5.3 Decimals and Fractions

Notice that as a fraction is shrunk is size it begins to look like a division symbol:

$$\frac{3}{5} \quad \tfrac{3}{5} \quad {\scriptstyle\frac{3}{5}} \quad \div$$

Given this visual similarity, then it is no surprise that a fraction is actually a division problem. A fraction is the quotient of the numerator divided by the denominator. Thus,

$$\frac{3}{5} = 3 \div 5 \Rightarrow 5\overline{)3.0}^{\;0.6} \qquad 30$$

Some fractions are equivalent to decimals that do not terminate. For example:

$$\frac{1}{3} = 1 \div 3 \Rightarrow 3\overline{)1.000}^{\;0.333\ldots}$$

$$\begin{array}{r} \underline{9} \\ 10 \\ \underline{9} \\ 10 \\ \underline{9} \\ 1 \end{array}$$

When a decimal contains a repeating pattern, such as above, we use bar notation:

$$0.333... = 0.\overline{3}$$

The repeating pattern may be more than one digit. It could be many digits.

$$\frac{1}{7} = 1 \div 7 \Rightarrow 7\overline{)1.000000}^{\;0.142857\ldots} \quad \Rightarrow \quad 0.\overline{142857}$$

$$\begin{array}{r} \underline{7} \\ 30 \\ \underline{28} \\ 20 \\ \underline{14} \\ 60 \\ \underline{56} \\ 40 \\ \underline{35} \\ 50 \\ \underline{49} \\ 1 \end{array}$$

Demonstration Problems	*Practice Problems*
Write the following fractions as decimals.	Write the following fractions as decimals.
1. (a) $\frac{3}{8}$	**1. (b)** $\frac{3}{4}$
2. (a) $-\frac{9}{4}$	**2. (b)** $-\frac{7}{2}$
3. (a) $\frac{7}{6}$	**3. (b)** $\frac{4}{3}$
4. (a) $\frac{27}{11}$	**4. (b)** $\frac{43}{22}$
	Answers: **1. (b)** 0.75; **2. (b)** –3.5; **3. (b)** $1.\overline{3}$; **4. (b)** $1.9\overline{54}$;

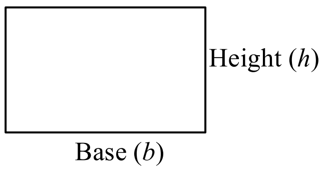
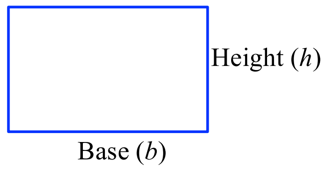
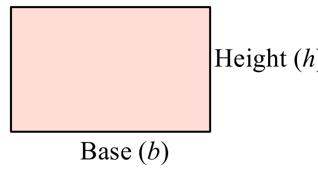
Demonstration Problems	*Practice Problems*
Simplify.	Simplify.
5. (a) $\frac{3}{8}+4.9$	**5. (b)** $\frac{7}{8}+6.4$
6. (a) $\frac{4}{5}(8.6-4.9)$	**6. (b)** $\frac{3}{4}(12.4-4.2)$
7. (a) $\left(\frac{1}{4}\right)^2+(3.2)(7.1)$	**7. (b)** $\left(\frac{1}{2}\right)^2+(3.8)(5.9)$

Answers: **5. (b)** 7.275; **6. (b)** 6.15; **7. (b)** 22.67

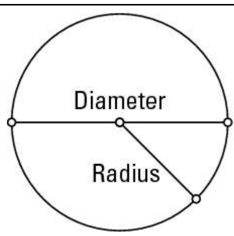
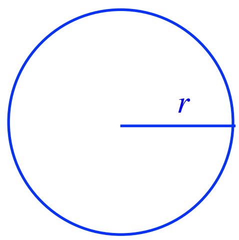
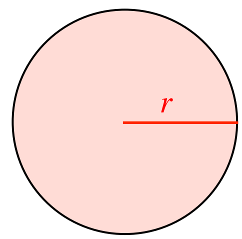
Demonstration Problems	*Practice Problems*
Insert <, >, or = to make a true statement.	Insert <, >, or = to make a true statement.
8. (a) 0.3 ________ $\frac{3}{4}$	**8. (b)** 0.7 ________ $\frac{3}{5}$
9. (a) $\frac{1}{8}$ ________ 0.8	**9. (b)** $\frac{1}{4}$ ________ 0.4
10. (a) 0.375 ________ $\frac{3}{8}$	**10. (b)** 0.875 ________ $\frac{7}{8}$
11. (a) $\frac{2}{3}$ ________ 0.67	**11. (b)** $\frac{5}{6}$ ________ 0.83
12. (a) $-0.\overline{15}$ ________ $-\frac{5}{33}$	**12. (b)** $-0.2\overline{27}$ ________ $-\frac{5}{22}$
	Answers: **8. (b)** >; **9. (b)** <; **10. (b)** =; **11. (b)** >; **12. (b)** =

Area and Perimeter

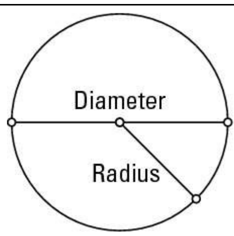
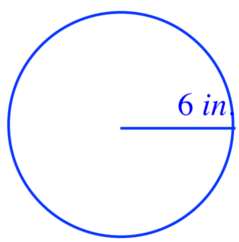
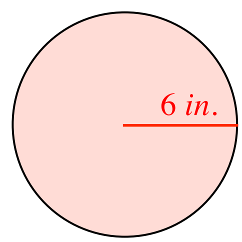
Recall from section 1.4:

Rectangles	Perimeter	Area
		
Formulas:	$P = 2b + 2h$	$A = bh$

We refer to the perimeter of a circle as “circumference”. The formulas for the circumference and area of a circle are as follows:

Circles	Circumference	Area
		
Formulas:	$C = 2\pi r$	$A = \pi r^2$

Example:

Circles	Circumference	Area
		
Formulas:	$C = 2\pi \bullet 6$ $= 2 \bullet 3.14 \bullet 6$ $= 12 \bullet 3.14$ $= 37.68$ inches	$A = \pi \bullet 6^2$ $= 3.14 \bullet 36$ $= 113.04$ square inches

Demonstration Problems	*Practice Problems*
Find the circumference and area of a circle with the following radius. Round to the nearest tenth.	Find the circumference and area of a circle with the following radius.
13. (a) radius = 5 in. circumference: area:	**13. (b)** radius = 9 in. circumference: area:
14. (a) radius = 20 in. circumference: area:	**14. (b)** radius = 4 in. circumference: area:

Answers: **13. (b)** $C = 56.52$ in., $A = 254.34$ in^2; **14. (b)** $C = 25.12$ in., $A = 50.24$ in^2