I'm hoping this loads faster!

Study Hard! ☺

Pages 598–603 Chapters 1–12 Cumulative Review

1 $$9x + x = 90$$
$$10x = 90, x = 9$$

The measure of the larger acute ∠ is 9(9) = 81°.

2 $$2x + 3 + 4x - 5 + 8x - 19 = 28$$
$$14x - 21 = 28$$
$$14x = 49, x = \frac{7}{2}$$

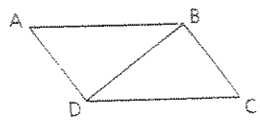
$AB = 2x + 3$	$BC = 4x - 5$	$CA = 8x - 19$
$AB = 2(\frac{7}{2}) + 3$	$BC = 4(\frac{7}{2}) - 5$	$CA = 8(\frac{7}{2}) - 19$
$AB = \frac{14}{2} + 3$	$BC = \frac{28}{2} - 5$	$CA = \frac{56}{2} - 19$
$AB = 10$	$BC = 9$	$CA = 9$

△ABC is isosceles.

3 Given: $\overline{BD} \perp \overline{AD}$

$\overline{BD} \perp \overline{BC}$

$\overline{AB} \cong \overline{CD}$



Prove: ABCD is a ▱.

1 $\overline{BD} \perp \overline{AD}$, $\overline{BD} \perp \overline{BC}$	1 Given
2 ∠ADB is a rt ∠.	2 ⊥ lines form rt ∠s.
3 ∠CBD is a rt ∠.	3 Same as 2
4 $\overline{AB} \cong \overline{CD}$	4 Given
5 $\overline{DB} \cong \overline{DB}$	5 Reflexive prop
6 △ABD ≅ △CDB	6 HL
7 $\overline{AD} \cong \overline{BC}$	7 CPCTC
8 ABCD is a ▱.	8 If both pairs of opposite sides of a quad are ≅, then it is a ▱.

4 a If a line is ∥ to one side of △ and intersects the other two sides, it divides them proportionally.

So TS = x then PT = 15 − x

$\frac{RS}{QR} = \frac{TS}{PT}$ $\quad 30 - 2x = x \quad$ PT = 15 − x

$\frac{12}{6} = \frac{x}{15-x}$ $\quad 30 = 3x \quad$ PT = 15 − 10

$\frac{2}{1} = \frac{x}{15-x}$ $\quad x = 10 \quad$ PT = 5

b Because the whole △ and the small △ can be proven ~ by AA, we can use the following method:

$\frac{RS}{TR} = \frac{SQ}{PQ}$ $\quad 9(TR) = 96$

$\frac{12}{TR} = \frac{12+6}{16}$ $\quad TR = \frac{96}{9}$

$\frac{12}{TR} = \frac{18}{16}$ $\quad TR = \frac{32}{3}$

$\frac{12}{TR} = \frac{9}{8}$

5 a By Chord-Chord power theorem:

$3x = (12)(2)$

$3x = 24, x = 8$

b $\frac{15}{3} = \frac{16}{x}$

$15x = 48, x = 3\frac{1}{5}$

c $12° = \frac{1}{2}(x - 20°)$

$12° = \frac{1}{2}x - 10°$

$22° = \frac{1}{2}x, x = 44°$

d Solve for hypotenuse of 3-4 rt △, using Pythagorean Triple 3-4-5. Then use another Pythagorean Triple 5-12-13 to find x = 12.

6 a $\left(\frac{s_1}{s_2}\right)^2 = \frac{A_1}{A_2}$ $\qquad$ b $\left(\frac{p_1}{p_2}\right)^2 = \frac{A_1}{A_2}$

$\left(\frac{s_1}{s_2}\right)^2 = \frac{9}{25}$ $\qquad$ $\left(\frac{p_1}{p_2}\right)^2 = \frac{9}{25}$

$\frac{s_1}{s_2} = \frac{3}{5}$ $\qquad$ $\frac{p_1}{p_2} = \frac{3}{5}$

7 a $\frac{WZ}{WX} = \frac{WX}{WY}$ $\qquad$ b $WY - WZ = YZ$

$\frac{6}{10} = \frac{10}{WY}$ $\qquad$ $\frac{50}{3} - 6 = YZ$

$100 = 6(WY)$ $\qquad$ $\frac{32}{3} = YZ$

$\frac{50}{3} = WY$

c WZX is a rt △. 3-4-5 is a Pythagorean Triple.

XW = 10 = 5 · 2

WZ = 6 = 3 · 2, so XZ = 4(2) = 8.

8 a $A_{trapezoid} = \frac{1}{2}(b_1 + b_2)h$

$A = \frac{1}{2}(27 + 15)8$

$A = \frac{1}{2}(42)8 = 168$

b $A = \frac{s^2}{4}\sqrt{3}$

$A = \frac{10^2}{4}\sqrt{3} = 25\sqrt{3}$

c A ⊙ = πr^2 Use Pythagorean Triple 5-12-13 to find r.

$A = \pi(13)^2 = 169\pi$

9 In an isosceles trap any lower base ∠ is supp to any upper base ∠.

∠S + ∠Q = 180

x + 40 + 2x − 7 = 180 $\qquad$ ∠S = x + 40

3x + 33 = 180 $\qquad$ ∠S = 49 + 40

3x = 147, x = 49 $\qquad$ ∠S = 89°

∠S ≅ ∠R, so ∠R = 89°.

10 $\pi = 3.14159$. $\frac{22}{7} = 3.1428$, so $3\frac{1}{7}$ is more accurate.

11 a The △ is a 30°60°90° △. The ∠ opp the side 9 is 30°, so ∠P = 60°.

b When a quad is inscribed in a ⊙, opp ∠s are supp.

180 − 97 = q

83 = q

c The measure of an exterior ∠ of a △ is equal to the sum of the measures of the remote interior ∠s.

72 = 22 + r

50 = r

d The sum of the measure of a tangent ∠ and its minor arc is 180°.

360 − 258 = 102

s + 102 = 180, s = 78

12 a $\frac{5}{3} = \frac{30}{x}$ $\qquad$ b $\frac{8}{x} = \frac{x}{18}$

$5x = 90, x = 18$ $\qquad$ $x^2 = 144, x = \pm 12$

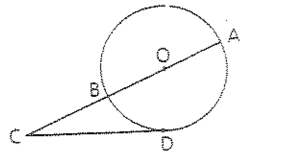
13 a $(CD)^2 = (BC)(AC)$ (Tangent-Secant Power Theorem)

$(15)^2 = 9(AC)$

$225 = 9(AC)$, $AC = 25$

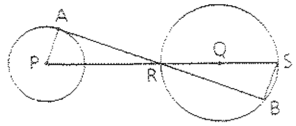
b $AB = AC - BC$

$AB = 25 - 9 = 16$



14 Given: $\overline{AR}$ tangent to ⊙ P.
$\overline{RS}$ diameter of ⊙ Q

Prove: △PAR ~ △SBR



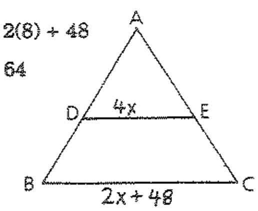
1 $\overline{AR}$ tangent to ⊙ P.	1 Given
2 $\overline{RS}$ diameter of ⊙ Q	2 Given
3 RBS is a semicircle.	3 A diameter divides a ⊙ into 2 semicircles.
4 ∠B is a rt∠.	4 An ∠ inscribed in a semicircle is a rt∠.
5 $\overline{AP} \perp \overline{AR}$	5 A tangent line is ⊥ to the radius.
6 ∠PAR is a rt∠.	6 ⊥ lines form a rt∠.
7 ∠PAR ≅ ∠B	7 Rt∠s are ≅.
8 ∠ARP ≅ ∠SRB	8 Vert∠s are ≅.
9 △PAR ~ △SBR	9 AA~

15 $DE = \frac{1}{2}BC$ $\qquad BC = 2(8) + 48$

$4x = \frac{1}{2}(2x + 48)$ $\qquad BC = 64$

$4x = x + 24$

$3x = 24, x = 8$



16 a $x = 13 - 7 = 6$

$10 = 5 \cdot 2$

$6 = 3 \cdot 2$ 3-4-5 is a Pythagorean Triple.

$y = 4 \cdot 2 = 8$

$A = \frac{1}{2}h(b_1 + b_2)$

$A = \frac{1}{2}(8)(13 + 7)$

$A = 4(20) = 80$

b Using Hero's Formula

$A_{\triangle} = \sqrt{s(s-a)(s-b)(s-c)}$

$s = \frac{10 + 17 + 21}{2}$

$s = \frac{48}{2} = 24$

$A_{\triangle} = \sqrt{24(24-10)(24-17)(24-21)}$

$A_{\triangle} = \sqrt{24(14)(7)(3)}$

$A_{\triangle} = \sqrt{7056} = 84$

c $A_{\text{inscribed quad}} = \sqrt{(s-a)(s-b)(s-c)(s-d)}$

$s = \frac{10 + 9 + 12 + 3}{2}$

$s = \frac{34}{2} = 17$

$A_{\text{inscribed quad}} = \sqrt{(17-10)(17-9)(17-12)(17-3)}$

$A_{\text{inscribed quad}} = \sqrt{7(8)(5)(14)}$

$A_{\text{inscribed quad}} = \sqrt{3920} = 28\sqrt{5}$

17 Se = 360. Each exterior ∠ = 10°, so 360 ÷ 10 = 36. There are 36 sides.

18 The base could be 10, then the other 2 sides would each be 13. If the 2 ≅ sides were each 10, their sum would be 20, so the base is 16 or 10.

19 a If the △ shown is reg then it is also equiangular, ∠1 = 60°.

b $S_i = (n-2)(180)$

$S_i = (8-2)(180)$ $\qquad \angle 2 = \frac{S_i}{n}$

$S_i = (6)180 = 1080$ $\qquad \angle 2 = \frac{1080}{8} = 135°$

c $S_i = (n-2)(180)$ $\qquad \angle 3 = \frac{S_i}{n}$

$S_i = (6-2)(180)$ $\qquad \angle 3 = \frac{720}{6} = 120°$

$S_i = 4(180) = 720$

d ∠4 = 360° − (∠△ + ∠hex + ∠octagon)

∠4 = 360° − (60° + 120° + 135°)

∠4 = 45°

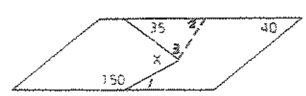
e The interior ∠ of a reg pentagon = 108°

∠hex + ∠5 + ∠octagon = 360°

120° + ∠5 + 135° = 360°

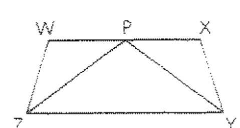
∠5 = 105°, 108° ≠ 105°, No

20 ∠1 is supp to 150°, so ∠1 = 30°.
∠2 = 30° (PAI),
so ∠3 = 115°.
∠x is supp to 115°,
so ∠x = 65°.



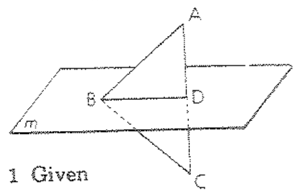
21 Given: WXYZ is an isos trap with $\overline{WZ} \cong \overline{XY}$.
△PZY is isos.

Prove: P is mdpt of $\overline{WX}$.



1 Isos trap, $\overline{WZ} \cong \overline{XY}$	1 Given
2 △PZY is isos.	2 Given
3 $\overline{PZ} \cong \overline{PY}$	3 In an isos △, 2 sides are ≅.
4 ∠PZY ≅ ∠PYZ	4 If △ then △

5 $\angle WZY \cong \angle XYZ$	5 The lower base $\angle$s of an isos trap are $\cong$.
6 $\angle WZP \cong \angle XYP$	6 Subtraction prop
7 $\triangle WZP \cong \triangle XYP$	7 SAS
8 $\overline{WP} \cong \overline{XP}$	8 CPCTC
9 P is mdpt of $\overline{WX}$.	9 If a pt divides a seg into 2 $\cong$ segs, it is the mdpt.



22 Given: $\overleftrightarrow{AC} \perp m$, $\overline{BC} \cong \overline{BA}$

Prove: D is the mdpt of $\overline{AC}$.

1 $\overleftrightarrow{AC} \perp m$, $\overline{BC} \cong \overline{BA}$	1 Given
2 $\angle ADB$ is a rt$\angle$.	2 $\perp$ lines form rt $\angle$s.
3 $\angle CDB$ is a rt$\angle$.	3 Same as 2
4 $\overline{BD} \cong \overline{BD}$	4 Reflexive prop
5 $\triangle ADB \cong \triangle CDB$	5 HL
6 $\overline{AD} \cong \overline{CD}$	6 CPCTC
7 D mdpt $\overline{AC}$	7 If a pt divides a seg into 2 $\cong$ parts, then it is the mdpt.

23 Length of arc = $C\left(\frac{\text{m arc}}{360}\right)$

Length of arc = $2\pi r\left(\frac{\text{m arc}}{360}\right)$

Length of arc = $2\pi(8)(\frac{45}{360})$

Length of arc = $16\pi(\frac{1}{8}) = 2\pi$

24 a **The $\angle$ between each number is 30°, because there are 360° in a circle and 360 ÷ 12 = 30°. There are 150° + $\frac{1}{2}$(30°) between the hands at 11:30. 150° + 15° = 165°**

b At 2:05 there are $30° + \frac{5}{60}(30)$ between the hands.

$30° + 2\frac{1}{2}° = 32\frac{1}{2}°$

c At 3:24, there are $30° + \frac{24}{60}(30)$ between the hands.

$30° + 12° = 42°$

25 RT + TQ = RQ, RQ = 7

RQ is a radius and radii of a ⊙ are $\cong$ so, RC = 7.

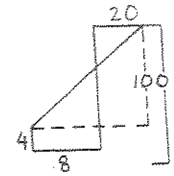
The diags of a rect are $\cong$, therefore RC = ET = 7.

26 mdpt $\overline{AB} = (\frac{-6+10}{2}, \frac{8+0}{2}) = (2, 4)$

If O is the center of the circle, $\overline{OM}$ is the radius.

$$\overline{OM} = \sqrt{(2-0)^2 + (4-0)^2}$$
$$= \sqrt{20}$$
$$A_{\text{SHADED}} = \pi(\sqrt{20})^2 = 20\pi$$

27 Her path forms a rt $\triangle$ with legs 28 m and 96 m. By Pythagorean Theorem, the hypotenuse (distance from starting point) is



$$28^2 + 96^2 = h^2$$
$$784 + 9216 = h^2$$
$$\sqrt{10{,}000} = h$$
$$100 = h\text{, distance is 100 m}$$

28 a $m\angle D + m\angle C + m\angle DBC = 180°$ $\quad \angle ABD = 180° - \angle DBC$

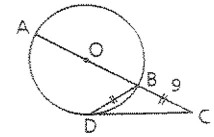
$30° + 30° + m\angle DBC = 180°$ $\quad \angle ABD = 180° - 120°$

$m\angle DBC = 120°$ $\quad \angle ABD = 60°$

$\angle ABD = \frac{1}{2}(\widehat{AD})$

$60° = \frac{1}{2}(\widehat{AD})$,

$m\widehat{AD} = 120°$



b Alt $\overline{BX}$ to the base of isosceles $\triangle DBC$ forms two 30°60°90° $\triangle$s.

$BX = \frac{1}{2}(9)$ $\quad CX = (BX)\sqrt{3}$ $\quad CD = 2(CX)$

$BX = \frac{9}{2}$ $\quad CX = \frac{9}{2}\sqrt{3}$ $\quad CD = 9\sqrt{3}$

c Use Tangent-Secant Power Theorem.

$(CD)^2 = (BC)(AC)$

$(9\sqrt{3})^2 = 9(9 + y)$

$243 = 81 + 9y$

$162 = 9y$

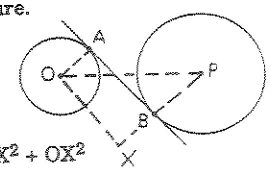
$18 = y, r = \frac{1}{2}y = 9$

29 a Use common tangent procedure.

ABXO is a rect.

If AB = 2.4, then OX = 2.4

If AO = .7, then BX = .7



PX = PB + BX $\quad OP^2 = PX^2 + OX^2$

PX = 1.1 + .7 $\quad OP^2 = (1.8)^2 + (2.4)^2$

PX = 1.8 $\quad OP^2 = 3.24 + (2.4)^2$

$OP = \sqrt{9.0} = 3$

b dist = OP – (radius ⊙ O + radius ⊙ P)

dist = 3 – (.7 + 1.1)

dist = 3 – (1.8) = 1.2

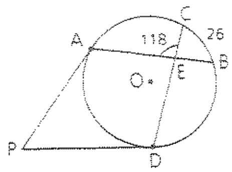
30 a $m\angle AED = 62°$ (supp to 118°)

$m\angle AED = \frac{1}{2}(\overset{\frown}{AD} + \overset{\frown}{CB})$

$62° = \frac{1}{2}(\overset{\frown}{AD} + 26°)$

$62° = \frac{1}{2}\overset{\frown}{AD} + 13°$

$49° = \frac{1}{2}\overset{\frown}{AD}$, $\overset{\frown}{AD} = 98°$



b $m\angle P = \frac{1}{2}(\overset{\frown}{ABD} - m\overset{\frown}{AD})$ ($m\overset{\frown}{ABD} = 360 - 98 = 262$)

$m\angle P = \frac{1}{2}(262 - 98)$

$m\angle P = \frac{1}{2}(164) = 82$

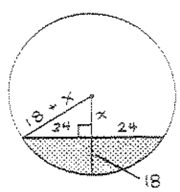
31 $8x - 15 = 4x + x + 45$ $m\angle AWY = 4 \cdot 20 = 80$

$8x = 5x + 60$ $m\angle WAY = 20 + 45 = 65$

$3x = 60$ $m\angle WYA = 180 - (80 + 65)$

$x = 20$ $m\angle WYA = 35°$

32 A radius ⊥ to a chord bis that chord, so the base of the rt △ = $\frac{1}{2}(48) = 24$. The radius of the ⊙ = 18 + x.



Using Pythagorean Theorem,

$x^2 + (24)^2 = (18 + x)^2$

$x^2 + 576 = 324 + 36x + x^2$

$576 = 324 + 36x$ radius $= 18 + x$

$252 = 36x$ radius $= 18 + 7$

$7 = x$ radius $= 25$

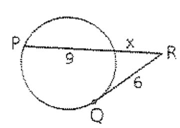
33 $6^2 = x(x + 9)$

$36 = x^2 + 9x$

$x^2 + 9x - 36 = 0$

$(x + 12)(x - 3) = 0$

$x = -12$ or $x = 3$ Reject $x = -12$, so $x = 3$.

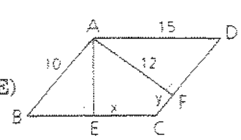


34 a ∠B ≅ ∠D because opp ∠s in a ▱ are ≅ and △AEB ~ △AFD by AA~.

$\frac{AB}{AD} = \frac{AE}{AF}$ $\frac{2}{3} = \frac{AE}{12}$

$\frac{10}{15} = \frac{AE}{12}$ $24 = 3(AE)$

$AE = 8$



b $10 = 5(2)$

$8 = 4(2)$

3-4-5 is a Pythagorean Triple, so

$BE = 3(2) = 6$

$\overline{AD} \cong \overline{BC}$, so $BC = 15$

$x = BC - BE$ $15 = 5(3)$

$x = 15 - 6$ $12 = 4(3)$

3-4-5 is Pythagorean Triple, so

$x = 9$ $FD = 3(3) = 9$

$CD - FD = y$

$10 - 9 = y$

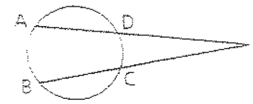
$1 = y$ $x{:}y = 9{:}1$

35 $m\angle P = \frac{1}{2}(m\overset{\frown}{AB} - m\overset{\frown}{CD})$

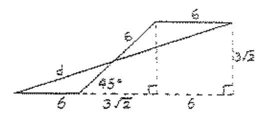
$24 = \frac{1}{2}(5x - 2x)$

$24 = \frac{1}{2}(3x)$

$x = 16$, $\overset{\frown}{CD} = 2 \cdot 16 = 32°$



36 Use the Pythagorean Theorem to solve for d.



$d^2 = (6 + 3\sqrt{2} + 6)^2 + (3\sqrt{2})^2$

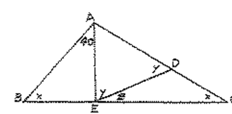
$d^2 = (12 + 3\sqrt{2})^2 + 18$

$d = 6\sqrt{5 + 2\sqrt{2}}$

37 The int ∠s of a △ add up to 180°.

∠x + 40° is supp of ∠AEB.

∠y + ∠x is supp of ∠AEB.



$\angle x + 40° = \angle y + \angle z$

$x + 40 - y = z$

$z = x + 40 - y$

$\angle EDC = 180 - y$

$x + \angle EDC + z = 180$ $z = x + 40 - y$

$x + 180 - y + z = 180$ $y - x = x + 40 - y$

$x - y + z = 0$ $2y - 2x = 40$

$y - x = z$ $y - x = 20$

$z = y - x = 20$

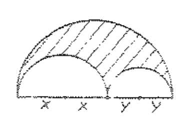
$\angle DEC = 20$

38 Shaded area = $A_{\text{semi}\odot} - A_{\text{medium semi}\odot} - A_{\text{sm semi}\odot}$

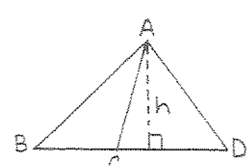
$= \frac{1}{2}\pi(x + y)^2 - \frac{1}{2}\pi x^2 - \frac{1}{2}\pi y^2$

$= \frac{1}{2}\pi(x^2 + 2xy + y^2) - \frac{1}{2}\pi x^2 - \frac{1}{2}\pi y^2$

Shaded area = πxy



39 Put the △s together using one of the ≅ pairs as a common side. $\overline{AC}$ is the median because it divides $\overline{BD}$ into 2 ≅ segs.



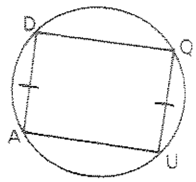
The height of both △s will be the same. The bases of both △s are ≅ also. So the areas are equal.

40 Given: QUAD has $\overline{QU} \cong \overline{AD}$.

$\angle A$ is supp to $\angle Q$.

$\overline{QD} \ncong \overline{AU}$

Prove: QUAD is an isos trapezoid



1 QUAD has $\overline{QU} \cong \overline{AD}$.	1 Given
2 $\angle A$ is supp to $\angle Q$.	2 Given
3 $\overline{QD} \ncong \overline{AU}$	3 Given
4 $\angle D$ is supp to $\angle U$.	4 In a quad, if two $\angle$s are supp, the remaining 2 $\angle$s are supp also.
5 QUAD may be inscribed in a $\odot$.	5 If a quadrilateral is inscribed in a $\odot$, its opposite $\angle$s are supp.
6 $\overset{\frown}{AD} \cong \overset{\frown}{QU}$	6 If chords $\cong$, arcs $\cong$.
7 $\overset{\frown}{DQ} \cong \overset{\frown}{DQ}$	7 Reflexive prop
8 $\overset{\frown}{ADQ} \cong \overset{\frown}{UQD}$	8 Addition prop
9 $\angle A \cong \angle U$	9 $\angle$s inscribed in $\cong$ arcs are $\cong$.
10 $\angle D$ is supp to $\angle A$	10 Substitution
11 $\overline{DQ} \parallel \overline{AU}$	11 If interior $\angle$s on same side of transversal are supp, then lines are $\parallel$.
12 QUAD is a trapezoid.	12 A trapezoid is a ▱ with exactly one pair of $\parallel$ sides.
13 QUAD is an isos trapezoid.	13 If a trapezoid has one pair of $\cong$ sides, it is isosceles.

41 $x + (x + k) + (x + 2k) + (x + 3k) + (x + 4k) + (x + 5k) = 30$

$6x + 15k = 30$

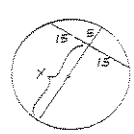
$x + 5k = 7$

Solving simultaneously,

$x = 3, k = \frac{4}{5}$

$x + 4k = 6\frac{1}{5}$

42 Use Chord-Chord Power Theorem. Each segment of the chord is 15 because the whole chord is 30 and it was bisected.



$$(15)(15) = 5x$$
$$225 = 5x, x = 45$$
$$\text{diameter} = x + 5 = 50$$