Overview: Welcome to Precalculus! To ensure you are prepared for success, I would like you to complete the exercises below over the summer. These exercises are intended as a review of the prerequisite algebraic skills you will need. You are strongly encouraged to put forth your best effort in completing this assignment, as it will be your first graded assignment for Precalculus. If you have any questions, contact Mr. Straniero at dstraniero@gmahs.org.

Use the properties of exponents to simplify each exponential expression.

1. $(-4)^3 \cdot (-4)^2$

2. $(-5)^2 \cdot (-5)^6$

3. 2^0

4. -2^0

5. $(5m)^0$

6. $\left(2^2\right)^5$

7. $\left(2x^5 y^4\right)^3$

8. $\left(-4m^3 n^9\right)^2$

9. $-\left(\dfrac{p^4}{q}\right)^2$

10. $\left(\dfrac{r^8}{s^2}\right)^3$

11. $\left(\dfrac{x^8}{x^4}\right)^2$

12. $\left(x^4 \cdot x^3\right)^3$

Simplify each of the following so that no negative exponents remain.

13. $(-4)^{-3}$

14. $(-5)^{-2}$

15. $\left(\dfrac{1}{5}\right)^{-2}$

16. $2^0 \cdot 5^{-3}$

17. $3x^{-2}$

18. $(5y)^{-2}$

19. $\left(x^{-2} y^3\right)\left(x^4 y^{-4}\right)$

20. xy^{-3}

21. $5m^2 n^{-4}$

22. $\dfrac{2x^{-3} \cdot z^0}{y^{-4}}$

23. $\left(\dfrac{x^3}{y^{-5}}\right)^{-2}$

24. $5^0 \cdot y^{-3}$

Perform the indicated operations. Write answers using only positive exponents.

25. $2^{-3} \cdot 2^{-4}$

26. $5^{-2} \cdot 5^{-6}$

27. $9^{-4} \cdot 9^{-1}$

28. $\dfrac{4^{-2} \cdot 4^{-1}}{4^{-3}}$

29. $\dfrac{3^{-1} \cdot 3^{-4}}{3^2 \cdot 3^{-2}}$

30. $\dfrac{7^3 7 r^{-3}}{7^2 r^{-2}}$

31. $\left(\dfrac{r^{-2}}{s^{-5}}\right)^{-3}$

32. $\dfrac{-4a^{-1} \cdot a^4}{a^{-2}}$

33. $\dfrac{x^2 \cdot x^{-7}}{4y^{-3}}$

34. $\left(\dfrac{5x^7}{x^7 y^6}\right)^0$

35. $\left(\dfrac{x^2 \cdot x^4}{y^{-1} \cdot y^{-3}}\right)^{-2}$

36. $\dfrac{(6z)^{-2} z^3}{y^2 \cdot 3y^{-2}}$

Simplify each of the following.

1. $25^{1/2}$

2. $(-8)^{2/3}$

3. $\left(16x^4\right)^{1/2}$

4. $\left(\dfrac{1}{8}\right)^{-5/3}$

5. $\left(\dfrac{121}{100}\right)^{-3/2}$

6. $\left(\dfrac{4}{9}\right)^{-3/2}$

7. $-81^{3/4}$

8. $\left(27x^6\right)^{2/3}$

9. $(-32)^{-4/5}$

10. $\left(36r^6\right)^{1/2}$

11. $\left(64a^{12}\right)^{5/6}$

12. $(16)^{1/4}$

Perform the indicated operations. Write answers using only positive exponents.

13. $\left(m^{2/3}\right)\left(m^{5/3}\right)$

14. $\left(2y^{3/4}z\right)\left(3y^{-2}z^{-1/3}\right)$

15. $\left(4a^{-1}b^{2/3}\right)\left(a^{3/2}b^{-3}\right)$

16. $\left(\dfrac{x^4y^3z}{16x^{-16}yz^5}\right)^{1/2}$

17. $\left(\dfrac{x^{3/2}}{x^{1/2}}\right)^2$

18. $\left(\dfrac{x^3y^{1/3}}{x^5y^{4/3}}\right)^4$

Find the sum or difference.

1. $\dfrac{1}{4x}+\dfrac{1}{3x}$

2. $\dfrac{3x+4}{x+2}-\dfrac{2x+5}{x+2}$

3. $z+\dfrac{1}{z}$

4. $\dfrac{5}{8y}-\dfrac{2}{12y}$

5. $\dfrac{2-y}{9y+6}+\dfrac{y-2}{6y+4}$

6. $\dfrac{3}{2x-3}-\dfrac{2}{9-4x^2}$

7. $\dfrac{7}{n^2}-\dfrac{5n-2}{n}$

8. $\dfrac{3}{a-3}-\dfrac{3}{a}$

9. $\dfrac{2x+3}{2x^3-4x^2}-\dfrac{1}{x-2}$

Let $h(x) = \dfrac{1}{x+9}$. Find:

1. $h(2)$

2. $h\left(\dfrac{1}{a}\right)$

3. $h(-x)$

4. $h(\sqrt{a})$

5. $h(a^2)$

6. $\dfrac{1}{h(a)}$

7. x if $h(x) = \dfrac{1}{13}$

8. x if $h(x) = \dfrac{1}{25}$

9. $\left[h(a)\right]^2$

Let $f(x) = 2x^2$. Find:

10. $f(-2)$

11. $f(2y)$

12. $f\left(6x^2\right)$

13. $f(-p)+1$

14. $f(p+1)$

15. $f(p+1)-f(p)$

16. $f(a+h)$

17. $f(2+h)$

18. $\dfrac{f(a+h)-f(a)}{h}$

Factor each trinomial.

1. $x^2+7x+10$

2. x^2+6x+8

3. $x^2-2x-15$

4. y^2+4y-5

5. $x^2-7x+12$

6. $x^2+8x+16$

7. $6a^2-48a-120$

8. $8x^2-24x-320$

9. $3y^3+12y^2+9y$

10. $2x^2+22x+20$

11. $h^2-14h+48$

12. x^3+10x^2+21x

Factor the difference of two squares.

13. $9a^2-16$

14. $16x^2-25$

15. x^4-81

16. $25x^2-9y^2$

17. $4m^4-16$

18. $256x^2-625y^2$

Solve for x.

1. $2x^2 + 5x - 7 = 0$

2. $5x^2 - 15x - 10 = 0$

3. $8x^3 - 32x = 0$

4. $x^2 - 7x + 12 = 0$

5. $6x^2 + 18x + 2 = 0$

6. $x^3 + 3x^2 + 2x = 0$

7. $x^2 - 5x + 4 = 0$

8. $5x^2 - 3x - 6 = 0$

9. $9x^2 - 6x^3 + x^4 = 0$

10. $5x^3 - 20x = 0$

11. $\frac{3}{2}x^3 - 6x = 0$

12. $-3x^2 + 9x + 10 = 0$

Find the slope of the line that goes through the following points.

1. $(2,5)$ and $(-4,7)$

2. $(0,6)$ and $(5,-2)$

3. $(3,4)$ and $(3,12)$

Write an equation of the line using either point-slope or slope-intercept form…

4. with slope $m = -\frac{1}{2}$ and through the point $(3,-4)$

5. through the points $(0,7)$ and $(-5,2)$

6. through the points $(-2,6)$ and $(9,6)$

7. with slope $m = \frac{2}{3}$ and through the point $(0,-2)$