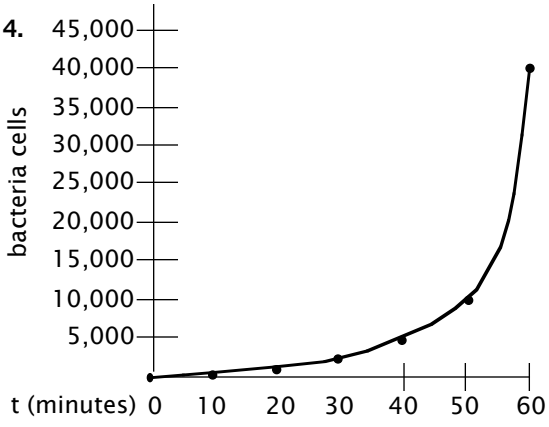
$B = 10(64) = 640$

3. $B = 10\left(2^{\frac{60}{5}}\right)$

$B = 10\left(2^{12}\right)$

$B = 10(4096) = 40{,}960$

4.



Honors Lesson 22H

1. never true: $3^{-2} = \frac{1}{9}$

2. sometimes true: $\left(\frac{1}{3}\right)^{-2} = 9$

3. never true: $\frac{1}{7} \neq \frac{1}{2} + \frac{1}{5}$

4. never true: $\frac{2}{X^0} = \frac{2}{1} = 2$

5. always true: $1 - 1 = 0$

6. never true: $8^{-1} = \frac{1}{8}$

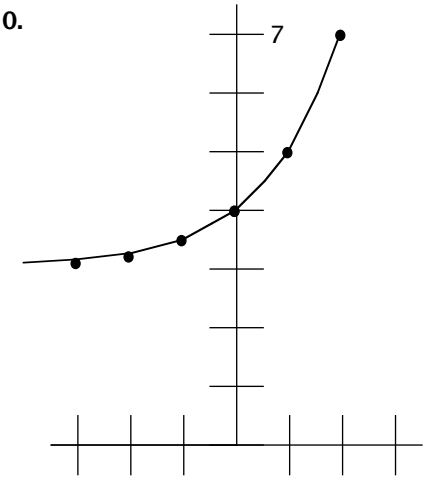
7. always true: a number multiplied by its reciprocal always equals 1.

8. always true: When raising a power to a power, you multiply exponents.

9.

X	Y
0	4
1	5
2	7
−1	3.5
−2	3.25

10.

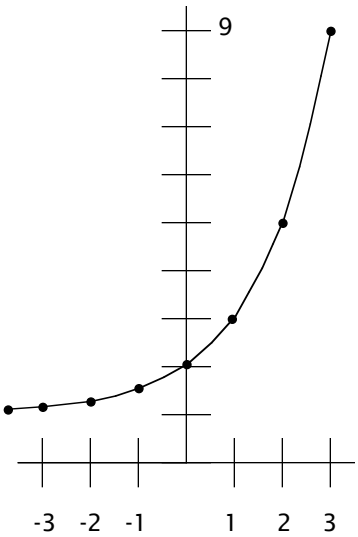


Honors Lesson 23H

1.

X	Y
0	2
1	3
2	5
3	9
–1	1.5
–2	1.25
–3	1.125

2.



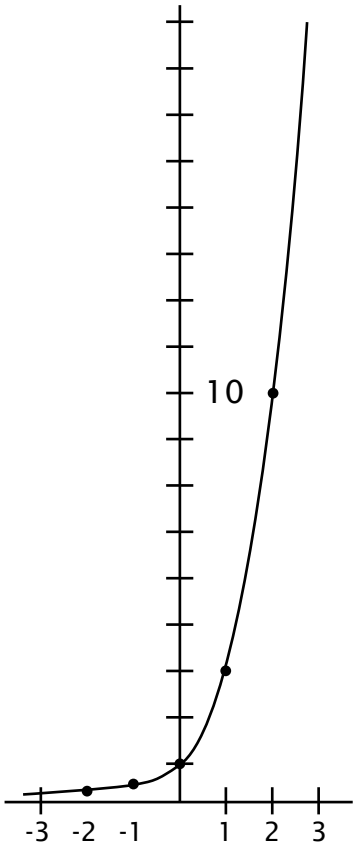
3. They get smaller.

4. They get larger.

5.

X	Y
0	1
1	3
2	9
3	27
4	81
–1	$\frac{1}{3}$
–2	$\frac{1}{9}$

6.



Honors Lesson 24H

1. $A = (2X)(12 + 2X)$

$A = 4X^2 + 24X$

2. $4(10)^2 + 24(10) = 400 + 240 = 640 \text{ ft}^2$

3. $A = \frac{1}{2}bh$

$A = \frac{1}{2}(Y + 1)(2Y - 1)$

$A = \frac{1}{2}(2Y^2 - Y + 2Y - 1)$

$A = \frac{1}{2}(2Y^2 + Y - 1)$

4.

$$\begin{array}{r} 2X^5 - 3X^4 + 7X \\ X^8 \qquad -2X^4 + 3X \\ \hline X^8 + 2X^5 - 5X^4 + 10X \end{array}$$

5.
$$\begin{array}{r} 6X^4 \quad +8 \\ \hline 2X^9-3X^5-7X^4+4X-2 \\ 2X^9-3X^5-1X^4+4X+6 \end{array}$$

6.
$$\begin{array}{r} 5X^3-7 \\ \hline 6X^4-5X^3+7 \\ 6X^4 \end{array}$$

7. $(2X^2+7)(3X^3+X) =$
$6X^5+2X^3+21X^3+7X = 6X^5+23X^3+7X$

8. $(4X^5+3)(X^2-2) = 4X^7-8X^5+3X^2-6$

9. $8X^4(7X^5-2X^3+3) = 56X^9-16X^7+24X^4$

Honors Lesson 25H

1. $\$12{,}200 \div 800 = \$15.25$ profit per gun

2. $P = \$19.50(2{,}000) - 3400$
$P = 39{,}000 - 3400$
$P = \$35{,}600$

3. $\$35{,}600 \div 2{,}000 = \$17.80$ per gun
As long as fixed costs remain the same, selling more items means more profit per item

4. fixed costs = 1,500 rent + 1,600 equipment + (100×4) electricity = \$3,500
$P = 19.50 - 3{,}500$
$P = 19.50(800) - 3{,}500$
$P = \$12{,}100$

5. $C = 3N + 500$
$R = 5N$

6. $P = 5N - (3N + 500)$
$P = 2N - 500$

7. $P = 2(500) - 500$
$P = 1{,}000 - 500 = \$500$

8. $P = 2N - 500$
$P = 2(2{,}000) - 500$
$P = 4{,}000 - 500 = \$3{,}500$

9. $0 = 2N - 500$
$500 = 2N$
$250 = N$
250 boxes of candy must be sold in order to break even.

Honors Lesson 26H

1. $P = 100N - (65N + 18{,}000)$
$P = 35N - 18{,}000$

2. $P = 35(1{,}000) - 18{,}000$
$P = 35{,}000 - 18{,}000$
$P = \$17{,}000$

3. $\$17{,}000 \div 1{,}000 = \$17$ per item

4. $P = 35(2{,}000) - 18{,}000$
$P = 70{,}000 - 18{,}000$
\$52,000

5. $\$52{,}000 \div 2{,}000 = \$26$ per item

6. $0 = 35N - 18{,}000$
$18{,}000 = 35N$
514.29 (rounded)
515 items is break – even point

7. $P = 50N - (30N + 10{,}000)$
$P = 20N - 10{,}000$
$P = 20(1{,}000) - 10{,}000$
$P = 20{,}000 - 10{,}000 = \$10{,}000$
$\$10{,}000 \div 1{,}000 = \$10$ per case

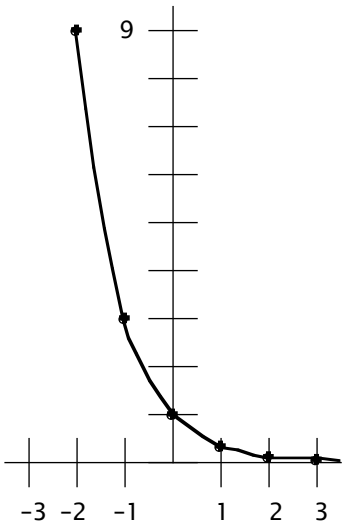
8. $P = 50N - (30N + 10{,}000)$
$P = 20N - 10{,}000$
$P = 20(2{,}000) - 10{,}000$
$P = 40{,}000 - 10{,}000 = \$30{,}000$
$\$30{,}000 \div 2{,}000 = \$15$ per case
It is more.

9. $R = 50N$
$C = 30N + 10{,}000$
R will equal C when: $50N = 30N + 10{,}000$
$20N = 10{,}000$
$N = 500$ cases

Honors Lesson 27H

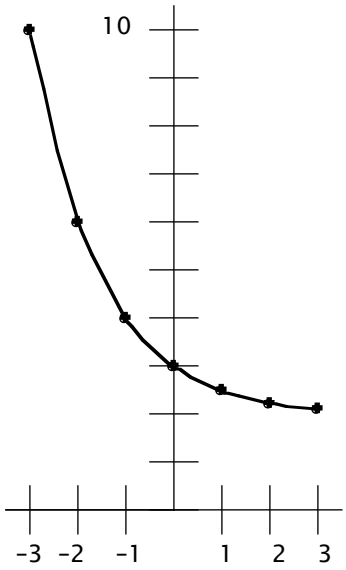
1. $2(2A^2+1)$
2. not factorable
3. not factorable
4. $8B(B^3+4)$
5. not factorable
6. $(X+3)(2X+1)$
7.

X	Y
0	1
1	.33
2	.11
−1	3
−2	9

8. 

9. They get smaller. They get larger.
10.

X	Y
0	3
1	2.5
2	2.25
3	2.125
−1	4
−2	6
−3	10

11. 

12. They get smaller. They get larger.

Honors Lesson 28H

1. $2X^3 - X^2 + 4X - 2 =$
   $X^2(2X-1) + 2(2X-1) = (2X-1)(X^2+2)$
2. $3A^3 - 6A^2 - A + 2$
   $-3A^2(-A+2) + 1(-A+2) = (-A+2)(-3A^2+1)$
3. $2B^3 + 3B^2 + 2B + 3 =$
   $B^2(2B+3) + (2B+3) = (B^2+1)(2B+3)$
4. $2X^4 + 4X^3 - 3X - 6 =$
   $2X^3(X+2) - 3(X+2) = (2X^3-3)(X+2)$
5. $4Y^2 + 6Y - 2Y - 3 =$
   $4Y^2 - 2Y + 6Y - 3 =$
   $2Y(2Y-1) + 3(2Y-1) =$
   $(2Y+3)(2Y-1)$
6. $6P^4 - 6P^3 + 14P^2 - 14P =$
   $6P^3(P-1) + 14P(P-1) =$
   $(6P^3+14P)(P-1) = 2P(3P^2+7)(P-1)$

7. $\frac{x^3+x^2-2x}{x^2+2x-3}\cdot\frac{x+3}{x^2+2x}=$

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

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

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

8. $\frac{x+5}{x^2-3x+2}\div\frac{x^2+3x}{x^3-x^2-6x}=$

$\frac{x+5}{(x+1)(x+2)}\cdot\frac{x(x^2-x-6)}{x(x-3)}=$

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

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

Honors Lesson 29H

1. $d=vt+16t^2$

$96=16t+16t^2$

$12=2t+2t^2$

$2t^2+2t-12=0$

$(2t-4)(t+3)=0$

$t=2,\ t=-3$

-3 makes no sense, so $t=2$ seconds

2. $77+3=80$, so the rock was dropped from 80 ft above the water

$d=vt+16t^2$

$80=8t+16t^2$

$10=t+2t^2$

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

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

$t=-2.5,\ 2$

-2.5 makes no sense, so $t=2$ seconds

3. $2000-80=1920$

so distance was 1,920 ft

$d=vt^2+16t^2$

$1920=32t+16t^2$

$120=2t+t^2$

$t^2+2t-120=0$

$(t+12)(t-10)=0$

$t=-12,\ 10$

-12 makes no sense, so $t=10$ seconds

4. $d=vt+16t^2$

$d=10(4)+16(4)^2$

$d=40+16(16)$

$d=40+256$

$d=296$ ft

Honors Lesson 30H

You may also use the unit multiplier method to get your answer. Either method is fine.

1. $300\times18=5{,}400$ in

$5{,}400\div12=450$ ft

This can also be figured by writing 18 in as 1.5 ft and multiplying.

2. 50×1.5 ft $=75$ ft

30×1.5 ft $=45$ ft

length from #1 $=450$ ft

$450\times75\times45=1{,}518{,}750$ ft^3

3. 1 pace $=5$ ft

$5\times1000=5000$ ft in Roman mile

It is shorter than modern mile.

4. $5{,}280\times5{,}280=27{,}878{,}400$

$28{,}000{,}000$ ft^2 (rounded)

one acre $=43{,}560$ ft^2 (from text)

$28{,}000{,}000\div43{,}560=643$ mornings (rounded)

5. a yard

6. 18×2 in $=36$ in

This is the number of inches short his measure is.

36 in $=3$ ft

$18-3=15$ ft $=$ actual length of room

7. Answers will vary.

Honors Lesson 31H

You may also have used the unit multipler method to get your answer. Either method is fine unless the directions specified using unit multipliers.

1. $20{,}000 \times 3 = 60{,}000$ mi
   $60{,}000 \times 8 = 480{,}000$ furlongs
2. $1{,}920 \div 4 = 480$ chains
   $480 \div 10 = 48$ furlongs
   $48 \div 8 = 6$ mi
3. 1 furlong = 10 chains
   $10 \times 4 = 40$ rods
4. $1 \text{ mi} \times \frac{8 \text{ furlongs}}{1 \text{ mi}} \times \frac{10 \text{ chains}}{1 \text{ furlong}} \times \frac{22 \text{ yd}}{1 \text{ chain}} \times \frac{3 \text{ ft}}{1 \text{ yd}}$
   = 5,280 feet
5. 14 pounds in a stone
   $14 \times 2 = 28$ pounds in a quarter
   $28 \times 4 = 112$ pounds in a hundredweight
   $112 \times 20 = 2{,}240$ pounds in a ton
   heavier than an American ton
6. $6{,}400 \text{ lb} \div 8 = 800$ gallons
   $800 \text{ gallons} \div 2 = 400$ pecks
   $400 \text{ pecks} \div 4 = 100$ bushels
7. $6{,}400 \div 2{,}240 = 2.86$ tons(rounded)
8. $\frac{1}{2}$ bushel = 2 pecks
   $2 \text{ pecks} \times 2 = 4$ gal
   $4 \text{ gal} \times 8 = 32$ lb

Honors Lesson 32H

1. $2(1.008) + 16.00 = 18.02$ amu(rounded)
2. $22.0 + 1.008 + 12.0 + 3(16.00) =$
   83.0 amu(rounded)
3. $1.008 + 35.5 = 36.5$ amu(rounded)
4. $12.0 + 2(16.00) = 44.0$ amu
5. hydrocholoric acid:
   $36.5 \times 1.67 \times 10^{-24} = 6.10 \times 10^{-23}$ g
   carbon dioxide:
   $44.0 \times 1.67 \times 10^{-24} = 7.35 \times 10^{-23}$ g
6. $4(12.0) + 10(1.008) + 16.00 = 74.08$ amu
   $74.08 \times 1.67 \times 10^{-24} = 1.24 \times 10^{-22}$ g

Honors Lesson 33H

1. $225 \div 16 = 14$ remainder 1
   E1
2. $888 \div 256 = 3$ remainder 120
   $120 \div 16 = 7$ remainder 8
   378
3. $5 \times 256 = 1{,}280$
4. $7 \times 256 + 5 \times 16 = 1{,}872$
5. A little bit of red, a little bit of green, and a lot of blue: since the amounts of red and green are insignificant, the result is blue.
6. FFFFFF
   Remember that we are mixing light, not paint, so white is all colors mixed together.
7. blue – green

Honors Lesson 34H

Each step was rounded using significant digits.

1. $P^2 = 11.8^3$

$P^2 = 1640$

$P = \sqrt{1640} = 40.5$ A.U.

$40.5 \times 365 = 14{,}782.5 =$

14,800 days using sig. digits

2. Most students know that Pluto is the furthest (former) planet from the sun, and that Mercury is closer to earth. Since this planet has an orbit size less than 1, it must be closer to the sun than the earth. So the answer is Mercury.

3. $P^2 = 1.88^3$

$P^2 = 6.64$

$P = \sqrt{6.64} = 2.58$ A.U.

$2.58 \times 365 = 942$ days using sig. digits

4. $P = 100 \div 365 \approx .274$

$.274^2 = A^3$

$\sqrt[3]{.075} = A$

$A = .422$ A.U.

$.422 \times 9.3 \times 10^7 = 3.925 \times 10^7$ mi

3.9×10^7 miles using sig. digits

Honors Lesson 35H

1. $2L + 3W = 1{,}200$

$2L = 1{,}200 - 3W$

$L = \dfrac{1{,}200 - 3W}{2}$

$A = \left(\dfrac{1{,}200 - 3W}{2}\right)(W)$

$= \dfrac{-3W^2 + 1{,}200W}{2}$

$= -\dfrac{3}{2}W^2 + 600W$

$h = \dfrac{-600}{(2)\left(-\frac{3}{2}\right)} = \dfrac{-600}{-3} = 200$

$k = \dfrac{-3(200)^2 + 1{,}200(200)}{2}$

$= \dfrac{-120{,}000 + 240{,}000}{2}$

$= \dfrac{120{,}000}{2} = 60{,}000\,\text{ft}^2$

$60{,}000 \div 200 = 300$ ft

dimensions with maximum area: $200\text{ ft} \times 300\text{ ft}$

2. $2L + 2W = 1{,}200$

$2L = 1{,}200 - 3W$

$L = 600 - W$

$A = (600 - W)(W) = -W^2 + 600W$

$h = \dfrac{600}{2(-1)} = 300$

$k = -(300)^2 + 600(300)$

$= -90{,}000 + 180{,}000 = 90{,}000\ \text{ft}^2$

$90{,}000 \div 300 = 300\,\text{ft}$

dimensions with maximum area: $300\text{ ft} \times 300\text{ ft}$