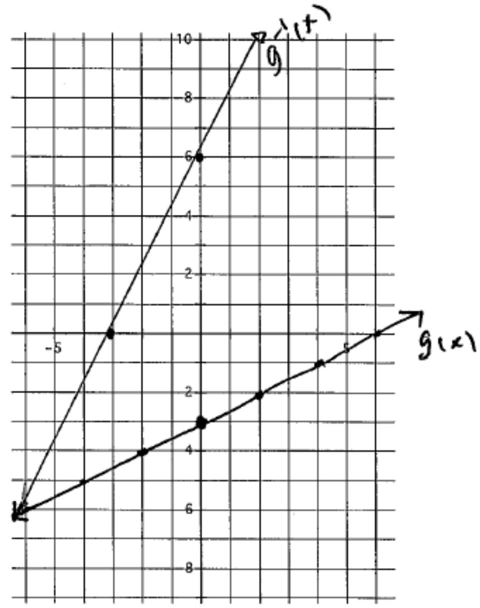
1. Given $g(x) = \frac{1}{2}x - 3$

a. Graph $g(x)$.

b. Graph $g^{-1}(x)$ on the same grid.

c. Algebraically determine the equation of $g^{-1}(x)$.



$x = \frac{1}{2}y - 3$

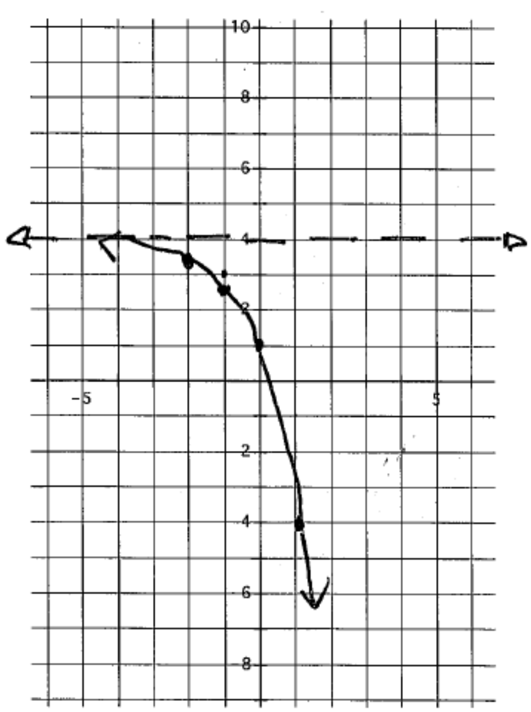
$x + 3 = \frac{1}{2}y$

$2(x+3) = y$

$g^{-1}(x) = 2x + 6$

2. Graph each exponential equation.

a. $f(x) = -3(2)^x + 4$



3. Given $\log_6 4 \approx 0.6$ and $\log_6 11 \approx 1.1$, find: $\log_6 6 = 1$ $\log_6 36 = 2 \ldots$

a. $\log_6 66$

$\log_6(6 \cdot 11)$

$\log_6 6 + \log_6 11$

$1 + 1.1$

2.1

b. $\log_6\left(\frac{11}{4}\right)$

$\log_6 11 - \log_6 4$

$1.1 - .6$

0.5

c. $\log_6\left(\frac{6}{11}\right)$

$\log_6 6 - \log_6 11$

$1 - 1.1$

-0.1

4. Solve. Be sure to check your solutions!

a. $3 \cdot 5^{2x-1} + 6 = 381$

$3 \cdot 5^{2x-1} = 375$

$5^{2x-1} = 125$

No Calc

$5^{2x-1} = 5^3$

$2x - 1 = 3$

$2x = 4$

$x = 2$

$\log_5 5^{2x-1} = \log_5 125$

$2x - 1 = 3$

$2x = 4$

$x = 2$

b. $\log_3 x + \log_3(x+5) = \log_3 36$

$3^{\log_3(x(x+5))} = 3^{\log_3 36}$

$x^2 + 5x = 36$

$x^2 + 5x - 36 = 0$

$(x+9)(x-4) = 0$

$\cancel{x = -9}$ $\boxed{x = 4}$

5. Mr. McCord invests $1500 in a savings account with 2.5% interest, compounded monthly. Find the account balance after 12 years.

$$1500\left(1+\frac{.025}{12}\right)^{12\cdot 12} = \$2024.16$$

6. Mrs. Long invests $5500 in a savings account with 3.8% interest, compounded continuously. How long will it take for her account balance to double?

$$5500\, e^{.038T} = 2(5500)$$

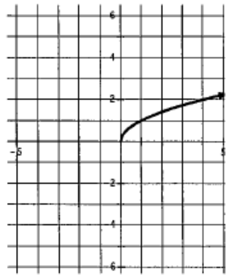
$$5500\, e^{.038t} = 11000$$

$$e^{.038T} = \cancel{5500}\ 2$$

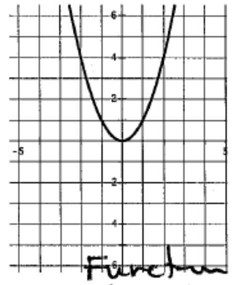
$$.038T = \ln \cancel{5500}\ 2$$

$$T = \frac{\ln \cancel{5500}\ 2}{.038} = \cancel{226.05} = 18.24$$

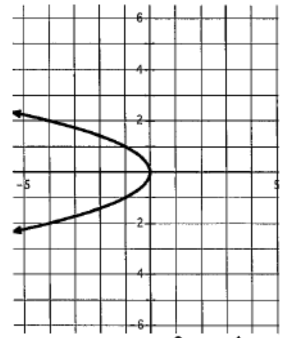
7. Determine if each graphs represents a one-to-one function.



one to one Function



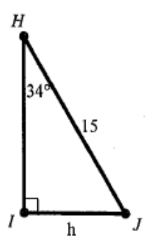
Function
Not one to one



Not a function

8. Solve for the missing side or angle. Round to three decimal places.

a. Solve for h.

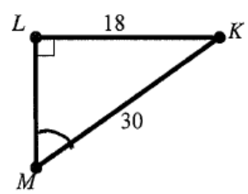


$\sin 34^\circ = \frac{h}{15}$

$15 \sin 34^\circ = h$

$8.39 = h$

b. Solve for $\angle M$



$\sin M = \frac{18}{30}$

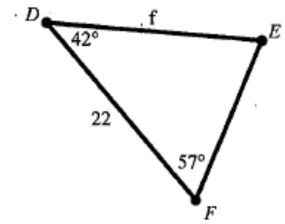
$m = \sin^{-1}\left(\frac{18}{30}\right)$

$m = 0.64$ radian

or

36.9°

d. Solve for all missing sides/angles .



$\measuredangle E = 180° - 42° - 57° = 81°$

$$\frac{d}{\sin 42} = \frac{22}{\sin 81}$$

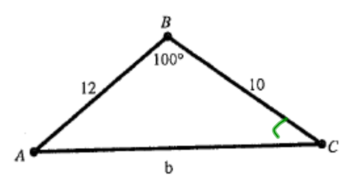
$$d = \frac{22 \sin 42}{\sin 81}$$

$$d = 14.9$$

$$\frac{f}{\sin 57} = \frac{22}{\sin 81°}$$

$$f = \frac{22 \sin 57}{\sin 81°} = 18.68$$

e. Solve for all missing sides/angles.



$$b = \sqrt{12^2 + 10^2 - 2(12)(10)\cos 100°}$$

$$b = 16.90$$

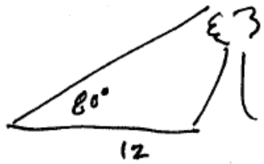
$\measuredangle C = 180 - 100 - 35.6 =$

$$\frac{\sin A}{10} = \frac{\sin 100}{16.9}$$

$$\sin A = \frac{10 \sin 100}{16.9}$$

$$A = \sin^{-1}(Ans) = 35.64$$

9. Mrs. Long measures the angle of elevation from the ground to the top of a tree to be 80°. If she is measuring this angle 12 feet from the base of the tree, find the height of the tree. Round to three decimal places.



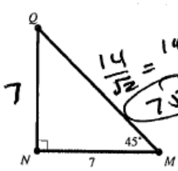
$\tan 80 = \frac{h}{12}$

$12 \tan 80 = h$

$68.05 = h$

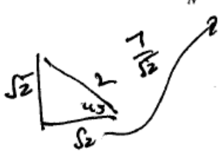
10. Find the exact value of all missing sides and angles. **HINT: Use your special right triangles**

a.



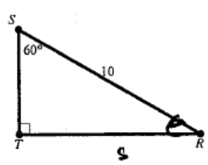
$\frac{14}{\sqrt{2}} = \frac{14\sqrt{2}}{2}$

$7\sqrt{2}$



$\frac{7}{\sqrt{2}}$

b.



$\sin 60 = \frac{s}{10}$

$\frac{\sqrt{3}}{2} = \frac{s}{10}$

$5\sqrt{3} = s$

$\cos 60 = \frac{r}{10}$

$10 \cos 60 = r$

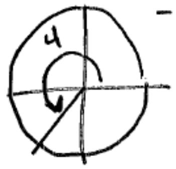
$5 = r$

11. Draw each angle. Include an arrow representing the amount of rotation. Find the measure of one other angle that is coterminal with the given angle. Give the quadrant of each angle.

a. 4 radian

coterminal

-2.28



b. $-148°$

$$\begin{array}{r} 360° \\ -148 \\ \hline \boxed{212°} \end{array}$$

12. Find the exact value.

a. $\sin 135° = \frac{\sqrt{2}}{2}$

b. $\csc \frac{3\pi}{4} = \frac{2}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \sqrt{2}$

c. $\csc 300°$ $\frac{1}{\sin 300} = \frac{1}{\sqrt{3}/2} = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

d. $\tan\left(-\frac{2\pi}{3}\right) = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = +\sqrt{3}$

e. $\sin 120°$ $\frac{\sqrt{3}}{2}$

f. $\cos\frac{4\pi}{3} = -\frac{1}{2}$

13. Sketch a right triangle where $\sin\theta = \frac{3}{5}$ and $\frac{\pi}{2} \le \theta < \pi$. Find the exact values of the remaining trig functions.

$x = -4$ $y = 3$ $r = 5$

$x^2 + y^2 = r^2$

$x^2 + 9 = 25$

$x^2 = 16$

$x = \pm 4$

$\sin\theta = \frac{3}{5}$ $\csc\theta = \frac{5}{3}$

$\cos\theta = -\frac{4}{5}$ $\sec\theta = -\frac{5}{4}$

$\tan\theta = -\frac{3}{4}$ $\cot\theta = -\frac{4}{3}$

14. Simplify.

a. $\sin\theta\cot\theta\cos\theta$

$\cancel{\sin\theta} \cdot \frac{\cos\theta}{\cancel{\sin\theta}} \cdot \cos\theta$

$\cos^2\theta$

15. Find the solution set where $0 \le \theta < 2\pi$

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

$\underline{Q_1}$ $\frac{\pi}{6}$ $\underline{Q_2}$ $\frac{5\pi}{6}$

c. $2\cos\theta + 3 = 4$

$2\cos\theta = 1$

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

$\underline{Q_1}$ $\frac{\pi}{3}$ $\underline{Q_4}$ $\frac{5\pi}{3}$

d. $2\cos^2\theta - \sqrt{3}\cos\theta = 0$

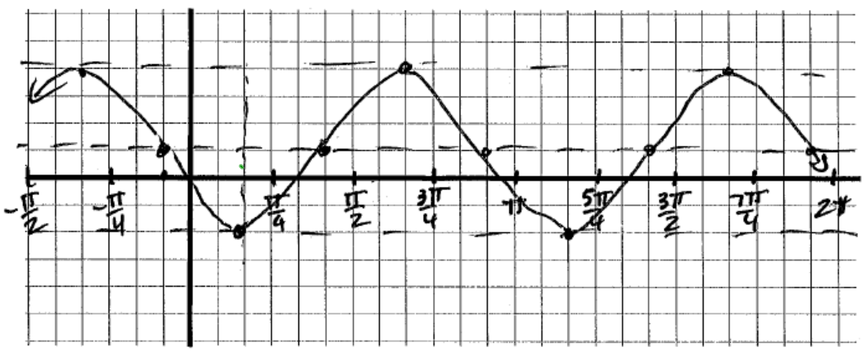
$\cos\theta\ (2\cos\theta - \sqrt{3})$

$\cos\theta = 0$ $\cos\theta = \frac{\sqrt{3}}{2}$

$\theta = \pi/2$ $\underline{Q1}$ $\frac{\pi}{6}$ $\underline{Q4}$ $11\pi/6$

$\theta = 3\pi/2$

16. Graph $f(\theta) = -3\cos 2\left(\theta - \frac{\pi}{6}\right) + 1$



A: -3

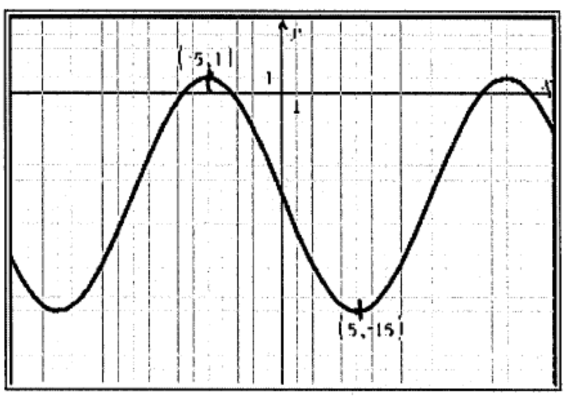
P: $\frac{2\pi}{2} = \pi$

H: $\frac{\pi}{6}$ rt $= \frac{2\pi}{12}$

V = up 1

increment $\frac{\pi}{4} = \frac{3\pi}{12}$

17. Write two equations for this graph, one using sine and one using cosine.



$A = \frac{16}{2} = 8$

P: 20 coef $= \frac{2\pi}{20} = \frac{\pi}{10}$

H: - sin 8 0
cos = 5 left

V: -7

$f(\theta) = 8\cos\left(\frac{\pi}{10}(\theta + 5)\right) - 7$

$f(\theta) = 8\sin\left(\frac{\pi}{10}(\theta)\right) - 7$