

Math 9

Unit 7 Review

1) Practice Test: pg. 280/ 1 – 15

[key below]

2) Worksheet Attached: on sheet

~~[key on back of this sheet]~~

3) Chapter Review: pg. 278/ 1 – 4, 6, 8, 9, 12 – 18

~~[key in text]~~

Chapter 7 Practice Test KEY

1. B 2. D 3. C 4. C 5. A 6. B 7. $-6x + 2z$

8. Example: $(12d)(2d - 1)$ 9. $9.6xy$ 10. $-9h^2 + 24h$

11. $-\frac{2}{3}x - 1$ 12. $8.9x^2$ 13. $2w^2 + 15w$ 14. $12x + 8y + 12$

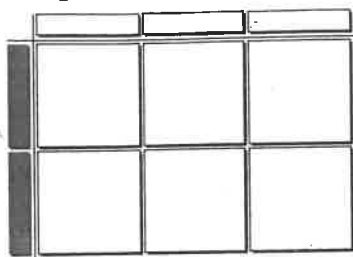
15. a) The addition sign should be a subtraction sign.

$$\begin{aligned} \text{b) } \frac{-18d^2 - 6d}{3d} &= \frac{-18d^2}{3d} - \frac{6d}{3d} \\ &= -6d - 2 \end{aligned}$$

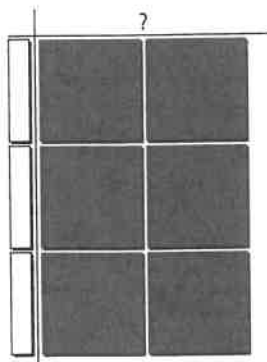
Chapter 7 Practice Test

For #1 to #6, select the best answer.

1. Which monomial multiplication statement is represented by the algebra tiles?



- A $(3x)(-2x) = -6x^2$
 B $(2x)(-3x) = -6x^2$
 C $(2x)(3x) = 6x^2$
 D $(-2x)(-3x) = 6x^2$
2. What is the product of $3y$ and $2.7y$?
 A $0.9y$ B $8.1y$
 C $0.9y^2$ D $8.1y^2$
3. Which monomial division statement is represented by the algebra tiles?



- A $\frac{-6x^2}{-3x} = -2x$
 B $\frac{-6x^2}{-3x} = 2x$
 C $\frac{6x^2}{-3x} = -2x$
 D $\frac{6x^2}{-3x} = 2x$

4. Which is equivalent to $-27q^2 \div 9q$?

- A $3q^2$ B $3q$
 C $-3q$ D $-3q^2$

5. Which is equivalent to $\left(\frac{2}{3}x\right)(-3x - 6)$?

- A $-2x^2 - 4x$ B $-2x - 4$
 C $2x - 4$ D $2x^2 - 4x$

6. Calculate $\frac{15y^2 - 10y}{-5y}$.

- A $-3y - 2$ B $-3y + 2$
 C $3y - 2$ D $3y + 2$

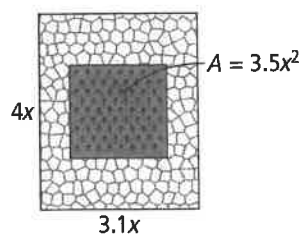
Complete the statements in #7 and #8.

7. The expression $\frac{-24x^2 + 8xz}{4x}$ is equivalent to $\boxed{}$.
8. A polynomial multiplication expression that is equivalent to $24d^2 - 12d$ is $\boxed{}$.

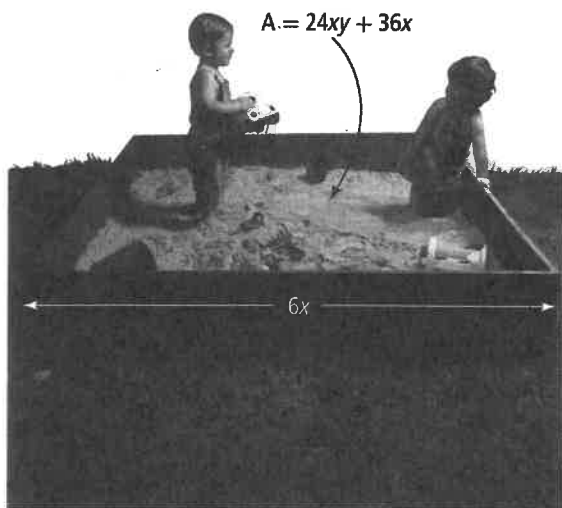
Short Answer

For #9 to #11, show all of the steps in your solutions.

9. Calculate $(2.4x)(4y)$.
10. What is the product of $12h$ and $\frac{-3}{4}h + 2$?
11. Simplify $\frac{2x^2 + 3x}{-3x}$.
12. Paula is building a rectangular patio. It will have a square flower bed in the middle. The rest will have paving stones. The patio will have a length of $4x$ and a width of $3.1x$. The area of the flower bed will be $3.5x^2$. What area of the patio will need paving stones?



13. A sports field is 15 m longer than twice its width. What is an expression for the area of the field in terms of its width, w ? Expand the expression.
14. The area of a rectangular sandbox can be expressed as $24xy + 36x$. The width of the sandbox is $6x$. What is the perimeter of the sandbox?



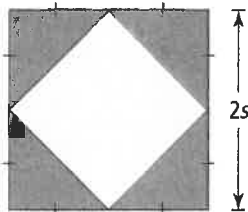
Extended Response

15. a) What error did Karim make when completing the division statement shown?

$$\begin{array}{r} -18d^2 - 6d \\ \underline{3d} \\ -18d^2 + 6d \\ \underline{3d} \\ -6d + 2 \end{array}$$

- b) Show the correct method.

16. A square with a side length of $2s$ has a smaller square inscribed. The vertices of the smaller square are at the midpoints of the sides of the larger square. What is the ratio of the area of the larger square to the area of the smaller square? Express your answer in its simplest form.



Math Link: Wrap It Up!

You have been hired to create a landscape design for a park. The park is rectangular and covers an area of $500\,000\text{ m}^2$. The park includes the following features:

- a play area covered with bark mulch
- a sand area for playing beach volleyball
- a wading pool

The features in your design include the following shapes:

- a circular area
- a rectangular area
- a parallelogram-shaped area with the base three times the height

The features of your park have varying depths.

Include the following in your design:

- a scale drawing showing the layout of each of the required features
- a list showing the area of each feature and the volume of each material (mulch, sand, and water) required to complete the park
- a polynomial expression for the area and volume of each feature, using a variable for one of the dimensions





Multiplying a Polynomial by a Monomial

$$\begin{aligned} -2a^2(9 - a - 4a^2) &= -2a^2 \cdot 9 - (-2a^2 \cdot a) - (-2a^2 \cdot 4a^2) = -18a^2 + 2a^3 + 8a^4 \\ (x + 2)(2x^2) &= 2x^2 \cdot x + 2x^2 \cdot 2 = 2x^3 + 4x^2 \end{aligned}$$

1. $2(x^2 - xy + 3y^2)$
2. $-2n(4 + 5n^3)$
3. $c^2d(c^2d^3 + 2cd^2 + d)$
4. $2xy^2(2 - x - x^2y)$
5. $(a^2 - 3ab - 2b^2)(-2ab)$
6. $3n(8n^2 - 2n)$
7. $(w^2z - 2wz + z)(-z^2)$
8. $-3ab^2(a^3b^2 - 2a^2b)$
9. $4x^2y(9x^2 - 6xy^2 - 7)$
10. $-6k^2m^2(2k - 3m + 4km - k^2m^2)$
11. $-n^2(n + 4n^2)$
12. $(4x^2 - 7x)(-x)$
13. $2x^2(x^3 - 2x^2 + 8x - 5)$
14. $(-6x^3)(3x^2 - 1)$
15. $(6x - 5x^2 + 8)(-3x)$
16. $-5x^2(2x^3 + 3x^2 - 7x + 9)$

Find the area.

$$A = l \cdot w$$

17.

$$x + 4$$

2x



18. A triangle has a base length (b) of $2x + 4$ and a height (h) of $3y$.

$$(\text{Area} = \frac{1}{2}bh)$$

Algebraic Fractions



Dividing a Polynomial by a Monomial

$$\frac{r^2 + 6r + 5}{r} = \frac{r^2}{r} + \frac{6r}{r} + \frac{5}{r}$$
$$= r + 6 + \frac{5}{r}$$

1. $\frac{a^2 + 2a}{a}$

9. $\frac{14k^3m^3 - 4k^2m^2 + 12km^3}{2km^2}$

2. $\frac{14x + 35}{7}$

10. $\frac{12v^5 - 27v^4 + 18uv^3}{3uv^3}$

3. $\frac{4y^2 + 6y}{2y}$

11. $\frac{2x^2 - 10xy}{2x}$

4. $\frac{x^2y - xy^2}{xy}$

12. $\frac{3x^3y^2 - 6x^2y^2 + 6xy^2}{3xy}$

5. $\frac{25u^2 - 15u - 5}{-5}$

13. $\frac{6z^2 - 3z + 9}{3z}$

6. $\frac{12x^2 - 9x^3 + 6x^4}{3x}$

14. $\frac{6a^2 + 42a + 72}{6a^3}$

7. $\frac{m^2n^2 + m - n}{mn}$

15. $\frac{64x^4 - 64x^3}{64x^3}$

8. $\frac{45a^2b^4 - 60a^3b^2 - 15a^2b}{-15a^2b}$

16. $\frac{18m^3n^4 - 12m^2n^3 + 24n^2}{6m^2n}$

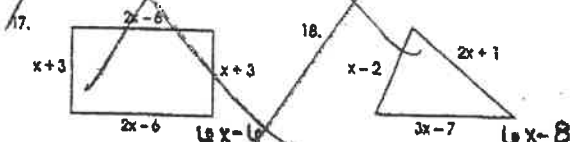
Polynomials

Adding and Subtracting Polynomials

$$(2x^2 - 3x + 4) + (x^2 - 5x + 7) = 3x^2 - 8x + 11$$

- $(4x + 2) + (x - 1) = 5x + 1$
- $(5a - 2b + 4) + (2a + b + 2) = 7a - b + 6$
- $(3a + 2b) - (a - b) = 2a + 3b$
- $(x^2 + y^2 - ab) - (x^2 - y^2 + ab) = 2y^2 - 2ab$
- $(4a^2 - 5ab - 6b^2) + (10ab - 6a^2 - 6b^2) = -2a^2 + 5ab - 12b^2$
- $(4x^2 - 2x - 3) - (-5x - 4) = 4x^2 + 3x + 1$
- $(4a^2 - 4ab - b^2) + (a^2 - b^2) - (2ab + a^2 + b^2) = 4a^2 - 2ab - b^2$
- $(-4x^2 + 6x + 3x - 1) - (8x^2 + 4x^2 - 2x + 3) = -12x^2 - 10x^2 + 5x - 4$
- $(a + 2b) + (3b - 4a) + (5a - 7c) + 3b = 6a + 8b - 11c$
- $(x^2 - 2xy + y^2) - (x^2 - 2xy + y^2) = 0$
- $(x + 3y) + (-3x - y) - (x - y) = -3x + 3y$
- $(2x^2 + 3y^2 - z^2) - (x^2 + y^2 - z^2) + (4x^2 - 3y^2) = 5x^2 + y^2$
- $(2x + 3) + (2x^2 + x - 5) = 2x^2 + 3x - 2$
- $(2y + 3x - 4) + (9 - 8y - 5x) - (3x + 4y - 2) = x - 2y + 3$
- $(2x^2 + 8) - (3y^2 - 4y - 6) = 2x^2 - 3y^2 + 4y + 14$
- $(7y - 4x + 9) - (6x - 8 + 11) = -2x + 15y - 2$

Find the perimeter.



KEY

Polynomials

Multiplying a Polynomial by a Monomial

$$2a^2(9 - a - 4ab) = 18a^2 - 2a^3 - 8a^3b$$

- $2(x^2 - xy + 3y^2) = 2x^2 - 2xy + 6y^2$
- $-2n(4 + 5n^2) = -8n - 10n^3$
- $-c^2d(c^2d^2 + 2cd^2 + d) = -c^4d^3 + 2c^3d^3 + c^2d^3$
- $2xy^2(2 - x - xy) = 4xy^2 - 2x^2y^2 - 2x^2y^3$
- $(a^2 - 3ab - 2b^2)(-2ab) = -2a^3b + 6a^2b^2 + 4ab^3$
- $3n(8n^2 - 2n) = 24n^3 - 6n^2$
- $(wz - 2wx + z)(-z^2) = -wz^3 + 2wxz^2 - z^3$
- $-3ab^2(a^2b^2 - 2ab^2) = -3a^3b^4 + 6a^2b^3$
- $4xy(9x^2 - 6xy^2 - 7) = 36x^3y - 24x^2y^3 - 28x^2y$
- $-6km^2(2k - 3m + 4km - km^2) = -12k^2m^2 + 18k^2m^3 - 24k^3m^2 + 6k^4m^3$
- $n^2(n + 4n^2) = 4n^3 + n^3$
- $(4x^2 - 7x)(-x) = -4x^3 + 7x^2$
- $2x^2(x^2 - 2x^2 + 8x - 5) = 2x^4 - 4x^4 + 16x^3 - 10x^3$
- $(-6x^2)(3x^2 - 1) = -18x^4 + 6x^2$
- $(6x - 5x^2 + 8)(-3x) = 15x^3 - 18x^2 - 24x$
- $-5x^2(2x^2 + 3x^2 - 7x + 9) = -10x^4 - 15x^4 + 35x^3 - 45x^2$

Find the area.

17. $A = l \cdot w$
 $x + 4$
 $a = 2x^2 + 8x$
18. A triangle has a base length (b) of $2x + 4$ and a height (h) of $3y$.
 $(\text{Area} = \frac{1}{2}bh) = 3xy + 6y$

Polynomials

Multiplying Binomials Using FOIL

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

- $(x + 2)(x + 3) = x^2 + 5x + 6$
- $(y + 7)(y + 4) = y^2 + 11y + 28$
- $(x - 8)(x + 4) = x^2 - 4x - 32$
- $(x - 6)(x - 4) = x^2 - 12x + 24$
- $(y - 4)(y + 5) = y^2 + y - 20$
- $(x - 9)(x - 2) = x^2 - 11x + 18$
- $(2x + 4)(x + 3) = 2x^2 + 10x + 12$
- $(3x + 2)(2x + 5) = 6x^2 + 19x + 10$
- $(4x - 9)(3x + 1) = 12x^2 - 23x - 9$
- $(2x + 5)(4x - 3) = 8x^2 + 14x - 15$
- $(n - 7)(3n - 2) = 3n^2 - 23n + 14$
- $(5x + 2)(3x - 7) = 15x^2 - 24x - 14$
- $(-4x + 5)(-2x - 3) = 8x^2 + 2x - 15$
- $(-x - 4)(4 + 3x) = -3x^2 - 16x - 16$
- $(x + 2y)(2x + 3y) = 2x^2 + 7xy + 6y^2$
- $(6x - y)(3x - 2y) = 18x^2 - 15xy + 2y^2$
- $(4x + y)(3x - y) = 12x^2 - 13xy - 4y^2$
- $(5a + 3b)(4a - b) = 20a^2 + 7ab - 3b^2$

Algebraic Fractions

Dividing a Polynomial by a Monomial

$$\frac{14k^3m^2 - 27k^2m + 18km^2}{3km^2} = \frac{14}{3}k - 9\frac{m}{k} + 6$$

- $\frac{a^2 + 2a}{a} = a + 2$
- $\frac{14x + 35}{7} = 2x + 5$
- $\frac{4y^2 + 6y}{2y} = 2y + 3$
- $\frac{xy - x^2}{xy} = 1 - x$
- $\frac{25x^2 - 15x - 5}{-5} = -5x^2 + 3x + 1$
- $\frac{12x^2 - 9x + 6x^2}{3x} = 4x - 3x^2 + 2x^3$
- $\frac{mn^2 + m - n}{mn} = n + \frac{1}{n} - \frac{1}{m}$
- $\frac{45a^2b^2 - 60a^2b^2 - 15a^2b}{-15a^2b} = -3b^2 + 4ab + 1$
- $\frac{14k^3m^2 - 4k^2m^2 + 12km^2}{2km^2} = 7k^2m - 2k + 6m$
- $\frac{12x^2 - 27x^2 + 18x^2}{3x^2} = 4\frac{x^2}{x^2} - \frac{9x}{x^2} + 6$
- $\frac{2x^2 - 10xy}{2x} = x - 5y$
- $\frac{3x^2y - 6xy^2 + 6xy^2}{3xy} = x^2y - 2xy + 2y$
- $\frac{6x^2 - 3x + 9}{3x} = 2x - 1 + \frac{3}{x}$
- $\frac{60x^2 + 42x + 72}{60x^2} = \frac{1}{x} + \frac{7}{x^2} + \frac{12}{x^3}$
- $\frac{64x^2 - 64x^2}{64x^2} = x - 1$
- $\frac{18mn^2 - 12mn^2 + 24n^2}{6mn^2} = 3mn - 2n^2 + \frac{4n}{m^2}$

Chapter 7 Review

Key Words

For #1 to #4, match the polynomial in Column A with an equivalent polynomial in Column B. Polynomials in Column B may be used more than once or not at all.

Column A

1. $\frac{8xy}{2x}$
2. $\frac{12x^2 - 6x}{3x}$
3. $(-2x + 1)(-2x)$
4. $\frac{12xy - 6x}{3}$

Column B

- A $4xy - 2x$
- B $4x^2 - 2x$
- C $4y$
- D $2x^2 - 2x$
- E $4xy$
- F $4x - 2$

7.1 Multiplying and Dividing Monomials, pages 254–263

5. Use a model to complete each monomial multiplication statement.

- a) $(3x)(5x)$
- b) $(4x)(-5y)$

6. Find each product.

- a) $(-3.2x)(-2.7y)$
- b) $\left(\frac{3}{7}a\right)(-14a)$

7. Use a model to complete each monomial division statement.

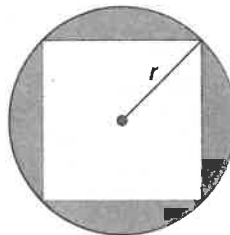
- a) $\frac{6x^2}{2x}$
- b) $15a^2 \div (-3a)$

8. Determine each quotient.

- a) $\frac{-4.8r^2}{-1.2r}$
- b) $2xy \div 2x$

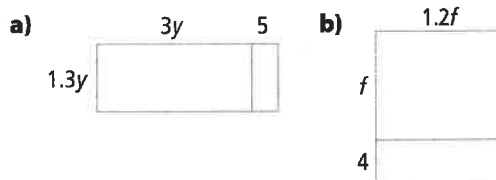
9. A rectangle is four times as long as it is wide. If the area of the rectangle is 1600 cm^2 , what are its dimensions?

10. A square is inscribed in a circle with radius r as shown. What is the ratio of the area of the square to the area of the circle?

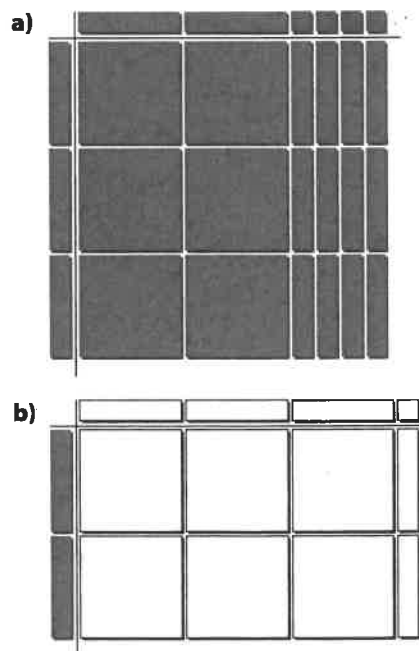


7.2 Multiplying Polynomials by Monomials, pages 264–271

11. What polynomial multiplication statement is represented by each area model?



12. What polynomial multiplication statement is represented by the algebra tiles?



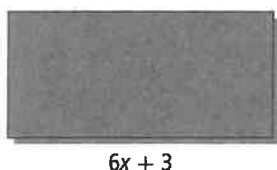
13. Expand.

a) $(20x)(2.3x - 1.4)$

b) $\left(\frac{2}{3}p\right)\left(p - \frac{3}{4}\right)$

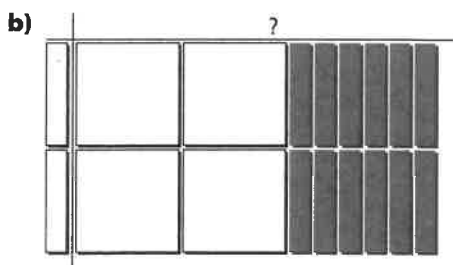
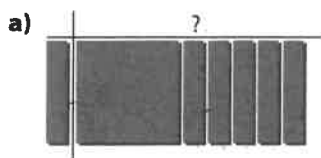
14. The length of a piece of rectangular cardboard in centimetres is $6x + 3$. The width is 1 cm less than $\frac{1}{3}$ of the length.

What is an expression for the area of the cardboard?



7.3 Dividing Polynomials by Monomials, pages 272-277

15. Determine the division statement represented by the algebra tiles. Give the quotient.

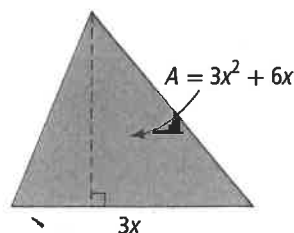


16. Divide.

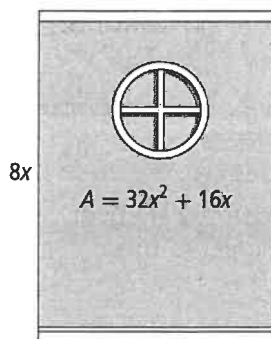
a) $\frac{12n^2 - 2n}{2n}$

b) $\frac{15x - 3x^2}{1.5x}$

17. A triangle has an area represented by $3x^2 + 6x$. If the base of the triangle is $3x$, what is the height?



18. A rectangular wall has a circular window. The area of the wall can be represented by $32x^2 + 16x$. The length of the wall is $8x$. The diameter of the circular window has a measurement that is half the width of the wall. What is the radius of the window written as an expression in terms of x ?



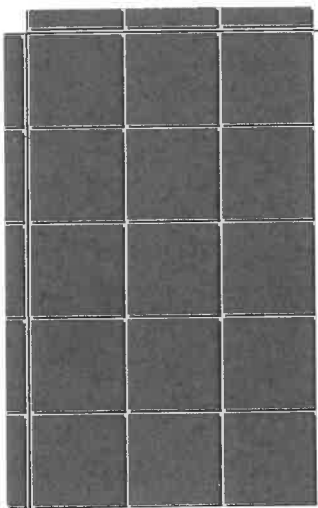
19. Naullaq is cutting ice blocks from the lake for her mother's drinking water tank. The cylindrical tank has a volume of $4x^2\pi$. Once each block has melted, it will have a volume of $3x^2$. How many blocks does she need to cut so that her mother's tank will be filled when the ice melts? Give your answer to the nearest whole block. Explain your answer.

Use the π key on your calculator.

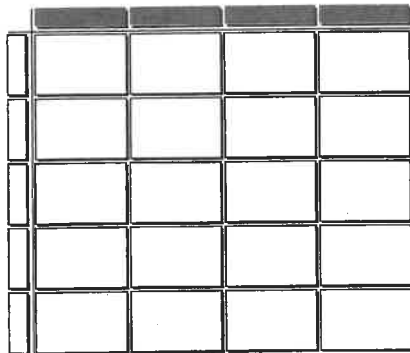
8. a) $y + 2.1$ b) $6m^2 - 3.1m + 12$ c) $3y + 1$ d) $v - 0.9$
 9. a) $0.9c + 1.2$ b) $2x + 8y$ c) $-0.2s - 0.3t$
 d) $-28w^2 - 14w + 1$
 10. $2x^2 + 3x$
 11. a) $A = 12.5w^2 - 5w$ b) $l = 12.5w - 5$
 c) $l = 2.5$ m, $V = 0.9$ m³
 12. $9x + 4$
 13. The length is $(3x - 1)$ units.
 14. a) $s = 4.9t + v$ b) 24.5 m/s
 15. a) $12f + 3.1$ b) $2b - a + 1$ c) $-24x^2 + 18x - 2$
 16. $3x + 1.5$
 17. $x + 6 : 15x$
 18. $12x + 4xy + 6y$

Chapter 7 Review, pages 278–279

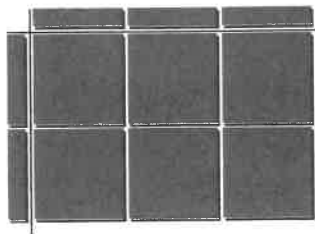
1. C
 2. F
 3. B
 4. A
 5. a) $15x^2$



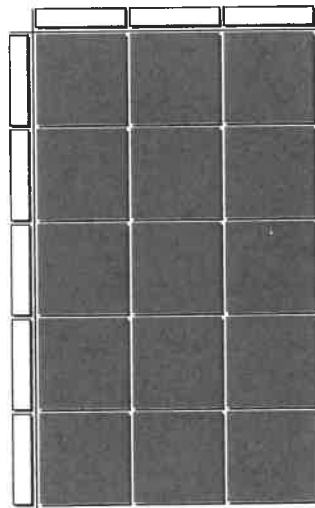
b) $-20xy$



6. a) $8.64xy$ b) $-6a^2$
 7. a) $3x$



b) $-5a$



8. a) $4r$ b) y
 9. 20 cm by 80 cm
 10. $2 : \pi$
 11. a) $(1.3y)(3y + 5) = 3.9y^2 + 6.5y$
 b) $(1.2f)(f + 4) = 1.2f^2 + 4.8f$
 12. a) $(3x)(2x + 4) = 6x^2 + 12x$
 b) $(2x)(-3x - 1) = -6x^2 - 2x$
 13. a) $46x^2 - 28x$ b) $\frac{2}{3}p^2 - \frac{1}{2}p$
 14. $12x^2 + 6x$
 15. a) $\frac{x^2 + 5x}{x} = x + 5$ b) $\frac{-4x^2 + 12x}{-2x} = 2x - 6$
 16. a) $6n - 1$ b) $10 - 2x$
 17. $2x + 4$
 18. $x + \frac{1}{2}$

19. Naullaq will need 5 blocks of ice to fill the drinking tank. The answer must be rounded up because 4 blocks will not fill the tank and Naullaq is only cutting full blocks.