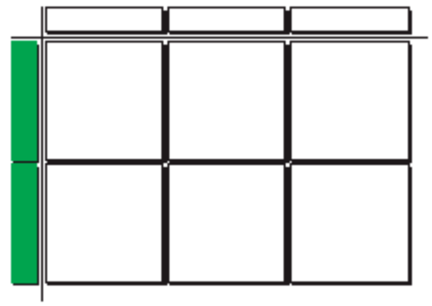
Chapter 7 Practice Test

Chapter 7 Practice Test Page 280 Question 1



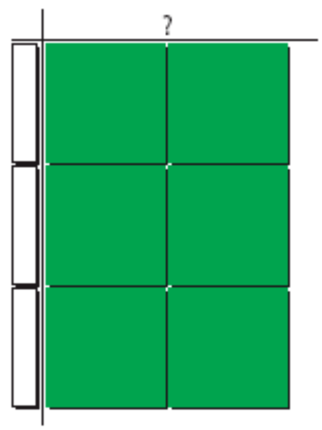
The width is two positive x-tiles. The length is three negative x-tiles. The area of the rectangle is made up of six negative x^2-tiles. The multiplication statement is $(2x)(-3x) = -6x^2$.
The correct choice is B.

Chapter 7 Practice Test Page 280 Question 2

$$\begin{aligned}&(3y)(2.7y)\\&= (3)(2.7)(y)(y)\\&= 8.1y^2\end{aligned}$$

The correct choice is D.

Chapter 7 Practice Test Page 280 Question 3



$$\frac{6x^2}{-3x}$$
$$= \frac{\overset{-2x}{\cancel{6x^2}}}{\underset{1}{\cancel{-3x}}}$$
$$= -2x$$

The monomial division statement is $\frac{6x^2}{-3x} = -2x$.

The correct choice is C.

Chapter 7 Practice Test Page 280 Question 4

$$\frac{-27q^2}{9q}$$
$$= \frac{\overset{-3q}{\cancel{-27q^2}}}{\underset{1}{\cancel{9q}}}$$
$$= -3q$$

$\frac{-27q^2}{9q}$ is equivalent to $-3q$.
The correct choice is C.

Chapter 7 Practice Test Page 280 Question 5

$$\left(\frac{2x}{3}\right)(-3x-6)$$
$$= \left(\frac{2x}{3}\right)(-3x) - \left(\frac{2x}{3}\right)(6)$$
$$= \left(\frac{2}{3}\right)(-3)(x)(x) - \left(\frac{2}{3}\right)(6)(x)$$
$$= -2x^2 - 4x$$

$\left(\frac{2x}{3}\right)(-3x-6)$ is equivalent to $-2x^2 - 4x$.
The correct choice is A.

Chapter 7 Practice Test Page 280 Question 6

$$\frac{15y^2 - 10y}{-5y}$$
$$= \frac{15y^2}{-5y} - \frac{10y}{-5y}$$
$$= \frac{\overset{-3y}{\cancel{15y^2}}}{\underset{1}{\cancel{-5y}}} - \frac{\overset{-2}{\cancel{10y}}}{\underset{1}{\cancel{-5y}}}$$
$= -3y - (-2)$
$= -3y + 2$

$\frac{15y^2 - 10y}{-5y}$ is equivalent to $-3y + 2$.
The correct choice is B.

Chapter 7 Practice Test Page 280 Question 7

$$\frac{-24x^2 + 8xz}{4x}$$
$$= \frac{-24x^2}{4x} + \frac{8xz}{4x}$$
$$= \frac{\overset{-6x}{\cancel{-24x^2}}}{\underset{1}{\cancel{4x}}} + \frac{\overset{2z}{\cancel{8xz}}}{\underset{1}{\cancel{4x}}}$$
$= -6x + 2z$

$\frac{-24x^2 + 8xz}{4x}$ is equivalent $-6x + 2z$.

Chapter 7 Practice Test Page 280 Question 8

Example: 12*d* could be the measurement of the length. The width can be calculated by dividing the area by the length.

$$\begin{aligned}\text{Width} &= \frac{24d^2 - 12d}{12d}\\ &= \frac{24d^2}{12d} - \frac{12d}{12d}\\ &= \frac{\overset{2d}{\cancel{24d^2}}}{\underset{1}{\cancel{12d}}} - \frac{\overset{1}{\cancel{12d}}}{\underset{1}{\cancel{12d}}}\\ &= 2d - 1\end{aligned}$$

A possible polynomial multiplication expression that is equivalent to $24d^2 - 12d$ is $(12d)(2d - 1)$.

Chapter 7 Practice Test Page 280 Question 9

$$\begin{aligned}&(2.4x)(4y)\\ &= (2.4)(4)(x)(y)\\ &= 9.6xy\end{aligned}$$

Chapter 7 Practice Test Page 280 Question 10

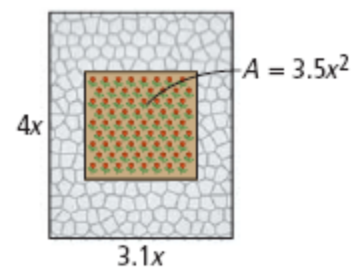
$$\begin{aligned}&(12h)\left(\frac{-3}{4}h + 2\right)\\ &= (12h)\left(\frac{-3}{4}h\right) + (12h)(2)\\ &= (12)\left(\frac{-3}{4}\right)(h)(h) + (12)(2)(h)\\ &= -9h^2 + 24h\end{aligned}$$

Chapter 7 Practice Test Page 280 Question 11

$$\frac{2x^2+3x}{-3x}$$
$$=\frac{2x^2}{-3x}+\frac{3x}{-3x}$$
$$=\frac{2\cancelto{x}{x^2}}{-3\cancelto{1}{x}}+\frac{\cancelto{-1}{3x}}{\cancelto{1}{-3x}}$$
$$=-\frac{2x}{3}-1$$

Chapter 7 Practice Test Page 280 Question 12

The difference between the area of the patio and the area of the flowerbed is the area of the paving stones.



The area of the patio = $(4x)(3.1x)$
= $(4)(3.1)(x)(x)$
= $12.4x^2$

Area of paving stones = $12.4x^2 - 3.5x^2$
= $8.9x^2$

The area of the paving stones is $8.9x^2$.

Chapter 7 Practice Test Page 281 Question 13

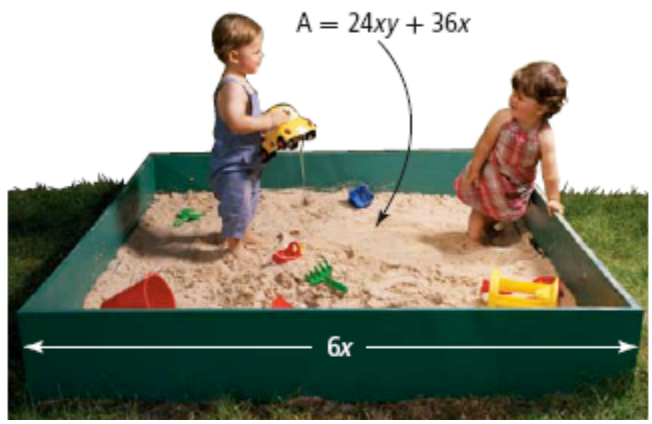
Since the width is represented by the variable w, the length is represented by $2w + 15$.

Area = (length)(width)
= $(2w + 15)(w)$
= $(2w)(w) + (15)(w)$
= $2w^2 + 15w$

The area of the field is represented by the expression $2w^2 + 15w$.

Chapter 7 Practice Test   Page 281   Question 14

The length of the sandbox can be determined by diving the area by the width.



$$\text{Length} = \frac{24xy + 36x}{6x}$$
$$= \frac{24xy}{6x} + \frac{36x}{6x}$$
$$= \frac{\overset{4}{\cancel{24x}}\,y}{\underset{1}{\cancel{6x}}} + \frac{\overset{6}{\cancel{36x}}}{\underset{1}{\cancel{6x}}}$$
$$= 4y + 6$$

The perimeter can be calculated by adding length and width together, and then multiplying the sum by 2.

$$\begin{aligned}\text{Perimeter} &= 2[(4y + 6) + 6x] \\ &= 2[4y + 6x + 6] \\ &= 2(4y) + 2(6x) + 2(6) \\ &= 8y + 12x + 12\end{aligned}$$

The perimeter of the sandbox is $8y + 12x + 12$.

Chapter 7 Practice Test   Page 281   Question 15

a) When Karim separated the division into two parts, he wrote down an addition operation instead of the subtraction operation.

b) The correct method is

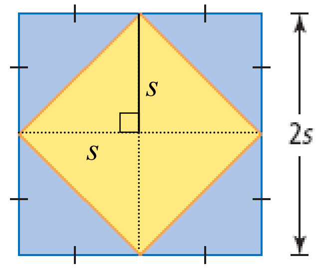
$$\frac{-18d^2 - 6d}{3d}$$
$$= \frac{-18d^2}{3d} - \frac{6d}{3d}$$
$$= \frac{\overset{-6d}{\cancel{-18d^2}}}{\underset{1}{\cancel{3d}}} - \frac{\overset{2}{\cancel{6d}}}{\underset{1}{\cancel{3d}}}$$
$$= -6d - 2$$

Chapter 7 Practice Test Page 281 Question 16

The area of the larger square, A_1, is $(\text{length})^2$.

$$\begin{aligned} A_1 &= (2s)^2 \\ &= (2s)(2s) \\ &= (2)(2)(s)(s) \\ &= 4s^2 \end{aligned}$$

The area of the smaller square, A_2, is the sum of the areas of four identical triangles with base and height both equal to s.



$$\begin{aligned} A_2 &= 4\left(\frac{(s)(s)}{2}\right) \\ &= 4\left(\frac{1}{2}\right)(s)(s) \\ &= 2s^2 \end{aligned}$$

The ratio of the area of the larger square to the area of the smaller square is

$$\begin{aligned} &\frac{4s^2}{2s^2} \\ &= \frac{\overset{2}{\cancel{4s^2}}}{\underset{1}{\cancel{2s^2}}} \\ &= 2:1 \end{aligned}$$

Chapters 5–7 Review

Chapters 5–7 Review Page 284 Question 1

a) Horizontally, we need one positive x-tile and three positive 1-tiles, or $(x + 3)$. Vertically, we need one x-tile and one 1-tile, or $(x + 1)$.

Thus, the perimeter, P, is calculated using the formula 2(length) + 2(width).

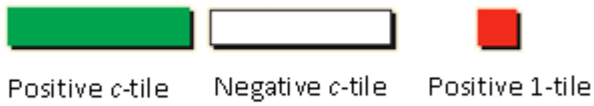
$$
\begin{aligned}
P &= 2(x + 3) + 2(x + 1) \\
&= (x + 3) + (x + 3) + (x + 1) + (x + 1) \\
&= (x + x + x + x) + (3 + 3 + 1 + 1) \\
&= 4x + 8
\end{aligned}
$$

The perimeter of the rectangle is $2(x + 3) + 2(x + 1)$, or $4x + 8$.

b) The rectangle has one x^2-tile, four x-tiles, and three 1-tiles. Therefore, the area is $x^2 + 4x + 3$.

Chapters 5–7 Review   Page 284   Question 2

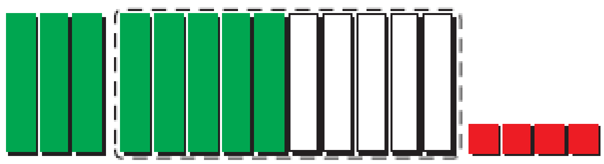
a) Use the following tiles to show the collection of terms.



Step 1

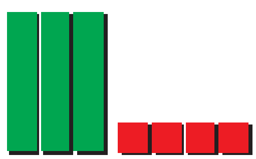
Draw eight positive *c*-tiles, three positive 1-tiles, five negative *c*-tiles, and one positive 1-tile.

Step 2



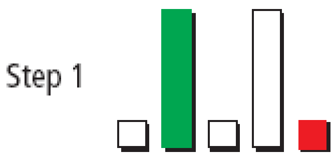
Put the same number of positive and negative *c*-tiles together. As a whole, the group has a sum of zero.

Step 3

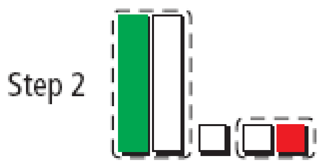


The remaining tiles show the collection after the zero pairs are removed.

b) Use the following tiles to show the collection of terms.



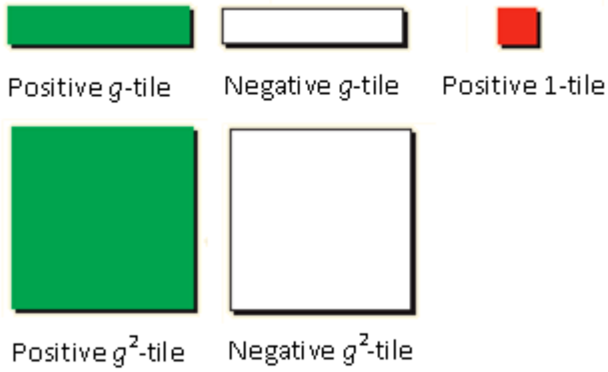
Draw one negative 1-tile, one positive x-tile, one negative 1-tile, one negative x-tile, and one positive 1-tile.

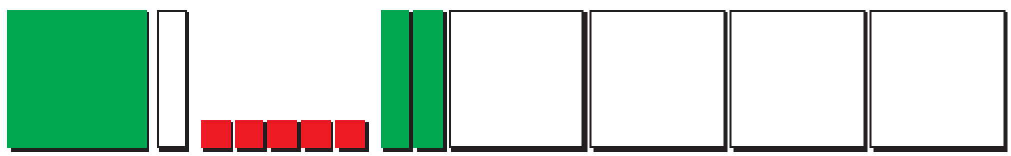


Put the same number of positive and negative x-tiles together. Put the same number of positive and negative 1-tiles together. As a whole, each of the two groups has a sum of zero.

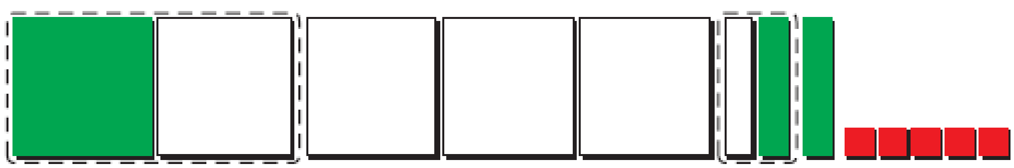
The remaining tile shows the collection after the zero pairs are removed.

c) Use the following tiles to show the collection of terms.

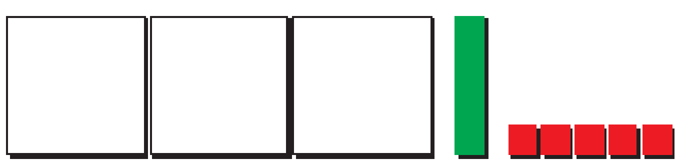




Draw one positive g^2-tile, one negative g-tile, five positive 1-tiles, two positive g-tiles, and four negative g^2-tiles.



Put the same number of positive and negative g^2-tiles together. Put the same number of positive and negative g-tiles together. As a whole, each of the two groups has a sum of zero.



The remaining tiles show the collection after the zero pairs are removed.

Chapters 5–7 Review Page 284 Question 3

a) $(2m - 3) + (5m + 1)$
$= 2m + 5m - 3 + 1$
$= 7m - 2$

b) $(w^2 - 4w + 7) + (3w^2 + 5w - 3)$
$= w^2 + 3w^2 - 4w + 5w + 7 - 3$
$= 4w^2 + w + 4$

c) $(9y^2 - 6.8) + (4.3 - 9y - 2y^2)$
$= 9y^2 - 2y^2 - 9y - 6.8 + 4.3$
$= 7y^2 - 9y - 2.5$

Chapters 5–7 Review Page 284 Question 4

a) $(-7z + 3) - (-4z + 5)$
$= (-7z + 3) + (4z - 5)$
$= -7z + 3 + 4z - 5$
$= -7z + 4z + 3 - 5$
$= -3z - 2$

b) $(3d - 2d - 7) - (d^2 - 5d + 6cd - 2)$
$= (3d - 2d - 7) + (- d^2 + 5d - 6cd + 2)$
$= 3d - 2d - 7 - d^2 + 5d - 6cd + 2$
$= -d^2 - 6cd + 3d - 2d + 5d - 7 + 2$
$= -d^2 - 6cd + 6d - 5$

c) $(2x^2 + 3xy) - (-xy + 4x^2)$
$= (2x^2 + 3xy) + (xy - 4x^2)$
$= 2x^2 + 3xy + xy - 4x^2$
$= 2x^2 - 4x^2 + 3xy + xy$
$= -2x^2 + 4xy$

Chapters 5–7 Review Page 284 Question 5

a) Example: The variable I represents income, c represents the number of comic books sold, h represents the number of hardcover books sold, and p represents the number of paperback books sold. The algebraic expression $I = 10c + 8h + 3p$ would represent the shop's income.

b) By substituting the given values, we have

$I = 10c + 8h + 3p$
$= 10(15) + 8(7) + 3(5)$
$= 150 + 56 + 15$
$= 221$

The sale would bring in $221.

c) Example: Use 'guess and check' to come up with a few combinations that have a sum of $100.

$I = 10c + 8h + 3p$

$10c$ is a multiple of tens, so try values for h and p so that the sum $8h + 3p$ is also a multiple of tens. For example, $8(2) + 3(8) = 16 + 24 = 40$. So, $10c$ must be 60 or c has a value of 6.

Thus, 6 comic books, 2 hardcover books, and 8 paperback books would bring in $100.

To see that another combination would work, determine values for c, h, and p so that $100 = 10c + 8h + 3p$.

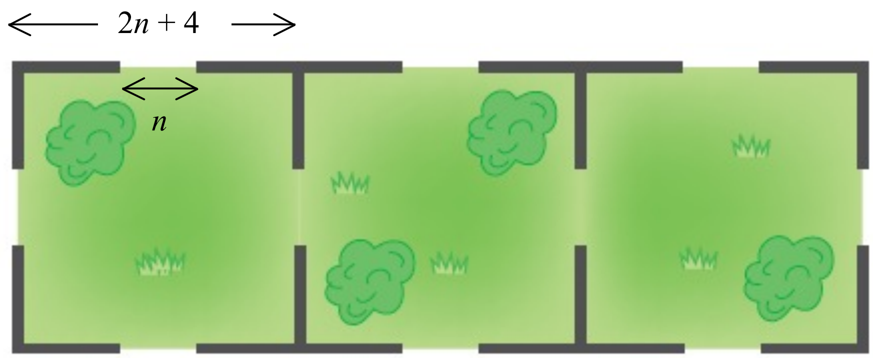
Now, try $h = 8$, $p = 2$, and $c = 3$.

$100 = 10(3) + 8(8) + 3(2)$
$= 30 + 64 + 6$
$= 100$

It is possible to have more than one way to bring in an income of $100.

Chapters 5–7 Review Page 284 Question 6

Since each side of the square fencing is identical to one another, we only need to calculate the measurement of one side. The length of fencing material needed per side is the length minus the opening.



Each side = length – opening
= $(2n + 4) - n$
= $2n - n + 4$
= $n + 4$

There are ten similar sides in total. Therefore, the amount of material needed is $10(n + 4)$.

Chapters 5–7 Review   Page 284   Question 7

a) A different color is used for the new squares that appear in each subsequent figure.

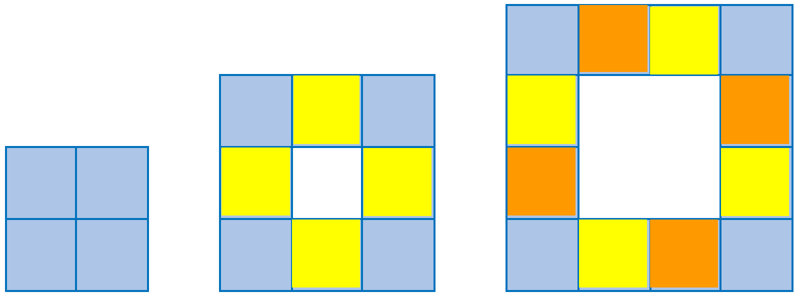


Figure 1 starts out with four blue squares.

Figure 2 has four blue squares and four yellow squares.

Figure 3 has four blue squares, four yellow squares, and four orange squares.

The pattern starts with four squares; each new figure has four new squares.

b) Write a linear relation based on the figure number. The following table shows the relationship between figure number and the number of squares found.

Figure number (n)	1	2	3	4
Number of squares (t)	4	8	12	16

The linear relation is $t = 4n$, where t represents the total number of squares and n represents the figure number.

c) For $n = 8$,
$t = 4n$
$= 4(8)$
$= 32$
There will be a total of 32 squares in figure 8.

Chapters 5–7 Review   Page 285   Question 8

a) Week 0 could start with \$112. Every week thereafter, add \$25 to the previous balance. The table stops after the fifth deposit.

Week	Savings (\$)
0	112
1	137
2	162
3	187
4	212
5	237

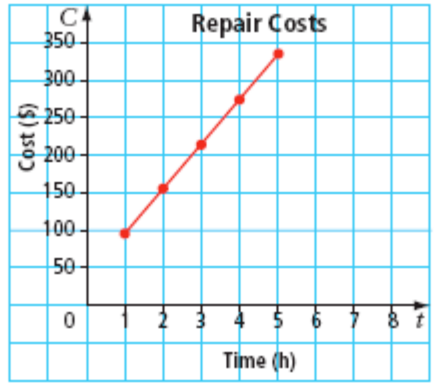
b) Let w represent the week number and s represent her savings. The linear equation that models the situation is $s = 112 + 25w$.

c) Monika`s goal is to have \$450. Substitute 450 for the value of s and solve the linear equation $s = 112 + 25w$.

$$\begin{aligned} s &= 112 + 25w \\ 450 &= 112 + 25w \\ 450 - 112 &= 112 - 112 + 25w \\ 338 &= 25w \\ \frac{338}{25} &= \frac{25}{25}w \\ 13.52 &= w \end{aligned}$$

It would take at least 13.52 weeks to save up to \$450. Monika would need to save for about 4 months.

Chapters 5–7 Review Page 285 Question 9



a) The linear equation that models the relationship is $C = 35 + 60t$, where C stands for the cost of repair and t stands for number of hours worked. For an 8-h job, substitute 8 for the variable t.

$$\begin{aligned} C &= 35 + 60t \\ &= 35 + 60(8) \\ &= 35 + 480 \\ &= 515 \end{aligned}$$

The repair cost would be $515 for the work done.

b) Substitute 225 for the value of C. To calculate the hours worked, solve the linear equation.

$$\begin{aligned} 225 &= 35 + 60t \\ 225 - 35 &= 35 - 35 + 60t \\ 190 &= 60t \\ \frac{190}{60} &= \frac{60}{60}t \\ 3.2 &= t \end{aligned}$$

Rounded to the nearest tenth, $225 would pay for approximately 3.2 h of work done on the vehicle.

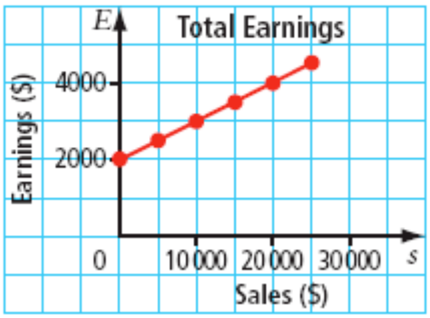
c) Each half-hour increment costs $30. So, 9.5 h means 19 half-hour increments. Substitute 19 for the value of t.

$$\begin{aligned} C &= 35 + 30(19) \\ &= 35 + 570 \\ &= 605 \end{aligned}$$

The repair cost for 9.5 h of work is $605.

Chapters 5–7 Review   Page 285   Question 10

a) The monthly salary appears to be \$2000, independent of any sales made. The salesperson would then receive 10% commission on any sales that he or she made. The graph should start at 2000 when the sale is zero. At every \$5000 sales mark, add \$500 to the earnings.



b) The linear relationship is $e = 2000 + 0.1s$, where s represents the amount of sales and e represents the amount of earnings. To find the total sales for the month, solve the equation when $e = 3750$.

$$\begin{aligned} 3750 &= 2000 + 0.1s \\ 3750 - 2000 &= 2000 - 2000 + 0.1s \\ 1750 &= 0.1s \\ \frac{1750}{0.1} &= \frac{0.1}{0.1}s \\ 17\,500 &= s \end{aligned}$$

The total sales for the month is \$17 500.

c) Substitute 5500 for the value of e and solve the linear equation.

$$\begin{aligned} 5500 &= 2000 + 0.1s \\ 5500 - 2000 &= 2000 - 2000 + 0.1s \\ 3500 &= 0.1s \\ \frac{3500}{0.1} &= \frac{0.1}{0.1}s \\ 35\,000 &= s \end{aligned}$$

The total sales for the month is \$35 000.

d) The earnings, e, is now 4250. Solve the linear equation using $e = 4250$.

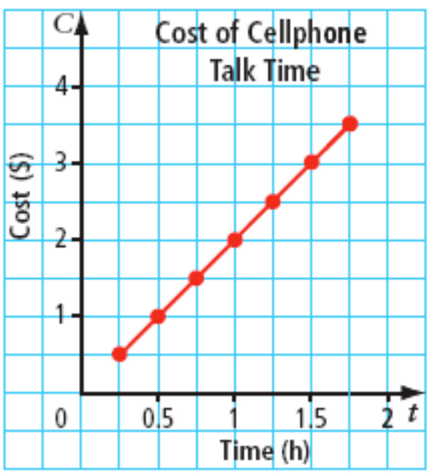
$$\begin{aligned} 4250 &= 2000 + 0.1s \\ 4250 - 2000 &= 2000 - 2000 + 0.1s \\ 2250 &= 0.1s \\ \frac{2250}{0.1} &= \frac{0.1}{0.1}s \\ 22\,500 &= s \end{aligned}$$

The total sales for the month is $22 500.

Chapters 5–7 Review **Page 285** **Question 11**

a) It appears that the time is in increments of 0.25 h and the cost is in increments of 50 cents per 0.25 h. The following graph describes the relationship between time and cost.

Example: A cell phone company charges 50 cents for every 0.25 h of talk time purchased.



b) The numerical value for the cost appears to be two times as much as the numerical value for the time. Let C represent the cost of the call and t represent the amount of talk time in hours. Use the linear relation $C = 2t$.

c) For a talk time of 3.25 h,

$$\begin{aligned} C &= 2(3.25) \\ &= 6.50 \end{aligned}$$

The cost of 3.25 h of talk time would be $6.50.

Chapters 5–7 Review Page 286 Question 12

a) $(3x)(4x)$
$= (3)(4)(x)(x)$
$= 12x^2$

b) $(2.5y)(-4y)$
$= (2.5)(-4)(y)(y)$
$= -10y^2$

c) $(s)(-0.5s)$
$= (1)(-0.5)(s)(s)$
$= -0.5\ s^2$

d) $\left(\frac{t}{5}\right)(10t)$
$= \left(\frac{1}{5}\right)(10)(t)(t)$
$= 2t^2$

a) $\dfrac{8.4x^2}{x}$

$= \dfrac{8.4\cancel{x^2}^{\,x}}{\cancel{x}_{\,1}}$

$= 8.4x$

b) $\dfrac{-12h^2}{2h}$

$= \dfrac{\cancel{-12h^2}^{\,-6h}}{\cancel{2h}_{\,1}}$

$= -6h$

c) $\dfrac{-0.6n^2}{-0.2n}$

$= \dfrac{\cancel{-0.6n^2}^{\,3n}}{\cancel{-0.2n}_{\,1}}$

$= 3n$

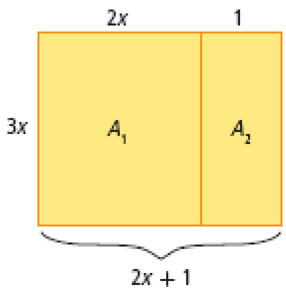
d) $\dfrac{4.8p^2}{-1.2p}$

$= \dfrac{\cancel{4.8p^2}^{\,-4p}}{\cancel{-1.2p}_{\,1}}$

$= -4p$

Chapters 5–7 Review Page 286 Question 14

a) Draw a rectangle with length $3x$ and width $2x$. Draw another rectangle with a common side $3x$ and width of 1 unit. To find the product of $(3x)(2x + 1)$, find the total area of the two rectangles.

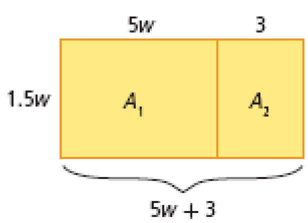


$A_1 = (3x)(2x)$
$= (3)(2)(x)(x)$
$= 6x^2$

$A_2 = (3x)(1)$
$= 3x$

$A_1 + A_2 = 6x^2 + 3x$
Therefore, $(3x)(2x + 1) = 6x^2 + 3x$.

b) Draw a rectangle with length $1.5w$ and width $5w$. Draw another rectangle with a common side $1.5w$ and width of 3 units. To find the product of $(1.5w)(5w + 3)$, find the total area of the two rectangles.



$A_1 = (1.5w)(5w)$
$= (1.5)(5)(w)(w)$
$= 7.5w^2$

$A_2 = (1.5w)(3)$
$= 4.5w$

$A_1 + A_2 = 7.5w^2 + 4.5w$

Therefore, $(1.5w)(5w + 3) = 7.5w^2 + 4.5w$.

Chapters 5–7 Review Page 286 Question 15

Let w represent the width. The length is $2w + 3$.

Area = (length)(width)
$= (2w + 3)(w)$
$= (2w)(w) + (3)(w)$
$= 2w^2 + 3w$

The expression for the area of the foosball table is $(2w + 3)(w)$ or $2w^2 + 3w$.

Chapters 5–7 Review Page 286 Question 16

a) $\frac{12g^2 + 8g}{4g}$

$= \frac{12g^2}{4g} + \frac{8g}{4g}$

$= \frac{\overset{3g}{\cancel{12g^2}}}{\underset{1}{\cancel{4g}}} + \frac{\overset{2}{\cancel{8g}}}{\underset{1}{\cancel{4g}}}$

$= 3g + 2$

b) $\frac{-6x^2 + 3xy}{3x}$

$= \frac{-6x^2}{3x} + \frac{3xy}{3x}$

$= \frac{\overset{-2x}{\cancel{-6x^2}}}{\underset{1}{\cancel{3x}}} + \frac{\overset{y}{\cancel{3xy}}}{\underset{1}{\cancel{3x}}}$

$= -2x + y$

c) $\frac{9.3ef^2 - 62e}{-3.1e}$

$= \frac{9.3ef^2}{-3.1e} + \frac{-62e}{-3.1e}$

$= \frac{\overset{-3f^2}{\cancel{9.3ef^2}}}{\underset{1}{\cancel{-3.1e}}} + \frac{\overset{20}{\cancel{-62e}}}{\underset{1}{\cancel{-3.1e}}}$

$= -3f^2 + 20$

d) $\dfrac{24n^2 + 8n}{0.5n}$

$= \dfrac{24n^2}{0.5n} + \dfrac{8n}{0.5n}$

$= \dfrac{\overset{48n}{\cancel{24n^2}}}{\underset{1}{\cancel{0.5n}}} + \dfrac{\overset{16}{\cancel{8n}}}{\underset{1}{\cancel{0.5n}}}$

$= 48n + 16$

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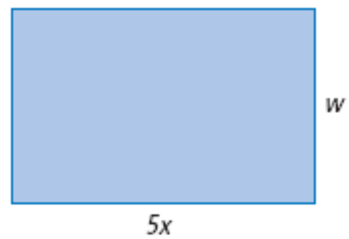
Width can be calculated as the area divided by the length.



Width $= \dfrac{10x^2 - 5x}{5x}$

$= \dfrac{10x^2}{5x} - \dfrac{5x}{5x}$

$= \dfrac{\overset{2x}{\cancel{10x^2}}}{\underset{1}{\cancel{5x}}} - \dfrac{\overset{1}{\cancel{5x}}}{\underset{1}{\cancel{5x}}}$

$= 2x - 1$