Additional Problems: Polynomials

**Polynomial Power**

1. Which of the following properly uses a polynomial identity to determine if $3^{2n}-1$ is prime?

a. $3^{2n}-1=\left(3^{2}+1\right)\left(3^{n}-1\right)$, so $3^{2n}-1$ is not prime.

b. $3^{2n}-1=\left(3^{n}+1\right)\left(3^{n}-1\right)$, so $3^{2n}-1$ is not prime.

c. $3^{2n}-1=\left(3^{n}+1\right)\left(3^{n}-1\right)$, so $3^{2n}-1$ is prime.

d.$3^{2n}-1=\left(3^{2}+1\right)\left(3^{n}-1\right)$, so $3^{2n}-1$ is prime.

1. Which of the following properly uses a polynomial identity to determine if $5^{2m}-1$ is prime?

a. $5^{2m}-1=\left(5^{2}+1\right)\left(5^{m}-1\right)$, so $5^{2m}-1$ is not prime.

b. $5^{2m}-1=\left(5^{m}+1\right)\left(5^{m}-1\right)$, so $5^{2m}-1$ is not prime.

c.$5^{2m}-1=\left(5^{m}+1\right)\left(5^{m}-1\right)$, so $5^{2m}-1$ is prime.

d.$5^{2m}-1= \left(5^{2}+1\right)\left(5^{m}-1\right)$, so $5^{2m}-1$ is prime.

1. Which of the following numbers is a prime in the form $2^{n}-1$?

a. 31

b. 64

c. 30

c. 127

1. Which of the following numbers is a prime in the form $2^{n}-1$?

a. 7

b. 16

c. 10

d. 62

1. Carlos wants to show that 31 is a Mersenne prime. Which of the following expressions should he use?

a. $2\left(5\right)-1$

b. $2^{5}-1$

c. 31 is not a Mersenne prime.

d. $2\left(5\right)+1$

1. Maria is trying to demonstrate that 3 is a Mersenne prime. Which of the following expressions should she use?

a. $2\left(5\right)-1$

b. $2^{2}-1$

c. 3 is not a Mersenne prime.

d. $2\left(2\right)+1$

1. Use the polynomial identity $\left(x^{2}+y^{2}\right)^{2}=\left(x^{2}-y^{2}\right)^{2}+\left(2xy\right)^{2}$ to generate a Pythagorean triple when x = 5 and y = 2. Which of the following is one of the values of the Pythagorean triple?

a. 20

b. 1,000

c. 625

d. 10

1. Use the polynomial identity $\left(x^{2}+y^{2}\right)^{2}=\left(x^{2}-y^{2}\right)^{2}+\left(2xy\right)^{2} $to generate a Pythagorean triple when x = 4 and y = 1. Which of the following is one of the values of the Pythagorean triple?

a. 8

b. 1,600

c. 16

d. 3

1. Javier wants to build a ramp in the shape of a right triangle for his skateboard. One side will be formed by an existing wall that is 60 inches long. To build the other two sides, Javier wants to use pieces of wood that are each precut to 10 inches, so each of the two undetermined side lengths will need to be in whole number of inches. Use the polynomial identity $\left(x^{2}+y^{2}\right)^{2}=\left(x^{2}-y^{2}\right)^{2}+\left(2xy\right)^{2}$ to find one of the other possible side lengths, assuming$ 2xy=60$ and that the two undetermined sides are of different lengths. Which of the following values could be one of the side lengths for his ramp?

a. 25 inches

b. 50 inches

c. 75 inches

d. 15 inches

1. Carlos plans to build a triangular sandbox with one side formed by an existing boundary that is 84 inches long. To construct the other two sides, Carlos wants to use pieces of wood that are each precut to 14 inches, so each of the two undetermined side lengths will need to be in whole number of inches. Use the polynomial identity $\left(x^{2}+y^{2}\right)^{2}=\left(x^{2}-y^{2}\right)^{2}+\left(2xy\right)^{2} $to find one of the other possible side lengths, assuming $2xy=84$ and that the two undetermined sides are of different lengths. Which of the following values could be one of the side lengths for his sandbox?

a. 98 inches

b. 28 inches

c. 70 inches

d. 42 inches