

Adv Alg Final Review '11-'12

Name: Key

1) $\frac{8x^2y \cdot 4x^5y^3}{32x^7y^4}$

2) $\frac{3x^4y^3}{6xy^6} \cdot \frac{x^4}{x^1} = x^3$
 $\frac{1x^3}{2y^3} \leftarrow \frac{y^3}{y^6} = y^{-3}$

3) $\frac{(10x^3y^4)^2}{100x^6y^8}$

4) \$1000 invested for 40 years.
 $A = P(1 + \frac{r}{n})^{nt}$
 r = rate, P = principle, t = yrs
 Bank A = 5% interest, compounded annually
 Bank B = 4.9% interest, compounded daily
 n = # times/yr

Which is better?

A: $1000(1 + 0.05)^{40} = \$7039.99$

B: $1000(1 + \frac{0.049}{365})^{40 \cdot 365} = \7098.39 ← Better deal!

5) $(\frac{25}{9})^{3/2}$
 $\frac{25^{3/2}}{9^{3/2}} = \frac{125}{27}$

6) $8^{-2} = \frac{1}{8^2} = \frac{1}{64}$

7) $27^{-2/3} = \frac{1}{27^{2/3}} = \frac{1}{9}$

8) $\sqrt[4]{4^5} = 4^8$

9) raise to reciprocal power
 $(x^{3/4})^{4/3} = (8)^{4/3}$
 $x = 16$

10) $\frac{3x^{4/3}}{3} = \frac{48}{3}$
 $(x^{4/3})^{3/4} = (16)^{3/4}$
 $x = 8$

11) $\frac{x^3y^{-5}}{x^{-2}y^2}$
 $\frac{x^3}{x^{-2}} = x^5$, $\frac{y^{-5}}{y^2} = y^{-7}$

12) $\frac{x^5}{y^7} + \frac{2x^{1/3} \cdot 4x^{3/4}}{8x^{1/3+3/4}}$
 $8x^{13/12}$

13) $(25x^5)^{3/2}$
 $25^{3/2} x^{5 \cdot 3/2}$
 $125x^{15/2}$

For 14-16, use the following: $f(x) = x-3$, $g(x) = x^2$

14) $f(g(x)) =$ place what $g(x)$ equals into the $f(x)$ equation wherever there's an x .

$$f(g(x)) = x^2 - 3$$

15) $g(f(x)) =$

$$g(f(x)) = (x-3)^2$$

16) $f(g(10)) =$ put 10 into g first. Then put answer in f .

$$10^2 = 100 \rightarrow 100 - 3 = 97$$

For questions 6-8, find the inverse of the given equation.

switch + solve

17) $y = x + 8$

$$x = y + 8$$

$$x - 8 = y$$

18) $y = x^{4/5}$

$$(x) = (y^{5/4})^{5/4}$$

$$x^{5/4} = y$$

19) $y = 5x - 8$

$$x = 5y - 8$$

$$\frac{x+8}{5} = \frac{5y}{5}$$

$$\frac{x+8}{5} = y$$

20) $\sqrt[3]{8} = 2$

21) $\sqrt[3]{\frac{1000}{27}} =$

$$\frac{\sqrt[3]{1000}}{\sqrt[3]{27}} = \frac{10}{3}$$

22) $\sqrt[3]{64x^{27}} =$

$$\sqrt[3]{64} \cdot \sqrt[3]{x^{27}} = 4 \cdot x^{27/3} = 4x^9$$

23) $\sqrt[3]{x^5} =$

$$x^{5/3}$$

24) $\sqrt[3]{\sqrt[4]{\sqrt{x}}}$

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

• multiply powers!
 $\frac{1}{4} \cdot \frac{1}{2} \cdot \frac{1}{3}$

$$x = x^{1/24}$$

~~25)~~ $y = a(b)^x$ → ~~25)~~ + future
- past
1+r
1-r

25) Your hair grows 11% longer every 2 days. Right now it is 3 inches long. How long will it be in 6 days?

$$3(1+.11)^{6/2} = 4.1 \text{ inches}$$

26) Your car is worth \$12,000 right now, and loses 8% of its value every month. How much was it worth 4 months ago?

$$x = -4$$

$$12000(1-.08)^{-4} = \$16,750.58$$

27) The half life of caffeine is 3 hours. If there are 120 mg in your system right now, then how much will there be in 12 hours?

rate = .5

$$120(.5)^{12/3} = 7.5 \text{ mg}$$

28) Bacteria reproduces continuously at an annual rate of 6%. If there are 1000 bacteria right now, how many will there be in 3 years?

$$1000e^{-.06 \cdot 3} = 835.27 \text{ bacteria}$$

Per^t = continuously!

29) Your money is in a bank that grows continuously at an annual rate of 3%. If you have \$5,000 right now, how much will you have in 30 years?

$$5000e^{.03 \times 30} = \$12,298.02$$

$\log_b x = y$
 $b^y = x$

30) $\log_9 81$
 $9^? = 81$
 $= 2$

32) $\log_8 \left(\frac{1}{64} \right)$
 $8^? = \frac{1}{64}$? = -2

31) $\log_4 4^{11}$
 $4^? = 4^{11}$
 $= 11$

33) $\ln e^8$
 $e^? = e^8 = 8$

- ① Take log of both sides
- ② apply power prop.
- ③ solve for variable

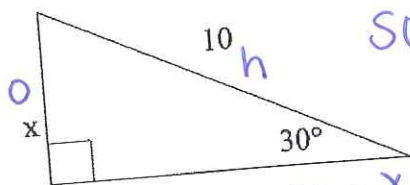
36) $8^{x-2} = 70$
 $\log 8^{x-2} = \log 70$
 $(x-2) \log 8 = \log 70$
 $\frac{(x-2) \log 8}{\log 8} = \frac{\log 70}{\log 8}$

$x-2 = 2.04$
 $\frac{x-2}{+2} = \frac{2.04}{+2} = x = 4.04$

37) $6^{3x} = 50$
 $\log 6^{3x} = \log 50$
 $3x \cdot \log 6 = \log 50$
 $\frac{3x \cdot \log 6}{\log 6} = \frac{\log 50}{\log 6}$

$3x = \frac{2.18}{3}$ $x = .728$

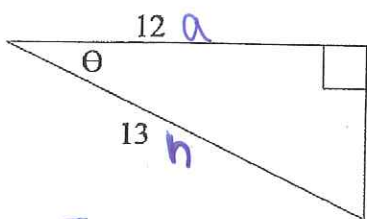
38)



SOHCAHTOA

$x = 10 \cdot \sin 30 = \frac{x}{10} \cdot 10$
 $x = 5$

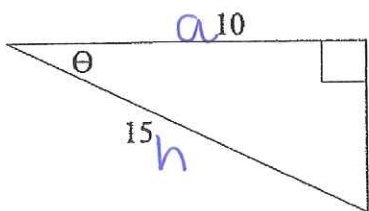
39)



to find θ ,
 use INVERSE

$\sin \theta = \frac{5}{13}$

40)



$\theta =$

$\cos \theta = \frac{10}{15}$ $\theta = \cos^{-1}(\frac{10}{15})$
 $\theta = 48.2^\circ$

41) $\sin 330$

$= -\frac{1}{2}$

★ unit circle

42)

$\tan 90$
 undefined

43) $\cos 270 = 0$

44) $\tan^{-1}(1)$

45 and

45) $\cos^{-1}(\frac{\sqrt{2}}{2})$

45 and

46) $\sin(\frac{\pi}{2})$

$= 1$

47) $\cos \frac{5\pi}{6}$
 $= -\frac{\sqrt{3}}{2}$

48) $\cos^{-1}(\frac{\sqrt{3}}{2})$

30 and

49) $\sin^{-1}(0)$ 0 and

50) $\cos^{-1}(-1)$ 180 and