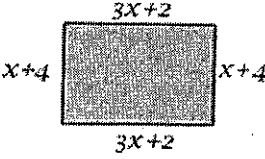
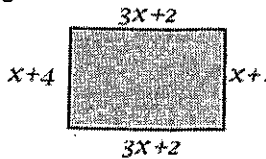


Study Guide

What you need to know and be able to do	Things to remember	Examples	
Convert by dimensional analysis	The unit that is in the numerator in one place is used in the denominator next.	1. Convert 8.2 weeks to years <i>16 weeks</i>	2. Convert 56.7 yards to inches <i>2040 in</i>
	For metric conversions, KHDBDCM can be used for finding the movement of the decimal.	3. Convert 5.2 gallons to cups <i>83 cups</i>	4. Convert 12.6 ounces to pounds <i>788 lbs</i>
	For mixed conversions, the conversion factor will be provided.	5. Convert 23.2 cm to dam <i>.0232 dam</i>	6. Convert .552 g to mg <i>552 mg</i>
		7. Convert 15.5 feet to meters. Use 1 inch = 2.54 cm. <i>4.72 m</i>	8. Convert 55 kg to pounds. Use 1 ounce = 28.35 grams. <i>120 lb</i>
Rate Conversions	The unit of a rate is always (something) PER (something). Make a fraction with the 1 <sup>st</sup> unit in the numerator and the 2 <sup>nd</sup> unit in the denominator.	9. Dijah can drive 320 miles on 10.5 gallons of gas. How many kilometers can she drive on 15 L? Use 5 km = 3.1 miles and 1L = 1.05 Qt <i>190 km</i>	10. Ms. Morton can run 2 miles in 16 minutes and 15 seconds. How fast is she running in miles per hour? <i>7.4 mph</i>
Identifying Parts of Expressions	Coefficients are numbers related to the variable. Constants do not have a variable. For both, we include the sign in front of the number.	11. Identify the terms, coefficients, constants, and factors of the expression. $5x^3 - 2xy + 4.8$ terms: $5x^3, -2xy, 4.8$ coeff: $5, -2$ const: $4.8$ fact: $5 \text{ and } x^3$ $-2 \text{ and } x \text{ and } y$	12. Identify the terms, coefficients, constants, and factors of the expression. $7x^2 - 4 + 3xy - 9.2x$ terms: $7x^2, -4, 3xy, -9.2x$ coeff: $7, 3, -9.2$ const: $-4$ factors: $7 \text{ and } x^2$ $3 \text{ and } x \text{ and } y$ $-9.2 \text{ and } x$

Study Guide

Writing Expressions from a Scenario	Look for key words to decide which operation to use.	13. 7 less than the product of negative eight and a number. $-8x - 7$	14. The quotient of a number squared and 4 times a number. $\frac{x^2}{4x}$
		15. You are buying $x$ oranges for \$.25 each. You then pay 4% tax and a \$2 tip to the bagger to take the groceries to your car. $26x + 2$	16. You are washing cars for a fundraiser. You make \$8 per car and \$20 in tips. $8x + 20$
Simplifying Radicals	Factor into PRIMES (2, 3, 5, 7, 11, ...). For each pair, only 1 is outside the radical.	17. $\sqrt{360x^3y^2}$ $6xy\sqrt{10x}$	18. $4xy\sqrt{900x^4y^6}$ $120x^3y^4$
Multiplying Radicals	Multiply the coefficients. Factor the radicands into primes and combine them under one radical to simplify.	19. $\sqrt{63x^2y} \cdot \sqrt{14y^3}$ $21xy^2\sqrt{2}$	20. $3x\sqrt{15x} \cdot 2\sqrt{10x^2}$ $30x^2\sqrt{6x}$
Adding/Subtracting Radicals	Simplify radicals separately. Combine ONLY if they have the same radicand.	21. $2\sqrt{6} - 3\sqrt{4} - 3\sqrt{24}$ $-6 - 4\sqrt{6}$	22. $-5\sqrt{27} + 2\sqrt{12} + \sqrt{8}$ $-11\sqrt{3} + 2\sqrt{2}$
Adding/Subtracting Polynomials	Combine like terms. IF SUBTRACTION, change all signs behind the subtraction before CLT. Put in order by descending exponents.	23. $\underline{5x^2} - \underline{2x} + \underline{3x^2} + \underline{7x}$ $8x^2 + 5x$	24. $(2x^2 - 4) - (3x - 7)$ $2x^2 - 4 - 3x + 7$ $2x^2 - 3x + 3$
Multiplying Polynomials	Distribute to every part of each expression. Use distribution or concrete model when 2 binomials.	25. $8x \cdot -3x$ $-24x^2$	26. $7x(3x - 5)$ $21x^2 - 35x$
		27. $(2x + 3)(3x - 4)$ $6x^2 + x - 12$	28. $(3x - 6)(3x + 6)$ $9x^2 - 36$
Operations of Rational and Irrational Numbers	Rational numbers can be represented as a ratio of INTEGERS. These include fractions, terminating, and repeating decimals.	29. What kind of number is the sum of a rational and irrational number? Give an example. $5 + \sqrt{2}$ irrational	30. What kind of number is the product of an irrational and an irrational number? Give an example. $\sqrt{3} \cdot \sqrt{5} = \sqrt{15}$ (irrational) can be either
Applications of Expressions	Perimeter = ADD UP ALL SIDES Area = USE FORMULA	31. Find the perimeter of the figure below.  $8x + 12$	32. Find the area of the figure below.  $3x^2 + 14x + 8$

$\sqrt{3} \cdot \sqrt{5} = \sqrt{15}$   
(irrational)  
 $\sqrt{2} \cdot \sqrt{2} = \sqrt{4} = 2$   
(rational)

$$1. \frac{8.2 \text{ weeks} \mid 7 \text{ days} \mid 1 \text{ year}}{1 \text{ week} \mid 365 \text{ days}} = .157 \text{ years}$$

$$2. \frac{56.7 \text{ yd} \mid 3 \text{ ft} \mid 12 \text{ in}}{1 \text{ yd} \mid 1 \text{ ft}} = 2041.2 \text{ in}$$

$$3. \frac{5.2 \text{ G} \mid 4 \text{ qt} \mid 2 \text{ pt} \mid 2 \text{ c.}}{1 \text{ G} \mid 1 \text{ qt} \mid 1 \text{ pt}} = 83.2 \text{ c}$$

$$4. \frac{12.6 \text{ oz} \mid 1 \text{ lb}}{16 \text{ oz}} = .7875 \text{ lb}$$

$$5. \underbrace{23.2 \text{ cm}} = .0232 \text{ dam} \quad \text{KHDa} \overbrace{\beta \text{DCM}}$$

$$6. \underbrace{552 \text{ g}} = 552 \text{ mg} \quad \text{KHDa} \overbrace{\beta \text{DCM}}$$

$$7. \frac{15.5 \text{ ft} \mid 12 \text{ in} \mid 2.54 \text{ cm} \mid 1 \text{ m}}{1 \text{ ft} \mid 1 \text{ in} \mid 100 \text{ cm}} = 4.7244 \text{ m}$$

$$8. \frac{55 \text{ kg} \mid 1000 \text{ g} \mid 1 \text{ oz} \mid 1 \text{ lb}}{1 \text{ kg} \mid 28.35 \text{ g} \mid 16 \text{ oz}} = 121.25 \text{ lb}$$

$$9. \frac{15 \text{ L} \mid 1.05 \text{ qt} \mid 1 \text{ G} \mid 320 \text{ miles} \mid 5 \text{ km}}{1 \text{ L} \mid 4 \text{ qt} \mid 10.56 \mid 3.1 \text{ miles}} = 193.55 \text{ km}$$

$$10. \frac{2 \text{ miles} \mid 60 \text{ sec} \mid 60 \text{ min}}{975 \text{ sec} \mid 1 \text{ min} \mid 1 \text{ hr}} = 7.38 \text{ mph}$$

$$\downarrow$$

$$\frac{16 \text{ min} \mid 60 \text{ sec}}{1 \text{ min}} = 960 \text{ sec} + 15 \text{ sec} = 975 \text{ sec}$$

$$\begin{aligned}
 15. \quad & .25x \\
 & 104\% = 1.04 \\
 & 1.04(.25x) \\
 & .26x + 2
 \end{aligned}$$

$$\begin{aligned}
 17. \quad & \sqrt{360x^3y^2} \\
 & \sqrt{\cancel{2} \cdot \cancel{2} \cdot \cancel{3} \cdot \cancel{3} \cdot \cancel{5} \cdot \cancel{x} \cdot \cancel{x} \cdot x \cdot \cancel{y} \cdot \cancel{y}} \\
 & \boxed{6xy\sqrt{10x}}
 \end{aligned}$$

$360$   
 $\swarrow \quad \searrow$   
 $36 \quad 10$   
 $\swarrow \quad \searrow \quad \swarrow \quad \searrow$   
 $6 \quad 6 \quad 2 \quad 5$   
 $\swarrow \quad \searrow \quad \swarrow \quad \searrow$   
 $2 \quad 3 \quad 2 \quad 3$

$$\begin{aligned}
 18. \quad & 4xy\sqrt{900x^4y^6} \\
 & 4xy\sqrt{\cancel{2} \cdot \cancel{2} \cdot \cancel{3} \cdot \cancel{3} \cdot \cancel{5} \cdot \cancel{5} \cdot x^4 \cdot y^6} \\
 & 4xy \cdot 2 \cdot 3 \cdot 5 \cdot x^2 \cdot y^3 \\
 & \boxed{120x^3y^4}
 \end{aligned}$$

$900$   
 $\swarrow \quad \searrow$   
 $90 \quad 10$   
 $\swarrow \quad \searrow \quad \swarrow \quad \searrow$   
 $9 \quad 10 \quad 2 \quad 5$   
 $\swarrow \quad \searrow \quad \swarrow \quad \searrow$   
 $3 \quad 3 \quad 2 \quad 5$

$$\begin{aligned}
 19. \quad & \sqrt{63x^2y} \cdot \sqrt{14y^3} \\
 & \sqrt{\cancel{3} \cdot \cancel{3} \cdot \cancel{7} \cdot \cancel{7} \cdot 2 \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{y} \cdot \cancel{y} \cdot \cancel{y} \cdot \cancel{y}} \\
 & 3 \cdot 7 \cdot x \cdot y \cdot y \cdot \sqrt{2} \\
 & \boxed{21xy^2\sqrt{2}}
 \end{aligned}$$

$63$   
 $\swarrow \quad \searrow$   
 $9 \quad 7$   
 $\swarrow \quad \searrow$   
 $3 \quad 3$

$14$   
 $\swarrow \quad \searrow$   
 $2 \quad 7$

$$\begin{aligned}
 20. \quad & 3x\sqrt{15x} \cdot 2\sqrt{10x^2} \\
 & 6x\sqrt{\cancel{3} \cdot \cancel{5} \cdot \cancel{5} \cdot 2 \cdot \cancel{x} \cdot \cancel{x} \cdot x} \\
 & 6x \cdot 5x \cdot \sqrt{3 \cdot 2 \cdot x} \\
 & \boxed{30x^2\sqrt{6x}}
 \end{aligned}$$

$$\begin{aligned}
 21. & 2\sqrt{6} - 3\sqrt{4} - 3\sqrt{24} \\
 & 2\sqrt{2 \cdot 3} - 3\sqrt{2 \cdot 2} - 3\sqrt{2 \cdot 2 \cdot 2 \cdot 3} \\
 & 2\sqrt{6} - 6 - 6\sqrt{6} \\
 & \boxed{-6 - 4\sqrt{6}}
 \end{aligned}$$

$$\begin{aligned}
 22. & -5\sqrt{27} + 2\sqrt{12} + \sqrt{8} \\
 & -5\sqrt{3 \cdot 3 \cdot 3} + 2\sqrt{2 \cdot 2 \cdot 3} + \sqrt{2 \cdot 2 \cdot 2} \\
 & -15\sqrt{3} + 4\sqrt{3} + 2\sqrt{2} \\
 & \boxed{-11\sqrt{3} + 2\sqrt{2}}
 \end{aligned}$$

$$\begin{aligned}
 27. & (2x+3)(3x-4) \\
 & 2x(3x-4) + 3(3x-4) \\
 & 6x^2 - 8x + 9x - 12 \\
 & \boxed{6x^2 + x - 12} \quad \leftarrow
 \end{aligned}
 \begin{array}{r|cc}
 & 2x & +3 \\
 3x & 6x^2 & 9x \\
 -4 & -8x & -12
 \end{array}$$

$$\begin{aligned}
 28. & (3x-6)(3x+6) \\
 & 3x(3x+6) - 6(3x+6) \\
 & 9x^2 + 18x - 18x - 36 \\
 & \boxed{9x^2 - 36} \quad \leftarrow
 \end{aligned}
 \begin{array}{r|cc}
 & 3x & -6 \\
 3x & 9x^2 & -18x \\
 +6 & 18x & -36
 \end{array}$$

$$\begin{array}{c}
 31. \\
 \begin{array}{ccc}
 & 3x+2 & \\
 x+4 & \boxed{\phantom{0000}} & x+4 \\
 & 3x+2 & 
 \end{array} \\
 \text{Perimeter} = 3x+2 + x+4 + 3x+2 + x+4 \\
 \boxed{8x+12}
 \end{array}$$

$$\begin{aligned}
 32. \text{ Area: } & (3x+2)(x+4) \\
 & 3x(x+4) + 2(x+4) \\
 & 3x^2 + 12x + 2x + 8 \\
 & \boxed{3x^2 + 14x + 8}
 \end{aligned}
 \begin{array}{r|cc}
 & 3x & +2 \\
 x & 3x^2 & +2x \\
 +4 & 12x & 8
 \end{array}$$