

Algebra 2 Assignment 45

NEW

$$1. \log_3 5 = \frac{\log 5}{\log 3} = \boxed{1.465}$$

$$2. \log_{20} 125 = \frac{\log 125}{\log 20} = \boxed{1.612}$$

$$3. \log_8 2.25 = \frac{\log 2.25}{\log 8} = .389975 = \boxed{.390}$$

$$4. \log_5 \left(\frac{3}{x}\right) = \boxed{\log_5 3 - \log_5 x}$$

$$5. \log_8 x^5 = \boxed{5 \log_8 x}$$

$$6. \ln(x^2 y) = \ln x^2 + \ln y = \boxed{2 \ln x + \ln y}$$

$$7. \ln(a\sqrt{b}) = \ln a + \ln \sqrt{b} = \ln a + \ln(b)^{1/2} = \boxed{\ln a + \frac{1}{2} \ln b}$$

$$8. \ln\left(\frac{\sqrt{x^2+3}}{y}\right) = \ln(x^2+3)^{1/2} - \ln y = \boxed{\frac{1}{2} \ln(x^2+3) - \ln y}$$

$$9. \log_2 \left(\frac{x^4 \sqrt{y}}{a^5}\right) = \log_2 x^4 + \log_2 \sqrt{y} - \log_2 a^5 = \boxed{4 \log_2 x + \frac{1}{2} \log_2 y - 5 \log_2 a}$$

$$10. \ln\left(\frac{a}{xy}\right) = \ln a - (\ln(xy)) = \ln a - (\ln x + \ln y) = \boxed{\ln a - \ln x - \ln y}$$

$$11. \ln y + \ln x = \boxed{\ln(xy)}$$

$$12. \ln x - 2 \ln 3 = \ln x - \ln 3^2 = \ln x - \ln 9 = \boxed{\ln\left(\frac{x}{9}\right)}$$

$$13. 2 \log_4 x - \log_4 y = \log_4 x^2 - \log_4 y = \boxed{\log_4 \left(\frac{x^2}{y}\right)}$$

$$14. \log x - \log 3 + \log 12 = \log\left(\frac{12x}{3}\right) = \boxed{\log(4x)}$$

$$15. \ln x - 3 \ln(x+1) = \ln x - \ln(x+1)^3 = \boxed{\ln\left(\frac{x}{(x+1)^3}\right)}$$

$$16. 2\ln(x+2) + \ln(x) - \ln(x-1) = \ln\left(\frac{(x+2)^2 \cdot x}{x-1}\right) = \ln\left(\frac{x^3 + 4x^2 + 4x}{x-1}\right)$$

$$17. \frac{1}{2}\ln(x+3) - \ln y = \ln\left(\frac{\sqrt{x+3}}{y}\right)$$

REVIEW

$$18. \text{Factor: } 8x^2 + 22x + 9$$

$$= 8x^2 + 4x + 18x + 9$$

$$= 4x(2x+1) + 9(2x+1)$$

$$= (2x+1)(4x+9)$$

$$8 \cdot 9 = 72 \quad 4 \cdot 18 = 72$$

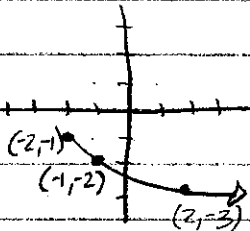
$$\begin{array}{r} 8 \ 9 \\ 12 \ 0 \\ 4 \ 18 \end{array} \quad 4 + 18 = 22$$

$$19. g(x) = x^2 + 2x \quad g(h(x)) = (x-9)^2 + 2(x-9) = x^2 - 18x + 81 + 2x - 18$$

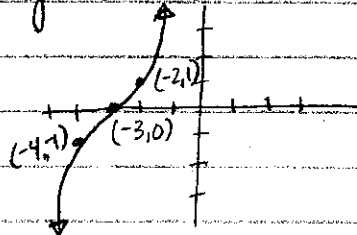
$$h(x) = x - 9 \quad = x^2 - 16x + 63$$

$$h(g(x)) = (x^2 + 2x) - 9 = x^2 + 2x - 9$$

$$20. f(x) = -\sqrt{x+2} - 1$$



$$21. y = (x+3)^3$$



22. Vertex (2, -2) through (4, 29)

$$y = a(x-2)^2 - 2$$

$$29 = a(4-2)^2 - 2 \rightarrow 31 = a(4) \rightarrow a = \frac{31}{4}$$

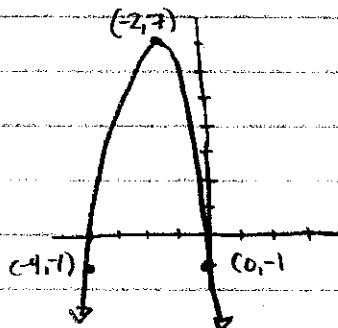
$$y = \frac{31}{4}(x-2)^2 - 2$$

$$23. f(x) = -2x^2 - 8x - 1$$

$$h = \frac{-b}{2a} = -2$$

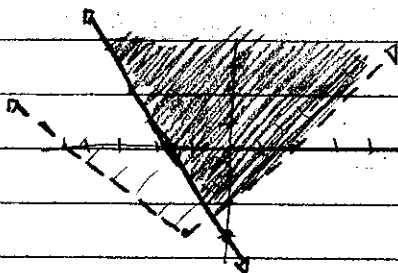
$$k = -2(4) + 16 - 1 = -8 + 15 = 7$$

vertex: (-2, 7)
opens down
 $f(x) = -2(x+2)^2 + 7$

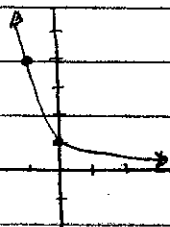


Asmt 45 - Continued

24. $y > |x+1| - 3$
 $2x + y \geq -3$

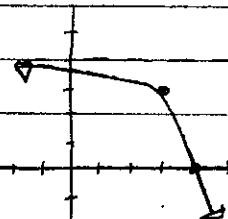


25. $g(x) = 4^{-x}$
 (0, 1)
 (-1, 4)



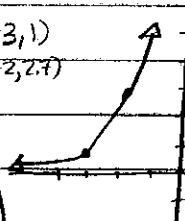
HA: $y = 0$

26. $h(x) = -4^{x-3} + 4$
 (0, 7) \rightarrow (3, 3)
 (1, 0) \rightarrow (4, 0)



HA: $y = 4$

27. $y = e^{x+3}$
 (0, 1) \rightarrow (-3, 1)
 (1, 2.7) \rightarrow (-2, 2.7)



HA: $y = 0$

28. $\log_3 81 = 4 \rightarrow 3^4 = 81$

29. $\ln 1 = 0 \rightarrow \log_e 1 = 0 \rightarrow e^0 = 1$

30. $e^x = 4 \rightarrow \log_e 4 = x \rightarrow \ln 4 = x$

31. $\log_9 3 = x$ or $9^x = 3$ $x = \frac{1}{2}$

32. $g(x) = \log_2(-x) + 3$

(1, 0) \rightarrow (-1, 3)
 (2, 1) \rightarrow (-2, 4)

VA: $x = 0$

REINFORCED

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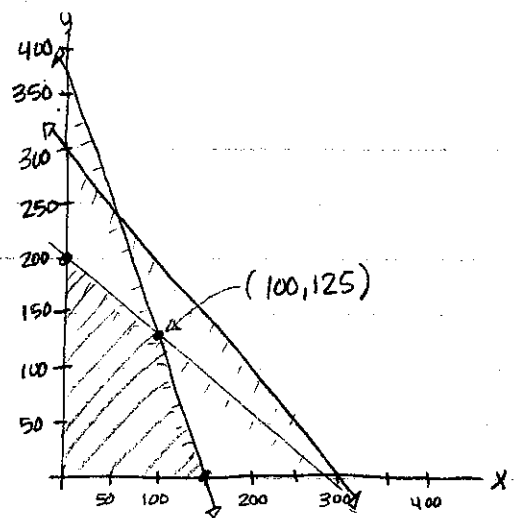
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33. $x = \text{acres of barley}$
 $y = \text{acres of rye}$

	x	y	total
#acres	$x + y$	≤ 300	$(300, 0)$ $(0, 300)$
days	$5x + 2y$	≤ 750	$(150, 0)$ $(0, 375)$
cost	$15x + 20y$	≤ 4000	$(266.67, 0)$ $(0, 200)$
profit	$40x + 30y$	$= f(x, y)$	



$x \geq 0, y \geq 0$

(x, y)	$f(x, y) = 40x + 30y$
$(0, 0)$	$40(0) + 30(0) = 0$
$(0, 200)$	$40(0) + 30(200) = 6000$
$(100, 125)$	$40(100) + 30(125) = 7750$
$(150, 0)$	$40(150) + 30(0) = 6000$

For max profit, he should plant 100 acres of barley & 125 acres of rye to make \$7750.

34. $f(x) = 3x$ $x = 3y \rightarrow y = \frac{x}{3}$ $f^{-1}(x) = \frac{x}{3}$

35. $f(x) = \frac{1}{8}(x+2)^2 - 1$ not one-to-one, no inverse

36. $f(x) = \frac{3x+4}{5}$ $x = \frac{3y+4}{5} \rightarrow 5x = 3y+4 \rightarrow 5x-4 = 3y \rightarrow \frac{5x-4}{3} = y$
 $f^{-1}(x) = \frac{5x-4}{3}$

37. $h(x) = |x-2|$ not one-to-one, no inverse

38. $y = 3x^2 - 3x + 2$
 $y = -|2x-3| + 4$ $(.232, 1.465)$
 $(1.434, 3.869)$

39. $e^{5.2} = 181.272$

40. $e^{-3/4} = .472$