1. The width of a rectangular dance floor is w feet. The length of the floor is 6 feet longer than its width. Which of the following expresses the perimeter, in feet, of the dance floor in terms of w?

$l = 6 + w$

$P = 2l + 2w$

$P = 2(6 + w) + 2w$

$= 12 + 2w + 2w$

$= 4w + 12$

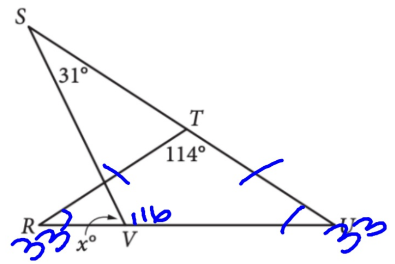
A) $2w + 6$

B) $4w + 12$

C) $w^2 + 6$

D) $w^2 + 6w$

2.



In the figure above, $RT = TU$. What is the value of x ?

A) 72

B) 66

C) 64

D) 58

3. $\sqrt{2x+6} + 4 = x + 3$

$-4 \qquad -4$

What is the solution set of the equation above?

$(\sqrt{2x+6})^2 = (x-1)^2$

$2x + 6 = x^2 - 2x + 1$

$0 = x^2 - 4x - 5$

$(x-5)(x+1) = 0$

$x = 5, -1$

$-5 \quad 1 \quad -5 \quad 4$

A) {-1}

B) {5}

C) {-1, 5}

D) {0, -1, 5}

4. The sum of $-2x^2 + x + 31$ and $3x^2 + 7x - 8$ can be written in the form $ax^2 + bx + c$, where a, b, and c are constants. What is the value of $a + b + c$?

$-2x^2 + x + 31 + 3x^2 + 7x - 8$

$1x^2 + 8x + 23$

$= 32$

5.

$$f(x) = x^3 - 9x$$
$$g(x) = x^2 - 2x - 3$$

Which of the following expressions is equivalent to $\frac{f(x)}{g(x)}$, for $x > 3$?

A) $\frac{1}{x+1}$

B) $\frac{x+3}{x+1}$

C) $\frac{x(x-3)}{x+1}$

D) $\frac{x(x+3)}{x+1}$

$$\frac{x^3-9x}{x^2-2x-3} = \frac{x(x^2-9)}{(x-3)(x+1)}$$
$$= \frac{x(x+3)\cancel{(x-3)}}{\cancel{(x-3)}(x+1)}$$
$$= \frac{x(x+3)}{x+1}$$

6.

$$g(x) = 2x - 1$$
$$h(x) = 1 - g(x)$$

The functions g and h are defined above. What is the value of $h(0)$?

A) -2

B) 0

C) 1

D) 2

$$h(0) = 1 - g(0) = 1 - -1$$
$$g(0) = 2(0) - 1$$
$$= -1$$

7.

$$x + 1 = \frac{2}{x+1}$$

In the equation above, which of the following is a possible value of $x + 1$?

A) $1 - \sqrt{2}$

B) $\sqrt{2}$

C) 2

D) 4

$$\sqrt{(x+1)^2} = \sqrt{2}$$
$$x + 1 = \pm\sqrt{2}$$

8.

Which of the following is a value of x for which the expression $\frac{-3}{x^2 + 3x - 10}$ is undefined?

$= 0$

A) -3

B) -2

C) 0

D) 2

$$(x+5)(x-2) = 0$$
$$x = -5, 2$$

Geometry Topic 5—Conditional Statements and Converses

Objective: Conditional Statements

A conditional is an if-then statement, such as "If you do your chores, then you can go to the movies." Every conditional has two parts. The part following *if* is the hypothesis and the part following *then* is the conclusion.

Example 1: Identify the hypothesis and conclusion of each conditional statement.

A. If Georgia won the Rose Bowl game, then Georgia was college football's national champion.

B. If T – 38 = 3, then T = 41.

C. If two lines are parallel, then the lines are coplanar.

You can rewrite many sentences so that they form conditionals. You may have to add words to make it grammatically correct, but it is important to keep the words in the same order.

Example 2: Write a conditional from each sentence.

A. A rectangle has four right angles.

If a shape is a rectangle, then it has four rt ∠s

B. A tiger is an animal.

If a creature is a tiger, then it's an animal

C. A square has four congruent sides.

If a figure is a square then it has 4 ≅ sides.

D. When it rains we stay inside for gym class.

If it rains, then we stay inside for gym class.

A conditional can have a truth value of true or false. To show that a conditional is true, show that every time the hypothesis is true, the conclusion is also true. To show that a conditional is false, you need to find one counterex. for which the hypothesis IS true and the conclusion is false.

Example 3: Find a counterexample to show that each conditional below is false.

A. If it is February, then there are only 28 days in the month.

False Leap year 29 days

B. If the name of the state contains the word *New*, then the state borders an ocean.

False New Mexico.

C. If $x^2 \geq 0$, then $x \geq 0$.

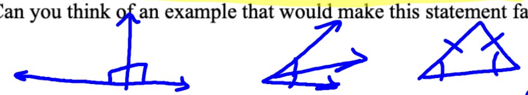
False Neg. #s.

Objective: Writing converses of conditionals

The converse of a conditional statement switches the hypothesis and the conclusion.

Consider the vertical angle theorem we learned in Topic 4: "If two lines intersect to form vertical angles, then the angles have the same measure."

But what if you change the structure of the theorem's sentence? Consider the following statement: "If two angles have the same measure, then they are vertical angles." Is this new statement true or false? Can you think of an example that would make this statement false?



The example you found to make the converse false is called a counterex.

Example 5: Write the converse of each conditional below. You may have to add words to make it grammatically correct, but the phrases need to be in the correct order.

A. If two lines intersect to form right angles, then they are perpendicular.

If two lines are ⊥, then they form rt ∠s.

B. If two angles are supplementary, then they add to 180 degrees.

If two angles add to 180°, then they are suppl.

C. If $x = 9$, then $x + 3 = 12$.

If $x+3=12$, then $x=9$

Example 6: Write the converse of each conditional below. What is its truth value? Give a counterexample if the truth value is false.

A. If $x = 2$, then $|x| = 2$.

If $|x| = 2$, then $x = 2$

False; $x = -2$

B. If a figure is a square, then it has four sides.

If a figure has 4 sides, then it's a square. False, rect-angle

C. If a point has an x-coordinate of 0, then it lies on the y-axis.

If a point lies on the y-axis then the x coord. is 0. True.

D. If two angles are congruent, then they have the same measure.

If two angles have the same measure, then they are ≅.