32

26 problems
p777, # 13, 35, 37, 41, 43
and packet # 26
all worth 2pts

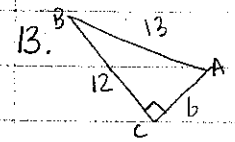
Algebra 2 ~ Assignment 49 Key

NEW

page 777

9. $\tan x = \frac{33}{15} \rightarrow x = \tan^{-1}\left(\frac{33}{15}\right) \approx \boxed{66^\circ}$

11. $\cos x = 0.9912 \rightarrow x = \cos^{-1}(.9912) \approx \boxed{8^\circ}$

13. 

(x2)

$12^2 + b^2 = 13^2$

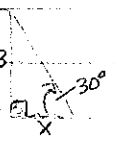
$b^2 = 13^2 - 12^2$

$b = \sqrt{169-144} = 5$

$a = 12$	$\angle A = 67^\circ$
$b = 5$	$\angle B = 23^\circ$
$c = 13$	$\angle C = 90^\circ$

$\sin \angle A = 12/13 \rightarrow \angle A = \sin^{-1}\left(\frac{12}{13}\right) = 67.4 \approx 67^\circ$

$\angle B = 180 - 90 - 67 = 90 - 67 = 23^\circ$

15. 

$\tan 30^\circ = \frac{173}{x} \rightarrow x \cdot \tan 30 = 173 \rightarrow x = \frac{173}{\tan 30} = 299.64$

$\approx$ 300 Feet

23. $\sin 54 = \frac{17.8}{x} \rightarrow x \sin 54 = 17.8 \rightarrow x = \frac{17.8}{\sin 54} = \boxed{22.0}$

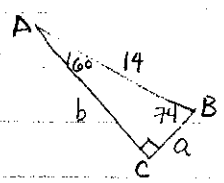
25. $\tan x = \frac{15}{21} \rightarrow x = \tan^{-1}\left(\frac{15}{21}\right) = 35.54 \approx \boxed{36^\circ}$

27. $\sin x = \frac{18}{33} \rightarrow x = \sin^{-1}\left(\frac{18}{33}\right) = 33.06 \approx \boxed{33^\circ}$

29. $\cos x = 0.5269 \rightarrow x = \cos^{-1}(0.5269) = 58.204 \approx \boxed{58^\circ}$

31. $\sin x = 0.9998 \rightarrow x = \sin^{-1}(.9998) = 88.85 \approx \boxed{89^\circ}$

33. $\sin x = 0.500 \rightarrow x = \sin^{-1}(.5) = \boxed{30^\circ}$

35. 

(x2)

$\angle B = 180 - 90 - 16 = 90 - 16 = 74^\circ$

$\sin 74 = \frac{b}{14}$ $\quad$ $\sin 16 = \frac{a}{14}$

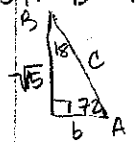
$14 \cdot \sin 74 = b$ $\quad$ $14 \cdot \sin 16 = a$

$13.5 = b$ $\quad$ $3.859 = a$

$a = 3.9$	$\angle A = 16^\circ$
$b = 13.5$	$\angle B = 74^\circ$
$c = 14$	$\angle C = 90^\circ$

A49 p2

37. $B = 18°$ $a = \sqrt{15}$, $\angle A = 180 - 90 - 18 = 72°$ (×2)



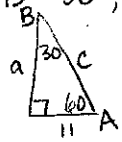
$\tan 18 = \frac{b}{\sqrt{15}}$ $\quad \sin 72 = \frac{\sqrt{15}}{c}$

$\sqrt{15} \cdot \tan 18 = b$ $\quad c = \frac{\sqrt{15}}{\sin 72}$

$1.3 = b$ $\quad c = 4.1$

$a = \sqrt{15}$	$\angle A = 72°$
$b = 1.3$	$\angle B = 18°$
$c = 4.1$	$\angle C = 90°$

41. $B = 30°$, $b = 11$ (×2)



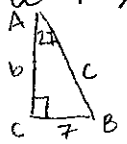
$\tan 30 = \frac{11}{a}$ $\quad \cos 60 = \frac{11}{c}$

$a = \frac{11}{\tan 30}$ $\quad c = \frac{11}{\cos 60}$

$a = 56.6$ $\quad c = 22$

$a = 56.6$	$\angle A = 60°$
$b = 11$	$\angle B = 30°$
$c = 22$	$\angle C = 90°$

43. $a = 7$ $\angle A = 27°$ $\angle B = 180 - 90 - 27 = 63$ (×2)



$\tan 27 = \frac{7}{b}$ $\quad \sin 27 = \frac{7}{c}$

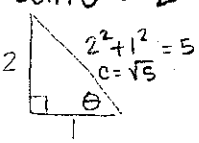
$b = \frac{7}{\tan 27}$ $\quad c = \frac{7}{\sin 27}$

$b = 13.7$ $\quad c = 15.4$

$a = 7$	$\angle A = 27°$
$b = 13.7$	$\angle B = 63°$
$c = 15.4$	$\angle C = 90°$

PACKET:

1. $\tan\theta = 2$



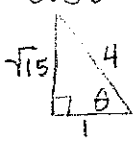
$\sin\theta = \frac{2}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$

$\cos\theta = \frac{1}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{5}}{5}$

$\sin\theta = \frac{2\sqrt{5}}{5}$

$\cos\theta = \frac{\sqrt{5}}{5}$

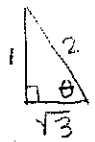
2. $\cos\theta = \frac{1}{4}$



$4^2 = 1^2 + x^2$
$16 = 1 + x^2$
$15 = x^2$
$\sqrt{15} = x$

$\sin\theta = \frac{\sqrt{15}}{4}$, $\quad \tan\theta = \frac{\sqrt{15}}{1} = \sqrt{15}$

3. $\sin\theta = \frac{1}{2}$



$2^2 = 1^2 + x^2$
$3 = x^2$
$\sqrt{3} = x$

$\cos\theta = \frac{\sqrt{3}}{2}$ $\quad \tan\theta = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

REVIEW

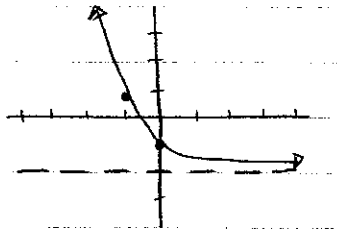
4. $\frac{p^2 x^{-4} k^5 (p^2 k)^{-2}}{(p^2 x^{-3})^{-2}} = \frac{p^2 x^{-4} k^5 p^{-4} k^{-2}}{p^{-4} x^6} = \frac{p^{-2} x^{-4} k^3}{p^{-4} x^6} = \frac{p^4 k^3}{p^2 x^4 x^6} = \boxed{\frac{p^2 k^3}{x^{10}}}$

5. $y = e^{-x} - 2$

$(0,1) \xrightarrow{-2} (0,-1)$

$(-1, 2.7) \to (-1, .7)$

HA: $y = -2$



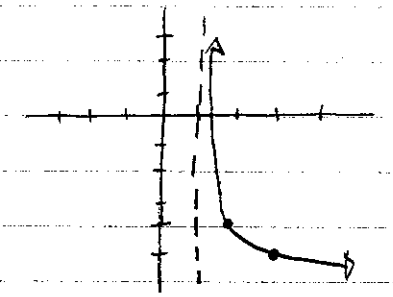
6. $\log_3\left(\frac{1}{9}\right) = \boxed{-2}$

7. $g(x) = -\log_2(x-1) - 4$

$(1,0) \xrightarrow{-1,-4} (2,-4)$

$(2,-1) \to (3,-5)$

VA: $x = 1$



8. $\ln\left(\frac{a^2}{b^4y^5}\right) = \boxed{2\ln a - 4\ln b - 5\ln y}$

9. $4\log_3 x + \log_3 y = \boxed{\log_3(x^4y)}$

10. $2\ln x - \frac{1}{2}\ln(y+3) = \boxed{\ln\left(\frac{x^2}{\sqrt{y+3}}\right)}$

11. $3^{x-1} = 27 \to 3^{x-1} = 3^3 \to x - 1 = 3 \xrightarrow{+1} \boxed{x = 4}$

12. $\log_{25} x = 3/2 \to x = 25^{3/2} \to \boxed{x = 125}$

13. $\log_6 x - \log_6(x-5) = 2 \to \log_6\left(\frac{x}{x-5}\right) = 2 \to \frac{x}{x-5} = 6^2$

$\to x = 36(x-5) \to x = 36x - 180 \to 180 = 35x$

$\to x = \frac{180}{35} = \boxed{\frac{36}{7}}$

14. $\log_8(5x+2) = \log_8(3x+9) \to 5x + 2 = 3x + 9$ $\quad -3x \quad -2 \quad -3x \quad -2$

$\to 2x = 7$ $\quad \boxed{x = \frac{7}{2}}$

#49 p4

15. $\log_5 x + \log_5(x+1) = \log_5 20 \rightarrow \log_5(x(x+1)) = \log_5(20)$
$\rightarrow x^2+x = 20 \rightarrow x^2+x-20=0 \rightarrow (x+5)(x-4)=0$
$\rightarrow x+5=0, \cancel{x=-5}, x-4=0$ $\boxed{x=4}$

16. $2\log x = \log 2 + \log(3x-4) \rightarrow \log x^2 = \log(2(3x-4))$
$\rightarrow x^2 = 6x-8 \rightarrow x^2-6x+8=0 \rightarrow (x-4)(x-2)=0$
$\boxed{x=4,2}$

17. $y = 11(1.21)^t$ $\quad 1.21-1=.21$ $\boxed{21\% \text{ growth}}$

18. $y = 15(.67)^t$ $\quad .67-1=-.33$ $\boxed{33\% \text{ decay}}$

19. $y = -5x^2-18x+39$
$y+25 = 5x \rightarrow y = 5x-25$
$\boxed{(-6.553, -57.766)}$
$\boxed{(1,953, -15.234)}$

20. $y=3500 \quad p=? \quad r=.08 \quad t=6$
$3500 = pe^{[.08\times 6]} \rightarrow p = \frac{3500}{e^{[.08\times 6]}} = \boxed{\$2165.74}$

21. $\log_5 23.76 = \frac{\log 23.76}{\log 5} = \boxed{1.968}$

22. $7^{3x} = 15 \rightarrow 3x = \log_7 15 \rightarrow x = \frac{\log_7 15}{3} = \frac{\left(\frac{\log 15}{\log 7}\right)}{3} = \boxed{.464}$

23. $e^{4x}-5 = 28 \rightarrow e^{4x} = 33 \rightarrow 4x = \ln 33 \rightarrow x = \frac{\ln 33}{4} = \boxed{.874}$

24. $2e^{12x} = 17 \rightarrow e^{12x} = \frac{17}{2} \rightarrow 12x = \ln\left(\frac{17}{2}\right) \rightarrow x = \frac{\ln\left(\frac{17}{2}\right)}{12} = \boxed{.178}$

25. $p=6500 \quad r=.06 \quad y=8000 \quad t=?$
$\frac{8000}{6500} = \frac{6500}{6500}e^{.06t} \rightarrow \left(\frac{80}{65}\right) = e^{.06t} \rightarrow .06t = \ln\left(\frac{80}{65}\right)$
$\rightarrow t = \frac{\ln\left(\frac{80}{65}\right)}{.06} = \boxed{3.46 \text{ years}}$

26. $p = 112{,}000 \quad r = .04$

a) $t = 7 \qquad y = 112{,}000e^{[(.04)(7)]} = 148190.54 \approx \boxed{148{,}191 \text{ people}}$

(x2)

b) $\frac{250000}{112000} = \frac{112000e^{.04t}}{112000} \rightarrow \frac{250}{112} = e^{.04t} \rightarrow .04t = \ln\left(\frac{250}{112}\right)$

$\rightarrow t = \frac{\ln\left(\frac{250}{112}\right)}{.04} = \boxed{20.07 \text{ years}}$