

Unit 1 Review Guide

For 1-5, state whether the statement is *true* or *false*. If **FALSE** provide a counterexample.

1. The ray from point R through point P and point Q is named as \overrightarrow{RQ} or \overrightarrow{RP} .

True

2. The line segment from point P to point Q can only be named as \overline{PQ} .

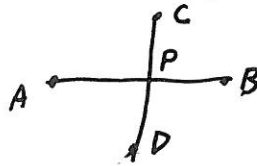
No, \overline{QP} would work.

3. If two angles are supplementary, then they are always a linear pair.

False, $\sphericalangle 45$ $\sphericalangle 135$

4. If \overline{AB} intersects \overline{CD} at point P , then $\angle APC$ and $\angle APD$ are a pair of vertical angles.

False



5. If two lines never intersect, then they are parallel.

False, Skew lines

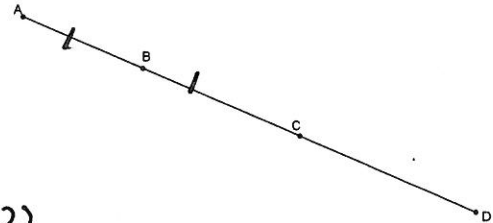
6. If point B is the midpoint of \overline{AC} , and $AB = 3x + 2$ and $BC = 6x - 7$. Find AC .

$$3x + 2 = 6x - 7$$

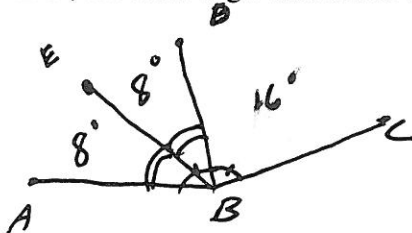
$$9 = 3x$$

$$3 = x$$

$$AC = 2AB = 2(3 \cdot 3 + 2) = 22$$



7. If \overline{BD} is the angle bisector of $\angle ABC$, \overline{BE} is the angle bisector of $\angle ABD$, and the $m\angle DBC = 16^\circ$, What is the measure of $\angle EBC$?

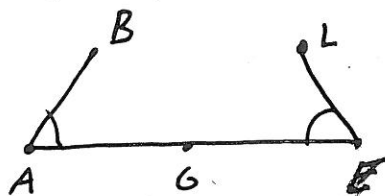


24°

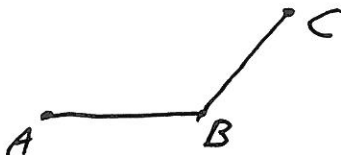
8. If four times the measure of an angle is equal to five times the measure of its complement, find the measure of each angle.

$$\begin{cases} 4x = 5y \\ x + y = 90 \end{cases} \rightarrow \begin{aligned} 4x &= 5(90 - x) \\ 4x &= 450 - 5x \\ 9x &= 450 \\ \frac{9x}{9} &= \frac{450}{9} \end{aligned} \rightarrow \begin{aligned} x &= 50^\circ \\ y &= 40^\circ \end{aligned}$$

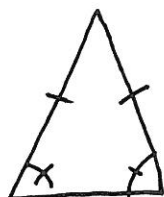
9. Draw points B, A, G, E, L such that points A, G and E are collinear and angles BAG and LEG were congruent.



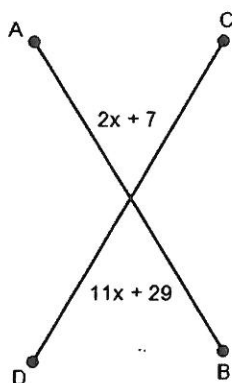
10. Draw two line segments using three points but without a midpoint.



11. Draw an isosceles triangle marking that two sides and the angles opposite those sides are congruent.



12. Solve for x.

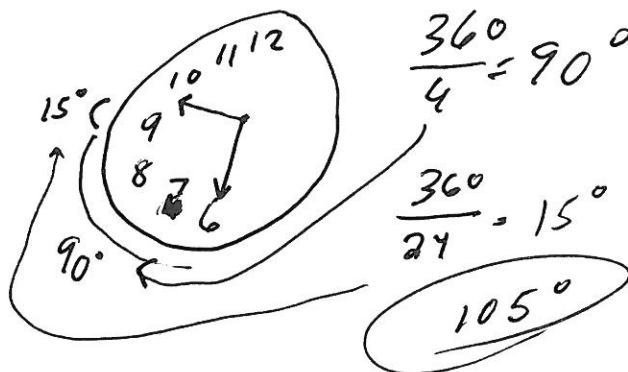


$$2x + 7 = 11x + 29$$

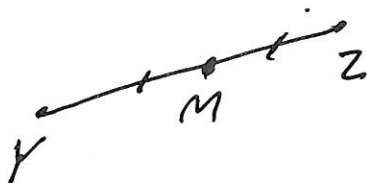
$$-22 = \frac{9x}{9}$$

$$\frac{-22}{9} = x$$

13. Find the measure of the hands of a clock at 9:30



14. M is the midpoint of \overline{YZ} . If $YM = r + 3$ and $YZ = 3r - 1$, find the length of \overline{MZ} .



$$2(YM) = YZ$$

$$2(r + 3) = 3r - 1$$

$$2r + 6 = 3r - 1$$

$$7 = r$$

$$YM = MZ = 7 + 3$$

$$10$$

15. What do we call a basic math assumption that does not require a proof?

Postulate.

16. Use the figure to the right to answer the following questions.

a. If $TQ \perp QR$, which angles must be complementary?

3, 4

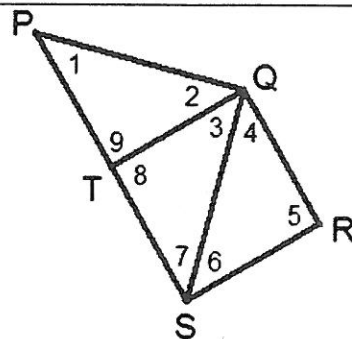
b. If $m\angle 8 = x + 80$ and $m\angle 9 = 2x - 30$ find the measure of x

$$x + 80 + 2x - 30 = 180$$

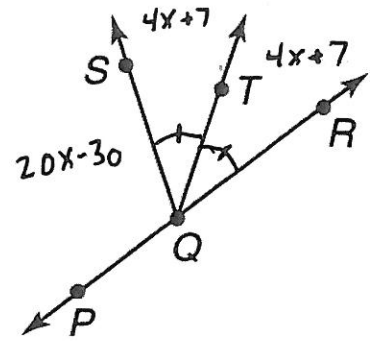
$$3x + 50 = 180$$

$$3x = 130$$

$$x = \frac{130}{3}$$



17. In the figure, \overline{QP} and \overline{QR} are opposite rays, and \overline{QT} bisects $\angle RQS$. Find the measure of $\angle PQT$ if $\angle RQT = 4x + 7$ and $\angle SQP = 20x - 30$



$$\begin{aligned}
 4x+7+4x+7+20x-30 &= 180^\circ \\
 28x-16 &= 180 \\
 28x &= 196 \\
 x &= 7
 \end{aligned}$$

18. Make sure you know the following vocabulary. You will not need to define these words from scratch, but you need to know what they mean: collinear, coplanar, opposite rays, partition, polygons from quadrilateral to dodecagon, vertical angles, linear pairs, complementary, supplementary, skew lines, postulate, theorem.

19. Write the equation of line through the points $(-11, 22)$ and $(-8, 10)$ in point-slope and slope intercept form.

$$\begin{aligned}
 m &= \frac{-12}{3} = -4 & y &= -4x + b \\
 10 &= -4(-8) + b & & \\
 -28 & -28 & & \\
 -18 & = b & y &= -4x - 18
 \end{aligned}$$

20. Write the equation of a line through the point $(25, 37)$ and perpendicular to the line through the points $(13, 47)$ and $(5, 63)$ in slope-intercept form and standard form.

$$\begin{aligned}
 \hookrightarrow m &= \frac{16}{-8} = -2 & y &= \frac{1}{2}x + b \\
 \downarrow \text{Perp.} & & 37 &= \frac{25}{2} + b \\
 m &= \frac{1}{2} & \frac{74}{2} - \frac{25}{2} &= b \\
 & & \frac{49}{2} &= b
 \end{aligned}$$

21. Ray PJ starts at the intersection of $y_1 = 4x - 17$ and $y_2 = 13 - 11x$. Find the coordinates of point P.

$$\begin{aligned}
 4x - 17 &= 13 - 11x & y_1 &= 4 \cdot 2 - 17 \\
 15x &= 30 & y_1 &= 8 - 17 = -9 \\
 x &= 2 & & (2, -9)
 \end{aligned}$$

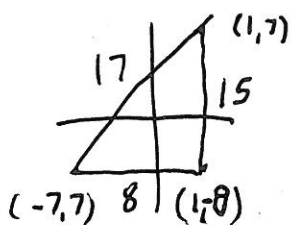
22. Solve for x.

$$\begin{aligned}
 17 - 3|2x - 4| &= -13 \\
 -17 & -17 \\
 -3|2x - 4| &= -30 \\
 \div -3 & \div -3 \\
 |2x - 4| &= 10 \\
 2x - 4 &= 10 & 5|8x| - 2 &= 38 \\
 & & 12 + 2 & \\
 X &= 7 & 5|8x| &= 40 \\
 & & 18x &= 8 \\
 & & X &= -1, 1 \\
 2x - 4 &= -12 & & \\
 X &= -3 & &
 \end{aligned}$$

23. Find the midpoint of segment NL given $N(22/7, 5)$ and $L(13/2, -5/3)$.

$$\begin{aligned}
 &\left(\frac{2 \cdot \frac{22}{7} + \frac{13 \cdot 7}{2 \cdot 7}}{2}, \frac{3 \cdot 5 + \frac{-5}{3}}{2} \right) \\
 &\left(\frac{44 + 91}{14} \cdot 14, \frac{15 - 5}{3} \cdot 3 \right) \\
 &\left(\frac{135}{28}, \frac{10}{6} \right)
 \end{aligned}$$

24. On a map, the coordinates of triangle F(-7, 7), U(1, 7) and N(1, -8) represent a park. Is this an accurate representation of a park that has a perimeter of 480 yards and area of 720 yards?



$$A = 8 \cdot 15 \div 2 = 60$$

$$P = 8 + 15 + 17 = 40$$

$$\frac{A}{P} = \frac{60}{40} = \frac{3}{2}$$

$$\frac{A}{P} = \frac{720}{480} = \frac{3}{2}$$

25. Find the perimeter and area of rectangle G(-3, 4), I(1, 4), R(-3, -2), L(3, -2). Also, find the midpoint of each side.



$$\text{Area} = 30$$

$$P = 16 + 250$$

(See last page)

Midpoints

$$GI = (-1, 4) \quad GR = (-3, 1)$$

$$IL = (2, 1)$$

$$LR = (0, -2)$$

26. Find the perimeter and area of triangle F(-7, 2), I(-5, 9) N(2, 7).

$$A = \frac{53}{2}$$

$$P = 2\sqrt{53} + \sqrt{106}$$

27. Find the sum of the interior angles of a:

a) undecagon

$$9 \cdot 180$$

$$1620$$

b) septagon

$$5 \cdot 180$$

$$900$$

c) 41-gon

$$39 \cdot 180$$

$$7020$$

28. Simplify. $\sqrt{2} + \sqrt{3} + \sqrt{4} + \sqrt{8} + \sqrt{12} + \sqrt{16} + \sqrt{20} + \sqrt{80}$

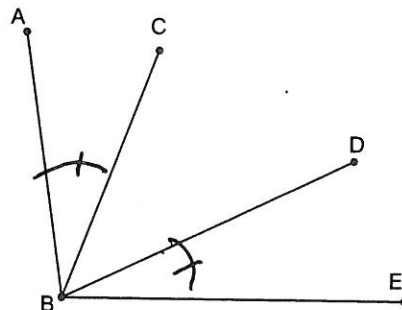
$$\sqrt{2} + \sqrt{3} + 2 + 2\sqrt{2} + 2\sqrt{3} + 4 + 2\sqrt{5} + 8\sqrt{5}$$

$$6 + 3\sqrt{2} + 3\sqrt{3} + 10\sqrt{5}$$

29. Prove.

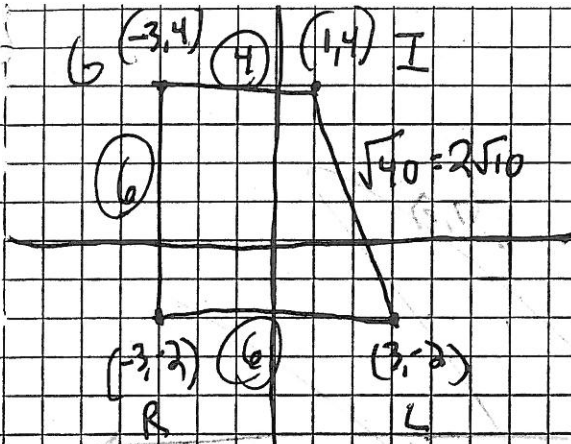
Given: $m\angle ABC = m\angle DBE$

Prove: $m\angle ABD = m\angle CBE$



Statements	Reasons
$m\angle ABC = m\angle DBE$	Given
$m\angle CBD = m\angle CBD$	Reflexive Property
$m\angle ABC + m\angle CBD = m\angle DBE + m\angle CBD$	Addition Property of Equality
$m\angle ABC + m\angle CBD = m\angle ABD$; $m\angle CBD + m\angle DBE = m\angle CBE$	Angle Addition Postulate
$m\angle ABD = m\angle CBE$	Transitive Property

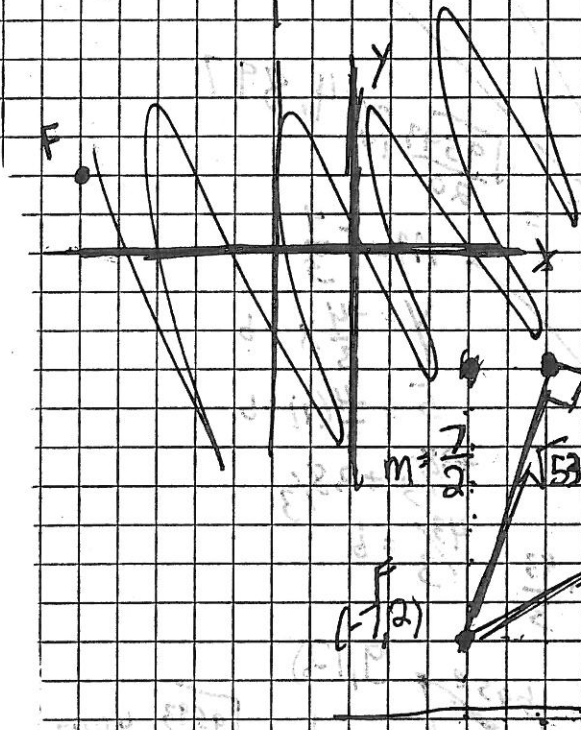
30. Challenge: Find the area of the triangle with vertices (-3,3), (7, 5) (9, 12)..



Trapezoid = $\frac{(b_1 + b_2)h}{2}$ (Not on test) 25

$$= \frac{(4+6)2}{2} = 30$$

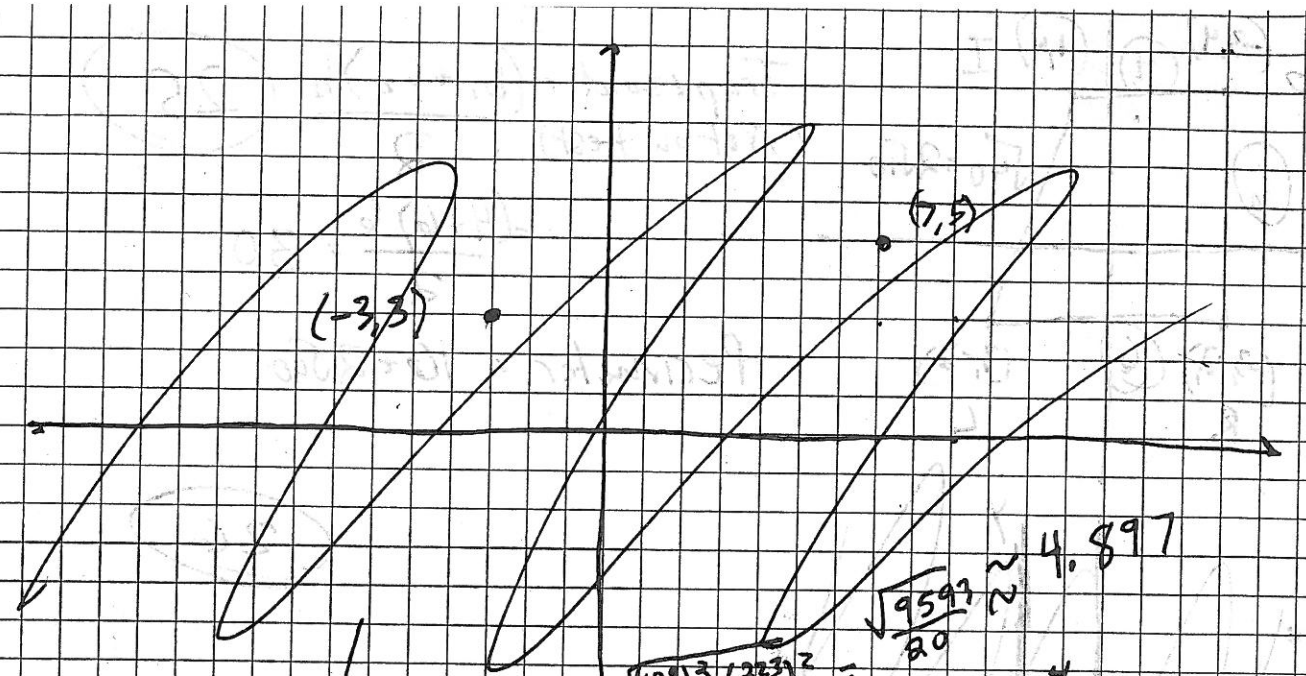
Perimeter = $16 + 2\sqrt{10}$



26

$$A = \frac{\sqrt{53} \cdot \sqrt{53}}{2}$$

$$= \frac{53}{2}$$



$$m = \frac{12-3}{9-3} = \frac{9}{6} = \frac{3}{2}$$

$$y = \frac{3}{2}x + b$$

$$3 = \frac{3(-3)}{2} + b$$

$$3 = -\frac{9}{2} + b$$

$$\frac{6}{2} + \frac{9}{2} = b$$

$$\frac{15}{2} = b$$

$$C = \sqrt{\left(\frac{109}{25}\right)^2 + \left(\frac{223}{100}\right)^2} = \sqrt{\frac{9593}{20}} \approx 4.897$$

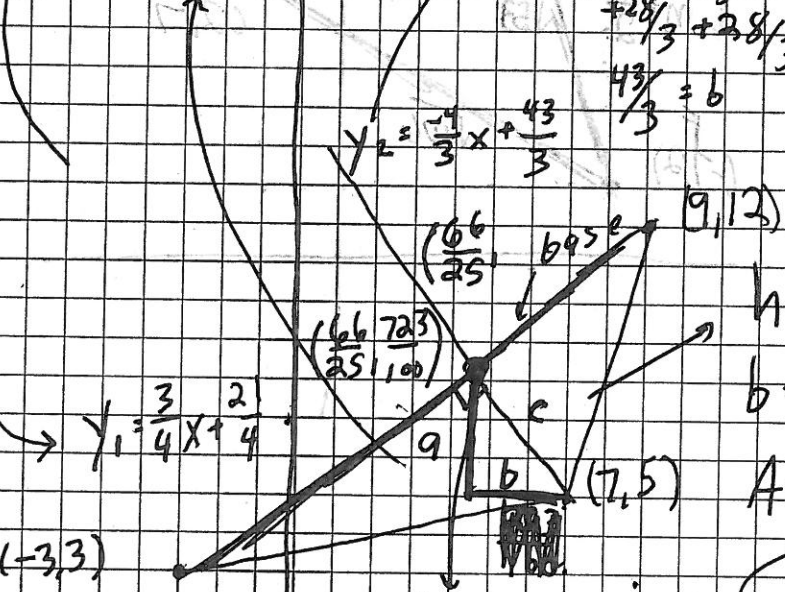
$$m = -\frac{4}{3}$$

$$y = -\frac{4}{3}x + b$$

$$5 = -\frac{4(7)}{3} + b$$

$$+\frac{28}{3} + \frac{28}{3}$$

$$\frac{43}{3} = b$$



$$y_1 = \frac{3}{4}x + \frac{21}{4}$$

$$y_1 = \frac{3}{4}\left(\frac{66}{25}\right) + \frac{21}{4}$$

$$y_1 = \frac{198}{100} + \frac{525}{100} = \frac{723}{100}$$

$$y_1 = y_2$$

$$\frac{3}{4}x + \frac{21}{4} = -\frac{4}{3}x + \frac{43}{3}$$

$$9x + 63 = -16x + 129$$

$$25x = 66$$

$$x = \frac{66}{25}$$

$$h = \sqrt{\frac{9593}{20}} \approx 4.897$$

$$b = 15$$

$$A = \frac{3\sqrt{9593}}{2}$$

$$\approx 36.7$$