

Summer Assignment for students ENTERING

PreCalculus Honors

Please have the following worksheets completed and ready with questions the first week of school. Make sure you show your work where appropriate. Answers are provided for you to check at the end of each worksheet. However, you will not be given credit if you don't show work on problems that require it. Please neatly organize your work, show all of your work, and place all of your work and answers ON these worksheets.

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

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

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

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

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

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

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

Answers:

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

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

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

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

Summer Packet WS #2 - Simplifying Rational Expressions

Simplify each expression.

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

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

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

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

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

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

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

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

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

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

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

Answers:

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

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

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

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

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

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

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

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

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

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. $\frac{x}{(x-3)^2}$ 7. $\frac{-(x^2-2x+4)}{(x-2)^2(x^2+4)}$
8. $x(x-1)$ 9. $\frac{x+2}{x}$ 10. $\frac{-1}{x^2-5x+7}$ 11. $\frac{x+1}{3x+2}$ 12. $\frac{x+3}{(x-3)(x+1)}$

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

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. $\log_9 x = \frac{3}{2}$

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. $\frac{3}{2}$

6. 25

7. 0

8. -4

9. 4

10. 1

11. 1

12. 1

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

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

15. 5

16. 2

17. 2

18. 32

19. 27

20. 5

21. 3

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

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

Summer Packet WS #5 - Trigonometric Expressions and Equations

Determine the exact value of each expression.

1. $\sin(60^\circ)$

2. $\cos\left(\frac{\pi}{4}\right)$

3. $\sec(30^\circ)$

4. $\tan\left(\frac{\pi}{4}\right)$

5. $\csc\left(\frac{\pi}{6}\right)$

6. $\cos\left(\frac{3\pi}{4}\right)$

7. $\tan\left(\frac{7\pi}{6}\right)$

8. $\sin(3\pi)$

9. $\sec(270^\circ)$

10. $\sin\left(-\frac{\pi}{6}\right)$

Find the exact value of x for $0 \leq x \leq 360^\circ$.

11. $\cos x = -\frac{\sqrt{3}}{2}$

12. $\tan x = 1$

13. $\sin x = \frac{\sqrt{3}}{2}$

14. $\csc x = -\sqrt{2}$

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

15. $\cot x = -\frac{1}{\sqrt{3}}$

16. $\sin x = -\frac{1}{2}$

17. $\cos x = 0$

18. $\sec x = -\frac{2}{\sqrt{3}}$

Use a calculator to find the value, to three decimal places, of x for $0 \leq x \leq 360^\circ$.

19. $\sin x = -\frac{1}{4}$

20. $\tan x = -0.65$

21. $\sec x = 3$

22. $\cot x = \frac{3}{2}$

Answers:

1. $\frac{\sqrt{3}}{2}$

2. $\frac{1}{\sqrt{2}}$

3. $\frac{2}{\sqrt{3}}$

4. 1

5. 2

6. $-\frac{1}{\sqrt{2}}$

7. $\frac{1}{\sqrt{3}}$

8. 0

9. Undefined

10. $-\frac{1}{2}$

11. $x = 210^\circ, 330^\circ$

12. $x = 45^\circ, 225^\circ$

13. $x = 60^\circ, 120^\circ$

14. $x = 225^\circ, 315^\circ$

15. $x = \frac{2\pi}{3}, \frac{5\pi}{3}$

16. $x = \frac{7\pi}{6}, \frac{11\pi}{6}$

17. $x = \frac{\pi}{2}, \frac{3\pi}{2}$

18. $x = \frac{5\pi}{6}, \frac{7\pi}{6}$

19. $x = 194.478^\circ, 345.522^\circ$

20. $x = 146.976^\circ, 326.976^\circ$

21. $x = 70.529^\circ, 289.471^\circ$

22. $x = 33.690^\circ, 213.690^\circ$