Cherry Creek High School
Summer Assignment
for Students Entering Precalculus Honors

The summer assignment is intended as a review for you in preparation for the first day of class. When you return to Math this school year, your teacher would like to "hit the ground running" with Precalculus Honors topics and not have to review too much of Algebra 2/Trig H. To be best prepared, please complete this assignment and bring it with you on the first day of class. Answers are provided for you to check. For best practice, don't start too early but don't wait until the last day of summer break. Have a great summer and we look forward to seeing you in the Fall!

 -The CCHS Math Department

Summer Packet WS #1: Factoring and Operations with Rational Expressions

Factor each expression in #1-10.

1. $x^4 - 9x^2$

2. $x^2 + 4x - 32$

3. $x^4 + 4x^2 - 32$

4. $x^6 + 4x^3 - 32$

5. $6x^2 - x - 2$

6. $10x^2 - 31x + 15$

7. $x^3 - 2x^2 - 7x + 14$

8. $x(x-4)^3(x-2) - 3(x-4)^2(x-2)^2$

9. $(x+1)^3(x^3+8x) - 8(x+1)^4$

10. $6x(x-2)^2(2x^2+1)^2 + 2(2x^2+1)(2-x)^3$

Simplify each rational expression in #11-17.

11. $\dfrac{9-x^2}{x^3-27}$

12. $\dfrac{3x^2-17x+20}{6x^2-7x-5}$

13. $\dfrac{x^2+x+1}{x^6-1}$

14. $\dfrac{(x+6)^4(x-3)^4-(x-3)^3(x+6)^5}{3(3-x)^2}$

15. $\dfrac{x^2-6x+9}{x^2-1} \cdot \dfrac{2x^2-2x}{x-3}$

16. $\dfrac{4x^2-9}{2x^2-13x+15} \div \dfrac{4x^2-1}{2x^2-11x+5}$

17. $\dfrac{7+6x-x^2}{3x-2} \cdot \dfrac{2x-3}{x^2-8x+7} \div \dfrac{1-x^2}{x^2-2x+1}$

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Answers:

1. $x^2(x-3)(x+3)$ 2. $(x+8)(x-4)$ 3. $(x^2+8)(x-2)(x+2)$ 4. $(x^3-4)(x+2)(x^2-2x+4)$

5. $(3x-2)(2x+1)$ 6. $(5x-3)(2x-5)$ 7. $(x-2)(x^2-7)$ 8. $(x-4)^2(x-2)(x-6)(x-1)$

9. $(x+1)^3(x-2)(x^2+2x+4)$ 10. $4(x-2)^2(2x^2+1)(3x^3+x+1)$ 11. $\dfrac{-(3+x)}{x^2+3x+9}$ 12. $\dfrac{x-4}{2x+1}$

13. $\dfrac{1}{(x-1)(x+1)(x^2-x+1)}$ 14. $-3(x+6)^4(x-3)$ 15. $\dfrac{2x(x-3)}{x+1}$ 16. $\dfrac{2x+3}{2x+1}$ 17. $\dfrac{2x-3}{3x-2}$

Summer Packet WS #2 - Simplifying Rational Expressions

Simplify each expression.

1. $\dfrac{5}{x-1} + \dfrac{8}{(x-1)^2} - \dfrac{3}{(x-1)^3}$

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

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

4. $2x+1 - \dfrac{6x^3+x^2-1}{2x-1}$

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

6. $\dfrac{6}{1-3x} - \dfrac{1}{2x-1} + \dfrac{3}{x} + \dfrac{x}{5x-6x^2-1}$

7. $\dfrac{x+3}{x^2+5x+6}+\dfrac{x+2}{x^2+8x+12}-\dfrac{3}{x+6}$

8. $\dfrac{1+\dfrac{2}{x^2}+\dfrac{1}{x^4}}{1+\dfrac{2}{x}+\dfrac{1}{x^2}}$

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

10. $\dfrac{\dfrac{2x+h}{x+h}+1}{\dfrac{2x+h}{x+h}-1}$

11. $\dfrac{4-\dfrac{1}{1-x}}{16+\dfrac{7}{x^2-1}}$

Answers:

1. $\dfrac{5x^2-2x-6}{(x-1)^3}$ 2. 4 3. $\dfrac{x^2}{(x+3)(x-3)}$ 4. $-3x^2$ 5. $\dfrac{(2x+3)(x^2+1)}{(x+1)(x-1)}$ 6. $\dfrac{2x^2-8x+3}{x(2x-1)(3x-1)}$

7. $\dfrac{-x+2}{(x+6)(x+2)}$ 8. $\dfrac{(x^2+1)^2}{x^2(x+1)^2}$ 9. $x-1$ 10. $\dfrac{3x+2h}{x}$ 11. $\dfrac{x+1}{4x+3}$

Summer Packet WS #3 – Factoring and Simplifying Rational Expressions

Factor each expression completely.

1. $2x^7 - 128x$

2. $10x^6 + 17x^3 + 6$

3. $4x^4 - 37x^2 + 9$

4. $x(x-3)^4 + 4(3-x)^3$

5. $5x^3(x-5)^4(2x+1) - 10x^2(x-5)^3(2x+1)^2$

Simplify each expression.

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

7. $\dfrac{x^3 + 8}{(2-x)^3} \cdot \dfrac{x^2 - 4x + 4}{x^4 - 16}$

8. $\dfrac{1 - \dfrac{6}{x} + \dfrac{5}{x^2}}{\dfrac{1}{x^2} - \dfrac{5}{x^3}}$

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

10. $\dfrac{\dfrac{1}{x-2} - \dfrac{1}{x-3}}{1 + \dfrac{1}{x^2 - 5x + 6}}$

11. $\dfrac{x}{2-3x}+\dfrac{2x}{3x+2}-\dfrac{2-7x}{9x^2-4}$

12. $\dfrac{1}{x+2}-\dfrac{2x+9}{6+x-x^2}-\dfrac{2x}{x^2-2x-3}$

Answers:

1. $2x(x-2)(x+2)(x^2-2x+4)(x^2+2x+4)$ 2. $(5x^3+6)(2x^3+1)$ 3. $(x-3)(x+3)(2x+1)(2x-1)$

4. $(x-3)^3(x-4)(x+1)$ 5. $5x^2(x-5)^3(2x+1)(x^2-9x-2)$ 6. $\dfrac{x}{(x-3)^2}$ 7. $\dfrac{-(x^2-2x+4)}{(x-2)^2(x^2+4)}$

8. $x(x-1)$ 9. $\dfrac{x+2}{x}$ 10. $\dfrac{-1}{x^2-5x+7}$ 11. $\dfrac{x+1}{3x+2}$ 12. $\dfrac{x+3}{(x-3)(x+1)}$

Summer Packet WS #4 - Logarithm and Exponential Expressions and Equations

Simplify each expression.

1. $\log_2 16$

2. $\ln e^5$

3. $\log_5 1$

4. $4^{\log_4 3}$

5. $\log_3 \sqrt{27}$

6. $10^{2\log 5}$

7. $\ln 1$

8. $\log_3\left(\dfrac{1}{81}\right)$

9. $e^{\ln 4}$

10. $\log 10$

11. $\ln e$

12. $\log_4 4$

13. $\ln \sqrt{e}$

14. $\log_{49} \sqrt[3]{7}$

15. $\log_3 3^5$

16. $\log_4 2 + \log_4 8$

17. $\log_4 128 - \log_4 8$

Solve each equation for x.

18. $\log_2 x = 5$

19. $\log_9 x = \dfrac{3}{2}$

20. $\log x + \log(x-3) = 1$

21. $5^{3x-1} = 25^{x+1}$

22. $4^{2x-1} = 8^{\frac{x}{3}}$

23. $2^x = 5$

Answers:

1. 4

2. 5

3. 0

4. 3

5. $\dfrac{3}{2}$

6. 25

7. 0

8. -4

9. 4

10. 1

11. 1

12. 1

13. $\dfrac{1}{2}$

14. $\dfrac{1}{6}$

15. 5

16. 2

17. 2

18. 32

19. 27

20. 5

21. 3

22. $\dfrac{2}{3}$

23. $\dfrac{\ln 5}{\ln 2}$ or $\log_2 5$

Summer Packet WS #5 - Trigonometric Expressions and Equations

Determine the exact value of each expression.

1. $\sin(60°)$ 2. $\cos\left(\dfrac{\pi}{4}\right)$ 3. $\sec(30°)$ 4. $\tan\left(\dfrac{\pi}{4}\right)$ 5. $\csc\left(\dfrac{\pi}{6}\right)$

6. $\cos\left(\dfrac{3\pi}{4}\right)$ 7. $\tan\left(\dfrac{7\pi}{6}\right)$ 8. $\sin(3\pi)$ 9. $\sec(270°)$ 10. $\sin\left(-\dfrac{\pi}{6}\right)$

Find the exact value of x for $0 \le x \le 360°$.

11. $\cos x = -\dfrac{\sqrt{3}}{2}$ 12. $\tan x = 1$ 13. $\sin x = \dfrac{\sqrt{3}}{2}$ 14. $\csc x = -\sqrt{2}$

Find the exact value of x for $0 \le x \le 2\pi$.

15. $\cot x = -\dfrac{1}{\sqrt{3}}$ 16. $\sin x = -\dfrac{1}{2}$ 17. $\cos x = 0$ 18. $\sec x = -\dfrac{2}{\sqrt{3}}$

Use a calculator to find the value, to three decimal places, of x for $0 \le x \le 360°$.

19. $\sin x = -\dfrac{1}{4}$ 20. $\tan x = -0.65$ 21. $\sec x = 3$ 22. $\cot x = \dfrac{3}{2}$

Answers:

1. $\dfrac{\sqrt{3}}{2}$ 2. $\dfrac{1}{\sqrt{2}}$ 3. $\dfrac{2}{\sqrt{3}}$ 4. 1   5. 2   6. $-\dfrac{1}{\sqrt{2}}$ 7. $\dfrac{1}{\sqrt{3}}$

8. 0   9. Undefined   10. $-\dfrac{1}{2}$ 11. $x = 150°, \ 210°$ 12. $x = 45°, \ 225°$

13. $x = 60°, \ 120°$ 14. $x = 225°, \ 315°$ 15. $x = \dfrac{2\pi}{3}, \dfrac{5\pi}{3}$ 16. $x = \dfrac{7\pi}{6}, \dfrac{11\pi}{6}$

17. $x = \dfrac{\pi}{2}, \dfrac{3\pi}{2}$ 18. $x = \dfrac{5\pi}{6}, \dfrac{7\pi}{6}$ 19. $x = 194.478°, \ 345.522°$

20. $x = 146.976°, \ 326.976°$ 21. $x = 70.529°, \ 289.471°$ 22. $x = 33.690°, \ 213.690°$