

Summer Packet: PCH

Topic 1: Factoring. Factor each expression

1.  $6x^2 + x - 12 \quad (3x - 4)(2x + 3)$

4,2 2,3 2.  $8x^2 - 19x + 6 \quad (8x - 3)(x - 2)$

8,1 3.  $49 - 4x^2 \quad (7 - 2x)(7 + 2x)$

4.  $16x^2 + 72x + 81 \quad (4x + 9)(4x + 9) \rightarrow (4x + 9)^2$

5.  $x^3 - 4x^2 - 25x + 100 \quad x^2(x - 4) - 25(x - 4) \rightarrow (x - 5)(x + 5)(x - 4)$

1,8 2,4 1,5 6.  $24x^5 + 18x^4 - 15x^3$

$3x^3(8x^2 + 6x - 5) \rightarrow 3x^3(2x - 1)(4x + 5)$

Topic 2: Complex Fractions. Simplify each complex fraction

7.  $\frac{x \left( \frac{\frac{5}{x} - 3}{4 + \frac{2}{x}} \right) x}{x \left( \frac{\frac{5}{x} - 3}{4 + \frac{2}{x}} \right) x} \rightarrow \frac{5 - 3x}{4x + 2}$

8.  $\frac{4(x-1) \left( 6 + \frac{x+1}{4} \right) 4(x-1)}{4(x-1) \left( 2 - \frac{3}{x-1} \right) 4(x-1)} \rightarrow \frac{24x - 24 + x^2 - 1}{8x - 8 - 12} \rightarrow \frac{x^2 + 24x - 25}{8x - 20}$

9.  $\frac{x(x-2) \left( 3 + \frac{x}{x-2} \right) x(x-2)}{\frac{4}{x} x(x-2)} \rightarrow \frac{3x^2 - 6x + x^2}{4x - 8} \rightarrow \frac{4x^2 - 6x}{4x - 8}$

10.  $\frac{\frac{2x}{x+5}}{\frac{3x+1}{2}} \rightarrow \frac{2x}{x+5} \cdot \frac{2}{3x+1} \rightarrow \frac{4x}{3x^2 + 16x + 5}$

Topic 3: Interval Notation. Write each inequality in interval notation

11.  $x \leq -8$   $(-\infty, -8]$   
 12.  $-3 < x$   $x > -3$   $(-3, \infty)$   
 13.  $2 \leq x < 35$   $[2, 35)$   
 14.  $x < -3$  or  $x \geq 1$   $(-\infty, -3) \cup [1, \infty)$

Topic 4: Domain. Write the domain of each function in interval notation

15.  $F(x) = 3x^2 - 7x + 5$   $(-\infty, \infty)$   
 16.  $F(x) = \sqrt{x-3}$   $x-3 \geq 0$   $x \geq 3$   $[3, \infty)$   
 17.  $F(x) = \sqrt{9-x}$   $9-x \geq 0$   $9 \geq x$   $x \leq 9$   $(-\infty, 9]$   
 18.  $F(x) = \frac{3x-1}{x+5}$   $x+5 \neq 0$   $x \neq -5$   $(-\infty, -5) \cup (-5, \infty)$   
 19.  $F(x) = \frac{x+2}{x^2-4}$   $x^2-4 \neq 0$   $x^2 \neq 4$   $x \neq \pm 2$   
 $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$   
 20.  $F(x) = \frac{3-x}{x^2-x-6}$   $x^2-x-6 \neq 0$   $x \neq 3$   
 $(x-3)(x+2) \neq 0$   $x \neq -2$   $(-\infty, -2) \cup (-2, 3) \cup (3, \infty)$

Topic 5: Logarithms

21. Expand expression

- a.  $\log(x^2(x-1)^3) \rightarrow 2 \log x + 3 \log(x-1)$   
 b.  $\log \frac{\sqrt{x}}{(3x+2)^2} \rightarrow \frac{1}{2} \log x - 2 \log(3x+2)$   
 c.  $\log \frac{x(y+3)^4}{y(x-1)} \rightarrow \log x + 4 \log(y+3) - \log y - \log(x-1)$

22. Evaluate each log expression

- a.  $\log_2 8 = \log_2 2^3 = 3$   
 b.  $\log_3 \frac{1}{9} = \log_3 3^{-2} = -2$   
 c.  $\log_4 2 = \frac{1}{2}$   
 $\log_4 2 \rightarrow 4^x = 2 \rightarrow 2^{2x} = 2^1$   
 $2x = 1$   
 $x = \frac{1}{2}$

$$\log_4 4^{1/2} = \frac{1}{2}$$

d.  $\text{Log}_7 1 = 0$   $\{7^0 = 1\}$   
 e.  $\text{Log}_3 18 - \text{log}_3 2$   $\text{Log}_3 9 \Rightarrow \text{Log}_3 3^2 = 2$   
 f.  $\text{Log}_2 + \text{log}_5$   $\text{Log}_{10} 10 \rightarrow \text{Log}_{10} 10 = 1$

23. Solve each log equation

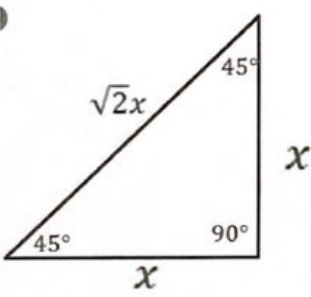
a.  $\text{Log}(x+2) + \text{log}(x-1) = 1$   $\text{Log}_{10} x + x - 2 = 1$   
 $3x = 5x - 10$   
 $10 = 2x$   
 $x = 5$   
 b.  $\text{Log}_2 3 + \text{log}_2 x = \text{log}_2 5 + \text{log}_2 (x-2)$   
 $\text{log}_2 3x = \text{log}_2 5x - 10$   
 $10 = 2x$   
 $x = 5$   
 c.  $\text{Log}_5(x+1) - \text{log}_5(x-1) = 2$   
 d.  $\text{Log}_9(x-5) + \text{log}_9(x+3) = 1$

$10 = x^2 + x - 2$   
 $0 = x^2 + x - 12$   
 $(x+4)(x-3) = 0$   
 $x = -4$  or  $x = 3$

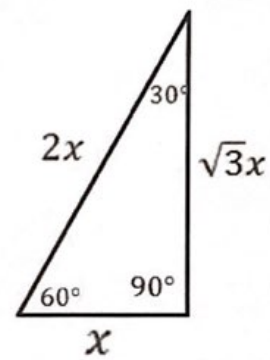
$\text{log}_5 \frac{x+1}{x-1} = 2$

$25 = \frac{x+1}{x-1}$   
 Topic 6: Special right Triangle

$25x - 25 = x + 1$   
 $24x = 26$   
 $x = \frac{26}{24} = \frac{13}{12}$  (c)



d)  $\text{log}_9 x^2 - 2x - 15 = 1$   
 $x^2 - 2x - 15 = 9$   
 $x^2 - 2x - 24 = 0$   
 $(x-6)(x+4) = 0$   
 $x = 6$  or  $x = -4$

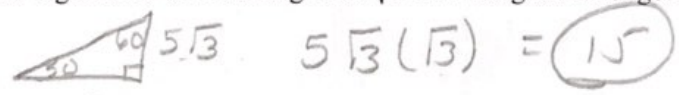


24. If the hypotenuse of a 45-45-90 triangle is 8 how long is each leg?  $4\sqrt{2}$

25. If the leg of a 45-45-90 triangle is  $3\sqrt{6}$  how long is the hypotenuse

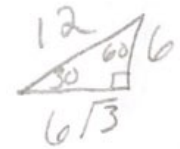
$3\sqrt{2} \rightarrow 3(2\sqrt{3}) \rightarrow 6\sqrt{3}$

26. If the shorter leg of a 30-60-90 triangle is  $5\sqrt{3}$  how long is the longer leg? The hypotenuse?



$5\sqrt{3}(\sqrt{3}) = 15$

27. If the hypotenuse of a 30-60-90 triangle is 12 how long are the other sides?



28. If the longer leg of a 30-60-90 triangle is 15 how long are the other sides?

$5\sqrt{3}, 10\sqrt{3}$

