Lesson 14  Solutions

Practice Set 14  (subscripts tell you which lesson each problem came from)

You do not need a calculator for any problems.

1. and Descartes developed analytical geometry independently of each other in the 1600's.  (Lesson 14A)

   A) Fermat  B) Kepler  C) Euler  D) Pascal

Choice A)

2. Unlike , the goal of Christians should not be to separate the Creator from His creation, but to study His creation and acknowledge Him.  (Lesson 14A)

   A) Fermat  B) Kepler  C) Descartes  D) Pascal

Choice C)

3. Make your own coordinate plane. Then, graph the following ordered pairs and label them:

   A) (2,-4)  B) (-1,-3)  C) (-3,5)

(Ex. 14.1)
4. Write the coordinates of the points shown on the graph below. (Ex. 14.1)

A = (-3,2)    B = (4,1)    C = (2, -3)

5. Add to your one-point perspective highway drawing from 13B and problem 13.3. Try to add another rectangular building on the left side of the road, behind the building drawn in problem 13.3. (Ex. 13.3)

6. Circle the net you think would fold to form the right solid shown below. (Ex. 13.1 and 13.2)
7. Is this an example of a tesselation or a fractal. Why? 

**Tesselation**, because there are no gaps or overlap

8. Find x and a°. For x, do not use a calculator. Just leave the answer in square root form. (Ex. 12.2, 11.1)

\[41 + 90 + a = 180\]

\[131 + a = 180\]

\[a = 49°\]

\[a^2 + b^2 = c^2\]

\[x^2 + 16^2 = 17^2\]

\[x^2 + 196 = 289\]

\[x^2 = 93\]

\[\sqrt{x^2} = \sqrt{93}\]

9. Find x and y, then find c. Lines m, n, and t are parallel. (Ex. 12.5)

\[x = y = 78°\]

\[\frac{4}{5} = \frac{c}{3}\]

\[5c = 12\]

\[c = \frac{12}{5} = \frac{2^2}{5}\]

10. Use the properties of quadrilaterals to determine whether each statement is true. Is its contrapositive also true? (Ex. 11.4, 11.5, Lsn 9 Rules, Lsn 12 Rules)
   a) If a quadrilateral has equal diagonals, then it is also a rectangle.

   b) If a quadrilateral is a rhombus, then it is also a parallelogram.

   a) True, contrapositive is also true, because if it is not a rectangle, then its diagonals aren’t =.

   b) True, contrapositive is also true, because if it’s not a parallelogram, then its not a rhombus either.
11. Given the central angle $ABC = 136^\circ$, find arcs $AC$ and $ADC$. (Ex. 12.7)

Arc $AC$ equals the central angle, $136^\circ$

$AD = 360 - 136 = 224^\circ$

12. Write a syllogism for the Euler diagram shown. (Ex. 11.6, 11.7)

All bicycles are 2-wheeled objects.
That vehicle is a bicycle.
That vehicle is a 2-wheeled object.

13. Use a compass and straightedge (or Geometer’s Sketchpad) to construct an equilateral triangle. Then, rearrange the steps shown in the correct order to complete the proof of Euclid’s Proposition 1. Don’t rewrite everything, just write the letters A,B,C, etc. in the correct order.

A) With center $A$ and distance $AB$, construct a circle $BCD$[Post. 3].
B) With center $B$ and distance $BA$, construct a circle $ACE$[Post. 3].
C) Therefore, the three line segments $CA$, $AB$, and $BC$ are equal to each other, and triangle $ABC$ is therefore an equilateral triangle, being what was required to do.
D) But $CA$ was also proved equal to $AB$. Therefore, $CA$ must also equal $CB$, since things equal to the same thing are equal to each other [Axiom 1].
E) Now, since point $A$ is the center of circle $CBD$, $AC = AB$ [Def. of circle].
F) Also, since point $B$ is the center of circle $ACE$, $BC = BA$ [Def. of circle].
G) From point $C$, where the circles intersect, construct line segments $CA$ and $CB$[Post. 1].
H) Construct line segment $AB$[Given].

(Lesson 10B)
Step 1 = H, Step 2 = A, Step 3 = B, Step 4 = G, Step 5 = E, Step 6 = F, Step 7 = D, Step 8 = C
14. Find x and y. (Ex. 9.2)

\[
\frac{12}{20} = \frac{5}{x} \quad \text{reduce} \quad \frac{12 + 4}{20 + 4} = \frac{3}{5}
\]

\[
3 \cdot \frac{5}{x} = 3 \cdot \frac{8}{y}
\]

\[
x = \frac{25}{3} = \frac{8}{3}
\]

\[
y = \frac{40}{3} = \frac{13}{3}
\]

15. Which of the following is an obtuse angle? (Lesson 9 Rules)

A) \[\quad\]
B) \[\quad\]
C) \[\quad\]

16. Factor. Find the GCF first. \(9xy^3 + 3x^3y^4 - 24x^2y^3\) (Ex. 8.5)

The terms have a 3, an x, and a \(y^3\) in common:

\[
3xy^3(3 + xy - 8x)
\]

17. Evaluate \(a^2 + 2b^2\) if \(a = -1\) and \(b = -3\) (Ex. 7.3)

\[
a^2 + 2b^2 = \quad (-1)^2 + 2(-3)^2 = \quad 1 + 2(9) = 1 + 18 = 19
\]

18. The dress cost $100, but was on sale for 20% off. What was the sale price? (Hint: think 80% of $100 equals what?) (Ex. 5.5)

If the retail price is the whole (100%) price, then the sale price is 100 - 20 = 80% of retail:

\[
\frac{80}{100} \cdot$100 = SP
\]

\[
\frac{80 \cdot 100}{100} = $80
\]

19. Simplify. \(6i^2 - |8| - 2^3 + (-2)^2(4-1)\) (Ex. 2.6, 3.6)

\[
6(-1) - 8 - 8 + 4(3) = \quad -6 - 16 + 12 = \quad -22 + 12 = -10
\]

20. The crew gathered 8,742 peaches. If each box held 12 peaches, how many boxes were
filled? How many peaches were left over? (Ex. 2.13)

Divide and find the remainder:

\[
\begin{array}{c}
728 \\
12 \overline{8742} \\
-84 \\
34 \\
-24 \\
102 \\
-96 \\
\hline
6 \\
\end{array}
\]

728 full boxes, 6 peaches left over