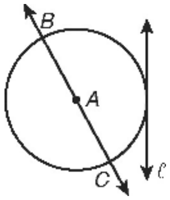
Name ______________________ Date ______________ Class ______________

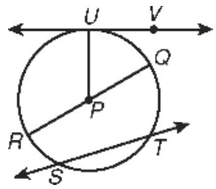
LESSON 12-1

Practice B

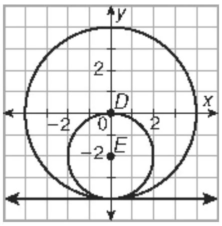
Lines That Intersect Circles

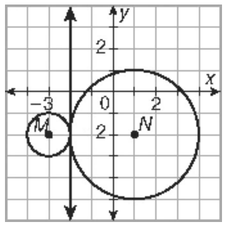
Identify each line or segment that intersects each circle.

1. 

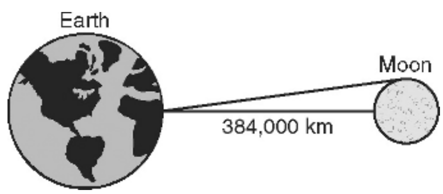
2. 

Find the length of each radius. Identify the point of tangency and write the equation of the tangent line at this point.

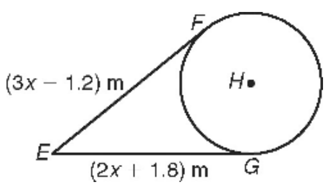
3. 

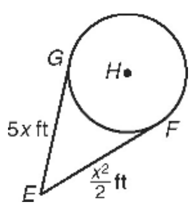
4. 

5. The Moon's orbit is not exactly circular, but the average distance from its surface to Earth's surface is 384,000 kilometers. The diameter of the Moon is 3476 kilometers. Find the distance from the surface of Earth to the visible edge of the Moon if the Moon is directly above the observer. Round to the nearest kilometer. (*Note:* The figure is not drawn to scale.)



In Exercises 6 and 7, $\overline{EF}$ and $\overline{EG}$ are tangent to ⊙*H*. Find *EF*.

6. 

7. 

4. 9π m2; 13.5π m2; 6.75π m3; 9π m^2; $\frac{9}{2}\pi$ m^3
5. sphere surface to cylinder surface; sphere volume to cylinder volume
6. Check students' work.

Problem Solving

1. 144π in^2
2. 347.3 in^3
3. about 3.5 times
4. about 2.3 times
5. D
6. G
7. B
8. H

Reading Strategies

1. radius
2. hemisphere
3. 6 cm
4. 450π ft^3
5. $S = 576\pi$ ft^2
   $V = 2304\pi$ ft^3
6. $S = 484\pi$ in^2
   $V = \frac{5324\pi}{3}$ in^3
7. $S = 324\pi$ m^2
   $V = 972\pi$ m^3

12-1 LINES THAT INTERSECT CIRCLES

Practice A

1. E
2. B
3. A
4. C
5. D
6. 2; 1
7. 4; 2
8. $x = 4$
9. tangent
10. congruent
11. perpendicular
12. 5 in.
13. 24
14. 21

Practice B

1. chords: $\overline{BC}$; secant: $\overleftrightarrow{BC}$; tangent: ℓ; diam.: $\overline{BC}$; radii: $\overline{AB}$, $\overline{AC}$
2. chords: $\overline{RQ}$, $\overline{ST}$; secant: $\overleftrightarrow{ST}$; tangent: $\overline{UV}$; diam.: $\overline{RQ}$; radii: $\overline{PQ}$, $\overline{PR}$, $\overline{PU}$
3. radius of $\odot D$: 4; radius of $\odot E$: 2; pt. of tangency: (0, –4); eqn. of tangent line: $y = -4$
4. radius of $\odot M$: 1; radius of $\odot N$: 3; pt. of tangency: (–2, –2); eqn. of tangent line: $x = -2$
5. 385,734 km
6. 7.8 m
7. 50 ft

Practice C

1. Possible answer: Draw $\overline{AB}$. A tangent segment is perpendicular to a radius at the point of tangency. So $\angle ACD$ and $\angle BDC$ are right angles. Two segments perpendicular to the same segment are parallel, so $\overline{AC}$ and $\overline{BD}$ are parallel. Because $\overline{AC}$ and $\overline{BD}$ are radii of $\odot A$ and $\odot B$, they are congruent. Therefore *ABDC* is a parallelogram. Opposite sides in a parallelogram are congruent, so $\overline{CD} \cong \overline{AB}$. Similar reasoning will show that $\overline{EF} \cong \overline{AB}$. By the Transitive Property of Congruence, $\overline{CD} \cong \overline{EF}$.
2. Possible answer: It is given that $\overline{RS}$ and $\overline{TU}$ are not parallel, so they must meet at some point. Call this point *X*. $\overline{XR}$ and $\overline{XT}$ are tangent to $\odot P$ and $\odot Q$. Because tangent segments from a common point to a circle are congruent, $XR = XT$ and $XS = XU$. The Segment Addition Postulate shows that $XR = XS + SR$ and $XT = XU + UT$. Thus, by the Transitive Property, $XS + SR = XU + UT$. By the Addition Property of Equality, $SR = UT$, and therefore $\overline{RS} \cong \overline{TU}$.
3. Possible answer: It is given that $\overline{IM}$ and $\overline{JL}$ are tangent segments. They intersect at point *K*. Because tangent segments from a common point to a circle are congruent, $KI = KL$ and $KM = KJ$. By the Addition Property of Equality, $KI + KM = KL + KJ$. The Segment Addition Postulate shows that $IM = KI + KM$ and $JL = KL + KJ$. Thus, by the Transitive Property of Equality, $IM = JL$ and therefore $\overline{IM} \cong \overline{JL}$.
4. 50 m
5. 8.5 ft or 16.5 ft