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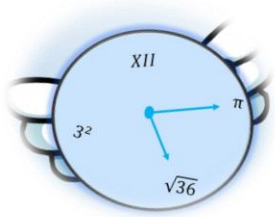

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About this product:

ACT Prep III has 30 questions covering geometry and trig. Included in this packet: Perimeter, Area, Volume, Dimensional Changes, Geometric Properties, Trig, Pythagorean Theorem, Laws of Cosines and Sines and more.

Name: _____ ACT Prep #3

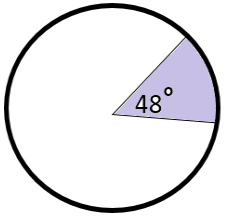
1. The length of a rectangle is 8.3 cm and the width is 4.5 cm. Find the area and perimeter of the rectangle. (Draw the picture)

2. If the length and width are both doubled in problem #1, will the area and the perimeter double? Explain.

3. Find the area of a circle with a radius of 5.5 inches. (Draw the picture)

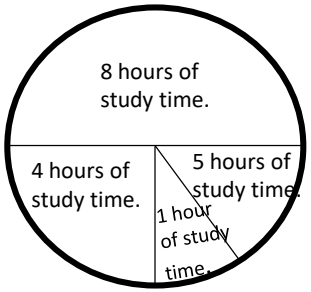
4. What is the diameter of the circle in #3? _____

5. Find the area of the sector if the central angle is 48° and radius is 3.25 inches. Round to the nearest 100^{th}.



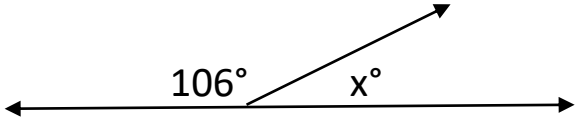
Name: _____ ACT Prep #3

6. Jimmy wanted to create a circle graph of the amount of time his group studied? What mistakes did he make? Redraw this circle and make it more accurate.

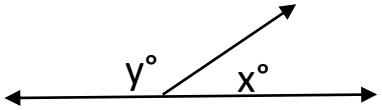


7. Using the new circle from problem 6, what should be the degree of the central angle represented by 8 hours of study time?

8. Find x: _____

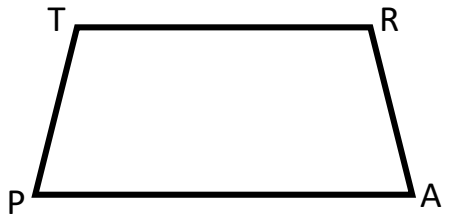


9. Write an equation to find x in terms of y.



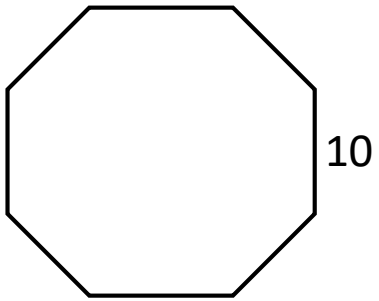
Name: _____ ACT Prep #3

10. Trapezoid TRAP is shown. TR ∥ PA.
If ∠P is 55° then what is the m∠T? ____



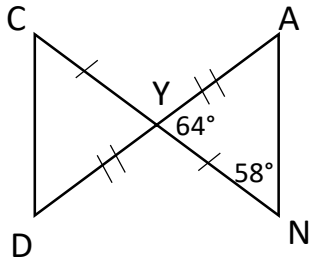
11. In TRAP above, TR = 12 ft and PA = 14 ft. If the area of the trapezoid is 104 ft^2, then what is the height of the trapezoid? (show work below)

12. Find the area of the regular hexagon rounded to the nearest hundredth if each side is 10 units.



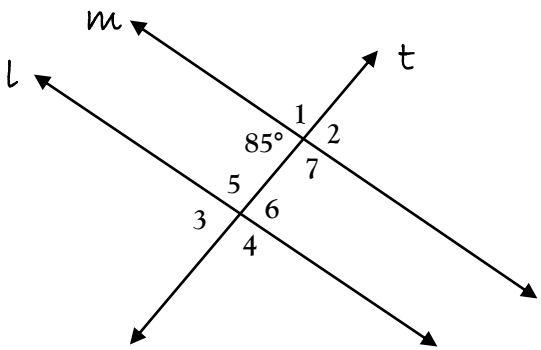
Name: _____ ACT Prep #3

13. Find all the missing angles in the figure:



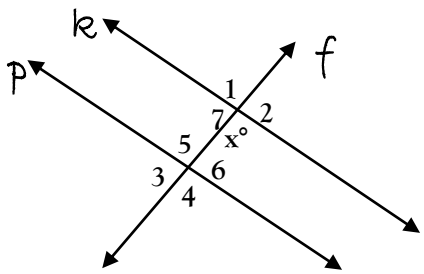
∠ C = _____ ∠ D = _____ ∠ A = _____ ∠ CYD = _____

14. If $l \parallel m$, use the information given to find all the angles.



1: _____ 2: _____ 3: _____ 4: _____
5: _____ 6: _____ 7: _____

15. Fill in the blank with an expression in terms of x.



∠ 6 = _____
∠ 5 = _____
∠ 2 = _____
∠ 4 = _____

16. The sum of the measures of the angles of a triangle = _____.

17. Which of the following could not be side lengths of a triangle?

a) 2, 3, 4 b) 3, 4, 5 c) 4, 5, 9 d) 4, 4, 5

18. In a triangle, the largest side is opposite the largest _____ and the smallest _____ is opposite the smallest angle.

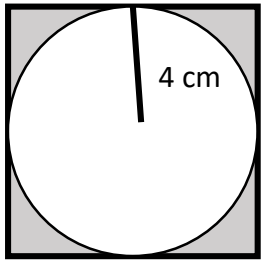
19. When should the Pythagorean Theorem be used?

20. In a right triangle, the side opposite a 35 degree angle has a length of 10 yards. Find all missing sides and angles. Draw the picture.

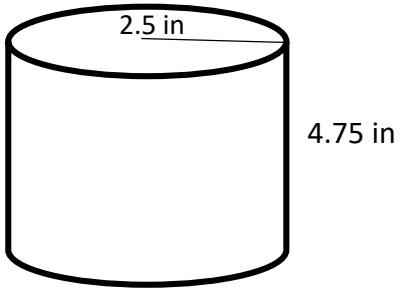
Name: _____ ACT Prep #3

21. A right isosceles triangle has a hypotenuse that = $6\sqrt{2}$. Find the area and perimeter. (Draw picture)

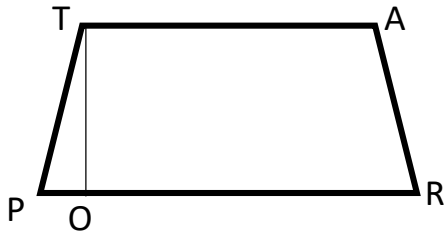
22. Find the area of the shaded region if a circle with a radius of 4 cm is inscribed in a square. Leave answers in terms of π.



23. Find the volume of a cylinder with the dimensions shown in the diagram. Round to the nearest 100th.



24. Find the area of isosceles trapezoid TARP if:
TO is the height, leg TP = 8 units, base TA = 11 units, ∠ P = 65°
(show work)



25. What factor does the area need to be multiplied by in problem #24, if all the dimensions are cut in half?

Name: _____ ACT Prep #3

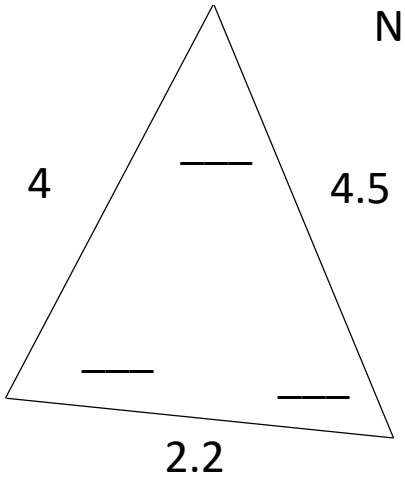
26. Write the formula for the Law of Sines: _____

27. Write the formula for the Law of Cosines: _____

Find all the missing sides and angles. (Round to the nearest 100th when necessary.)

Not drawn to scale.

28.



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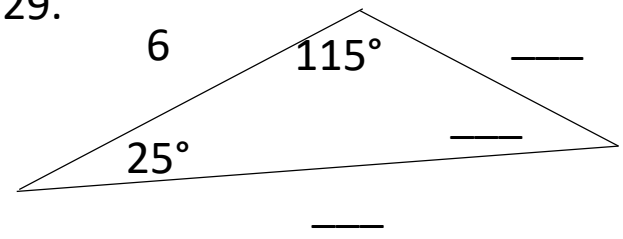
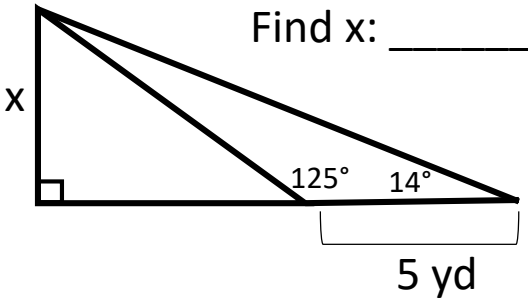


30. Find x: _____



Answer Keys

The answers are in red and the explanations are in blue.

1. The length of a rectangle is 8.3 cm and the width is 4.5 cm. Find the area and perimeter of the rectangle. (Draw the picture) area = 37.35 cm^2

   perimeter = 25.6 cm

   Area = lw or (8.3)(4.5) = 37.35 cm^2

   Perimeter = 2l + 2w or 2(8.3)+2(4.5) = 25.6 cm

2. If the length and width are both doubled in problem #1, will the area and the perimeter double? Explain. The perimeter will, but the area will quadruple. The area will (double)^2.

   Perimeter: 16.6 and 9 are the new dimensions, 2(16.6) + 2(9) = 51.2 which is twice as big as 25.6 from problem #1. Since area is a multiplication process, then when two sides are doubled, it is the same thing as multiplying by 2 times 2 or 4, so the new area will quadruple. A = (16.6)(9) = 149.4 which is 4 times bigger than 37.35 from problem #1.

3. Find the area of a circle with a radius of 5.5 inches. (Draw the picture)

   30.25π or 95.03 in^2

   $A = \pi r^2 = \pi(5.5)^2 = 30.25\pi$ or 95.03 in^2

   This answer is called leaving it in terms of pi.

4. What is the diameter of the circle in #3? 11 inches

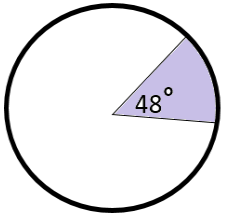
   The diameter is twice as big as the radius.

5. Find the area of the sector if the central angle is 48° and radius is 3.25 inches. Round to the nearest 100th.

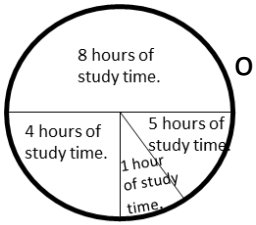
   $(\frac{48}{360})(\pi 3.25^2) \approx$ 4.42 in^2

   A sector is like a slice of pizza. The formula is central angle divided by 360 times the area of the circle or

   $\frac{m}{360} \times \pi r^2$

KEY WITH EXPLANATIONS



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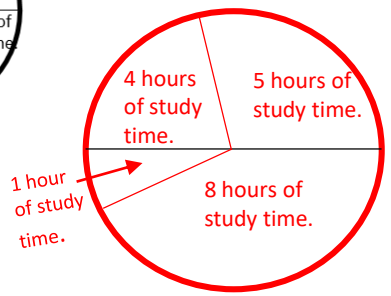
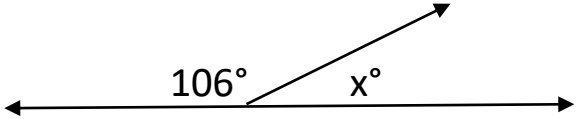


6. Jimmy wanted to create a circle graph of the amount of time his group studied? What mistakes did he make? Redraw this circle and make it more accurate. The is a total of 18 hours, so half the circle should be divided into 9 hours.

7. Using the new circle from problem 6, what should be the degree of the central angle represented by 8 hours of study time? 160°

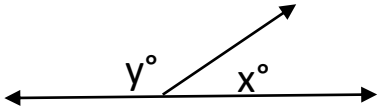
$\frac{8}{18} \times 360° = 160°$ (8 hours out of a total of 18 hours times the total degrees in a circle.)

8. Find x: 74°



A straight line is 180°, so 180 – 106 = 74.

9. Write an equation to find x in terms of y.

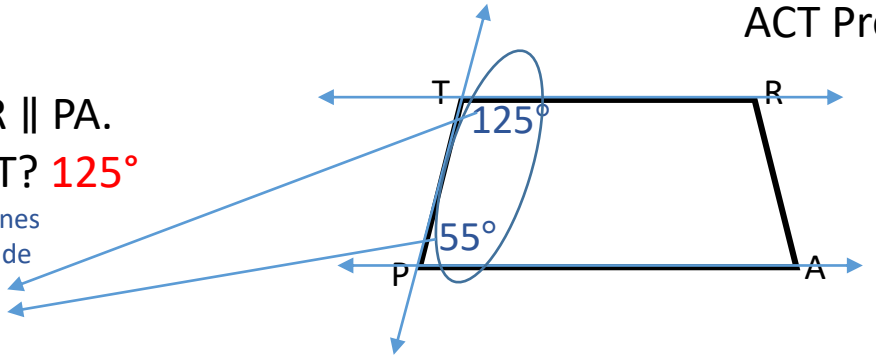


x = 180 - y

A straight line is 180°, so x has to be whatever y is subtracted from 180.

10. Trapezoid TRAP is shown. TR ∥ PA.
If ∠P is 55° then what is the m∠T? 125°

Same side interior angle theorem – When two lines are parallel and cut by a transversal, the same side interior angles are supplementary.



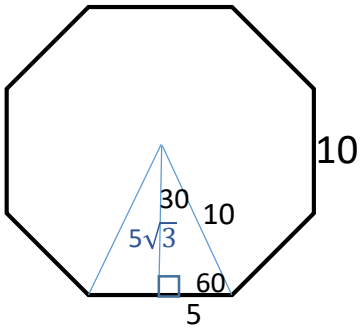
11. In TRAP above, TR = 12 ft and PA = 14 ft. If the area of the trapezoid is 104 ft^2, then what is the height of the trapezoid? (show work below) height = 8 feet

.5h(12+14) = 104 Formula for the Area of a Trapezoid: $A = \frac{1}{2}h(b_1+b_2)$

13 h = 104

h = 8 ft

12. Find the area of the regular hexagon rounded to the nearest hundredth if each side is 10 units. 346.41 square units

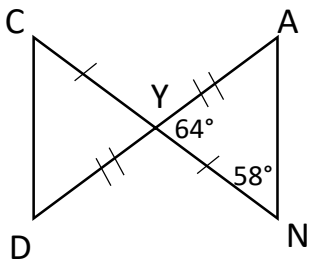


A = ½Pa (formula for area of regular polygons.

A= ½ (80)($5\sqrt{3}$)

A=$200\sqrt{3}$ ≈ 346.41

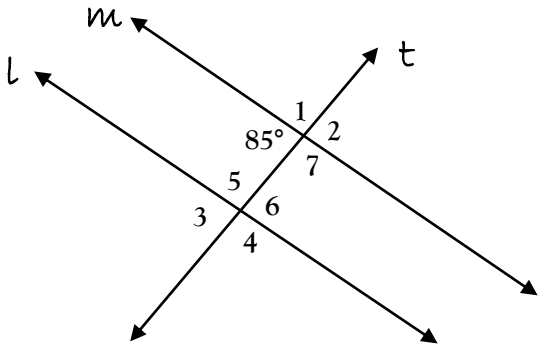
13. Find all the missing angles in the figure:



∠ C = 58° ∠ D = 58° ∠ A = 58° ∠ CYD = 64°

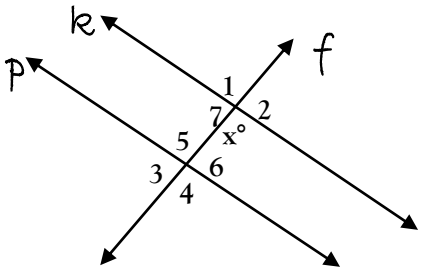
The triangles are congruent by SAS, so corresponding parts are congruent.

14. If $l \parallel m$, use the information given to find all the angles.



1: 95° 2: 85° 3: 85° 4: 95°
5: 95° 6: 85° 7: 95°

15. Fill in the blank with an expression in terms of x.



∠ 6 = 180 - x
∠ 5 = x
∠ 2 = 180 - x
∠ 4 = x

You must know:
1) Vertical angles are congruent.
2) Same side interiors are supplementary.
3) Corresponding angles are congruent.
4) Alternate interior angles are congruent.

16. The sum of the measures of the angles of a triangle = 180 degrees.

17. Which of the following could not be side lengths of a triangle?

a) 2, 3, 4 b) 3, 4, 5 c) 4, 5, 9 d) 4, 4, 5

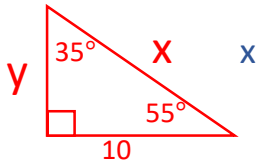
The sum of any two sides must be greater than the third side.

18. In a triangle, the largest side is opposite the largest angle and the smallest side is opposite the smallest angle.

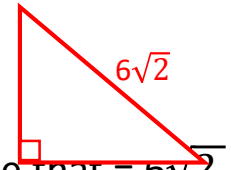
19. When should the Pythagorean Theorem be used? When two sides of a right triangle are known.

20. In a right triangle, the side opposite a 35 degree angle has a length of 10 yards. Find all missing sides and angles. Draw the picture. missing angle: 55°
hypotenuse = 17.43 (or 17.44 depending on the method and rounding used)
and missing leg = 14.28

$(17.43)^2 - (10)^2 = y^2$
$y = 14.28$



$\sin(35) = \frac{10}{x}$
$x = \frac{10}{\sin(35)} \approx 17.43$



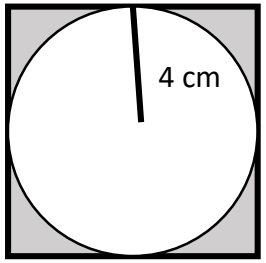
21. A right isosceles triangle has a hypotenuse that = $6\sqrt{2}$. Find the area and perimeter. (Draw picture) perimeter: $12 + 6\sqrt{2} = 20.49$ area: 18

A right isosceles is a 45-45-90, so the legs are the same. The hypotenuse is $\sqrt{2}$ times bigger, so the legs are 6 each.

22. Find the area of the shaded region if a circle with a radius of 4 cm is inscribed in a square. Leave answers in terms of π.

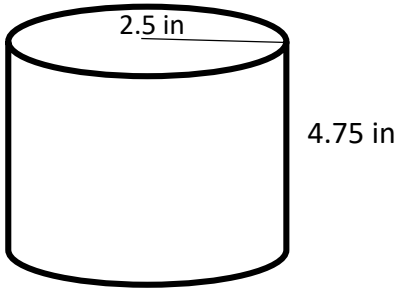
$64 - 16\pi$ (≈ 13.73 cm^2)

If the radius is 4, then a side length of the square is 8. Use area of square – area of circle.



23. Find the volume of a cylinder with the dimensions shown in the diagram. Round to the nearest 100th.

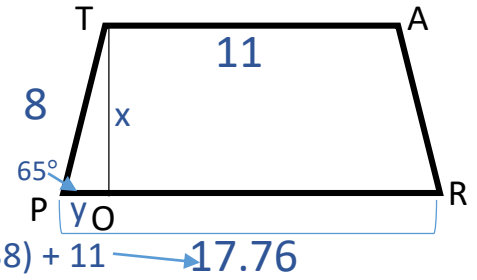
93.27 in^3 V = Bh $V = \pi(2.5)^2(4.75) \approx 93.266032$



24. Find the area of isosceles trapezoid TARP if:
TO is the height, leg TP = 8 units, base TA = 11 units, ∠ P = 65°
(show work) A = ½(7.25)(11+17.76)
104.26 units^2
(Use trig to find measures in triangle TOP.)

$\sin(65) = \frac{x}{8}$ $x = 8\sin(65)$ $x \approx 7.25$

$\cos(65) = \frac{y}{8}$ $x = 8\cos(65)$ $x \approx 3.38$



25. What factor does the area need to be multiplied by in problem #24, if all the dimensions are cut in half?

¼ Take what is happening to all the dimensions and square it, so (½)^2.

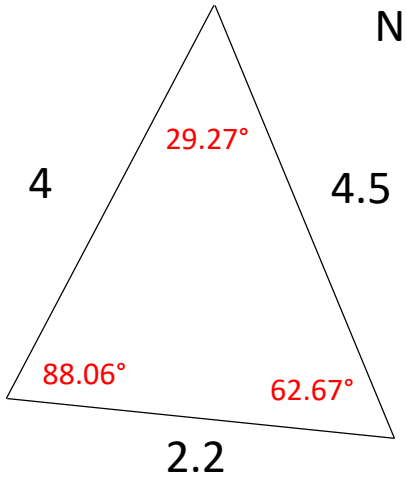
26. Write the formula for the Law of Sines: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

27. Write the formula for the Law of Cosines: $a^2 = b^2 + c^2 - 2(b)(c)\cos(A)$

Find all the missing sides and angles. (Round to the nearest 100th when necessary.)

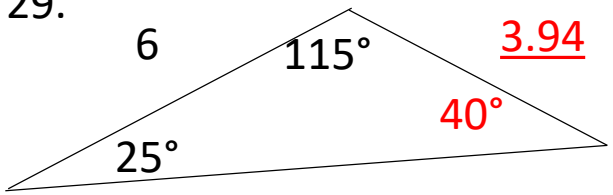
Not drawn to scale.

28.



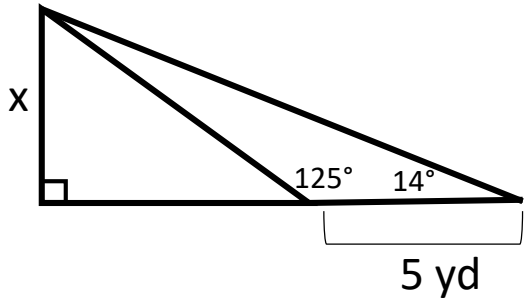
Depending on how the problem was solved could cause the decimals to be slightly different!

29.



8.46

30.

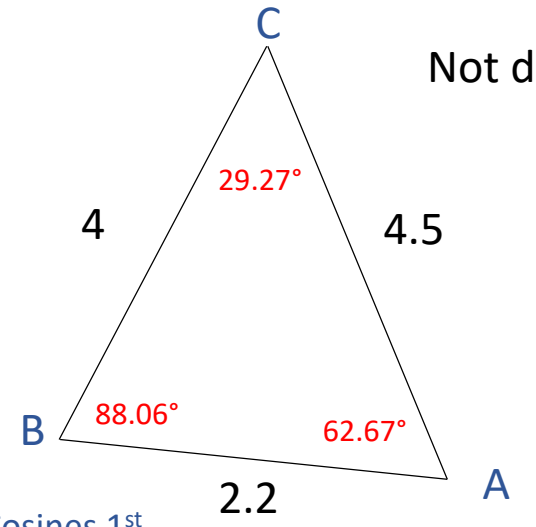


Find x: 1.51

28, 29 and 30 are worked on the next page.

Not drawn to scale.

28.



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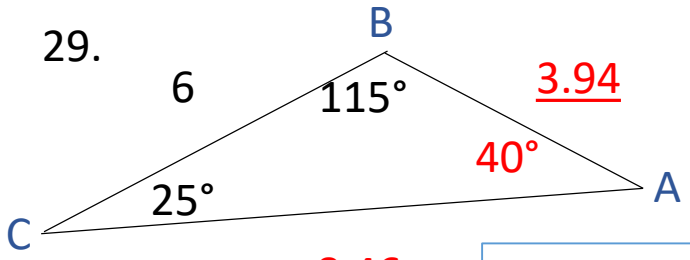


8.46

Sum of the angles of a triangle must add to = 180:

180 – 115 –25= 40

Use Law of Cosines 1st.

$4^2 = 4.5^2 + 2.2^2 - 2(4.5)(2.2)\cos(A)$

$16 = 25.09 - 19.8\cos(A)$

$-9.09 = -19.8\cos(A)$

$\frac{-9.09}{-19.8} = \cos A$ (Use $\cos^{-1}\left(\frac{-9.09}{-19.8}\right)$)

$\angle A \approx 62.67$

Use Law of Sines

$\frac{6}{\sin(40)} = \frac{b}{\sin(115)}$

$6\sin(115) = b\sin(40)$

$b = \frac{6\sin(115)}{\sin(40)}$

$b \approx 8.46$

Use Law of Sines Now.

$\frac{4}{\sin(62.67)} = \frac{4.5}{\sin B}$

$4\sin B = 4.5\sin(62.67)$

$\sin B = \frac{4.5\sin(62.67)}{4}$

$\angle B \approx 88.06$

Sum of the angles of a triangle must add to = 180:

180 – 62.67 – 88.06 = 29.27

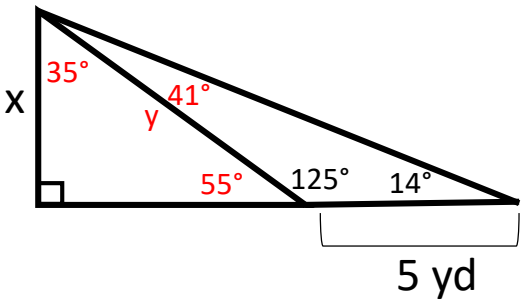
$\frac{6}{\sin(40)} = \frac{c}{\sin(25)}$

$6\sin(25) = c\sin(40)$

$c = \frac{6\sin(25)}{\sin(40)}$

$c \approx 3.94$

30.



Find x: 1.51

First find all of the angles:

180 – 125 = 55°

90 – 55 = 35°

180 – 125 – 14 = 41°

Use Law of Sines Now.

$$\frac{5}{\sin(41)} = \frac{y}{\sin(14)}$$

$y \sin(41) = 5\sin(14)$

$$y = \frac{5\sin(14)}{\sin(41)}$$

$y \approx 1.84$

Now set up a right triangle trig problem:

$$\sin(55) = \frac{x}{1.84}$$

$x = 1.84\sin(55)$

$x \approx 1.51$

Reporting categories for this lesson:

PHM = Preparing for Higher Math (Geometry is under this heading)

G = Geometry (and trig)

IES = Integrating Essential Skills
MDL = Modeling (each modeling item is also a part of another category)

Name: _____ Answer Document – ACT Prep #3

1.	area = 37.35 cm^2 perimeter = 25.6 cm	**G**
2.	See the other answer key	**G**
3.	30.25π or 95.03 in^2	**G**
4.	11 inches	**G**
5.	4.42 in^2	**G**
6.	See the other answer key	**IES MDL**
7.	160°	**G**
8.	74°	**G**
9.	x = 180 - y	**G**
10.	125°	**G**

11.	8 feet	**G**
12.	346.41 square units	**G**
13.	∠C = 58° ∠D = 58° ∠A = 58° ∠CYD = 64°	**G**
14.	1:95° 2:85° 3:85° 4:95° 5:95° 6:85° 7:95°	**G**
15.	∠ 6 = 180 – x ∠ 5 = x ∠ 2 = 180 – x ∠ 4 = x	**G**
16.	180 degrees	**G**
17.	C	**G**
18.	angle, side	**G**
19.	When two sides of a right triangle are known.	**G**
20.	Angle: 55 Hyp: 17.43 Side: 14.28	**G**

21.	per: $12+6\sqrt{2}$ = 20.49 area: 18	**G**
22.	$64 - 16\pi$	**G**
23.	93.27 in^3	**G**
24.	104.26 $units^2$	**G**
25.	¼	**G**
26.	$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$	**G**
27.	$a^2 = b^2 + c^2 - 2(b)(c)\cos(A)$	**G**
28.	See the other answer key	**G**
29.	See the other answer key	**G**
30.	1.51	**G**

Name: _____ Answer Document – ACT Prep #3

1.		**G**
2.		**G**
3.		**G**
4.		**G**
5.		**G**
6.		**IES MDL**
7.		**G**
8.		**G**
9.		**G**
10.		**G**

11.		**G**
12.		**G**
13.		**G**
14.		**G**
15.		**G**
16.		**G**
17.		**G**
18.		**G**
19.		**G**
20.		**G**

21.		**G**
22.		**G**
23.		**G**
24.		**G**
25.		**G**
26.		**G**
27.		**G**
28.		**G**
29.		**G**
30.		**G**