1. Simplify each of the following.

   a) $\left(-2a^3b^2\right)^{-2}\left(-2a^5b^6\right)$
   b) $\dfrac{a^3b^{-2}}{a^{-1}b^{-1}}$
   c) $\dfrac{a^3-b^{-2}}{a^{-1}+b^{-1}}$
   d) $2^{-3}\left(1-3^{-2}\right)$
   e) $2^{-3}-\left(1-3^{-2}\right)$
   f) $\left(\left(2^{-2}\right)^{-2}\right)^{-2}$
   g) $\left(\dfrac{a^{-2}}{b^{-1}}\right)^{-3}$
   h) $\left(\dfrac{a^{-2}}{b^{-1}}\right)^{0}$
   i) -2^2
   j) $(-2)^{-2}$
   k) $32^{-2/5}$
   l) $-32^{-2/5}$
   m) $(-32)^{-2/5}$
   n) $\left(\dfrac{a^2b^0}{a^{-2}b^{12}}\right)^{1/2}$
   o) $\dfrac{a^{1/2}b^{2/3}}{a^{-1/2}b^{-1/3}}$

2. Solve the equation $3x^2-8x=-2x+1$ using exact values. Check your solution using exact values.

3. Simplify each of the following. Assume that x is positive.

   a) $(-16)^{-3/4}$
   b) $-16^{-3/4}$
   c) $\left(x^{2/3}\right)^{3/4}\left(\dfrac{1}{\sqrt{x}}\right)$
   d) $\dfrac{2}{\left(\sqrt{5}-1\right)^2}$
   e) $\left(1+\sqrt{3}\right)^3\left(1-\sqrt{3}\right)^3$
   f) $\left(\sqrt{3+\sqrt{5}}-\sqrt{3-\sqrt{5}}\right)^2$
   g) $\dfrac{3+\sqrt{3}}{3-\sqrt{3}}$

4. Simplify each of the following. Assume that a is positive.

   a) $\log_4\left(\dfrac{1}{2}\right)$
   b) $\log_4 8$
   c) $\log_{10}1000$
   d) $\log_{100}1000$
   e) $\log_2\left(\dfrac{1}{8}\right)$
   f) $\log_8 2$
   g) $\log_{\sqrt{2}}8$
   h) $\log_4 8$
   i) $\log_4(-8)$
   j) $\log_8\left(\dfrac{1}{4}\right)$
   k) $\log_{(1/5)}125$
   l) $\log_{0.1}100\,000$
   m) $\log_5 1$
   n) $\log_1 5$
   o) $\log_a\left(a^{17}\right)$
   p) $\log_{(-5)}25$
   q) $\log_9\left(\dfrac{1}{\sqrt{27}}\right)$
   r) $\log_a\left(\sqrt[7]{a^2}\right)$
   s) $2^{\log_2 8}$
   t) $3^{\log_3 8}$

5. Simplify each of the following.

   a) $5^{\log_5 A}$
   b) $25^{\log_5 A}$
   c) $5^{\log_{25} A}$
   d) $5^{-\log_5 A}$
   e) $e^{\ln B}$
   f) $e^{-\ln B}$
   g) $e^{3\ln B}$
   h) $e^{-2\ln B}$
   i) $4^{-3\log_2 C}$
   j) $2^{-3\log_4 C}$

6. Simplify each of the following. Use exact values.

   a) $\cos 30°$
   b) $\csc 45°$
   c) $\sin 60°$
   d) $\cot 45°$
   e) $\tan 30°$
   f) $\sec 60°$
   g) $\csc 30°$
   h) $\sin 45°$
   i) $\sec 30°$
   j) $\cot 60°$

7. Suppose that a and b are real numbers so that a is eight less than three times b. Find the greatest possible value of $5b^2-a^2$.

8. a) Re-write $\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{x}}}}}$ using exponential notation. b) Simplify $\log_2\left(\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{2}}}}}\right)$

9. Find the exact value of each of the following expressions and simplify.

   a) $\sin 30°-\cos 45°\tan 60°$
   b) $\sin 45°\cdot\cos 45°-\cos 30°\cdot\sin 30°$
   c) $\dfrac{\sin 10°}{\cos 80°}$
   d) $\sin 60°\sin 60°+\cos 60°\cos 60°$
   e) $(\sin 45°+\cos 45°)^2$
   f) $\sin^2 45°+\cos^2 45°$

g) $(\sin 45^\circ + \cos 45^\circ)^4$

h) $\sin^4 45^\circ + \cos^4 45^\circ$

i) $\log_2(\sec 45^\circ)$

j) $\log_3(\tan 60^\circ)$

k) $\dfrac{\sec 45^\circ \cos 30^\circ - \csc 60^\circ}{\sin 60^\circ}$

l) $\dfrac{\cot 30^\circ - \tan^2 60^\circ}{\cot 30^\circ + \tan^2 60^\circ}$

10. Approximate each of the following by placing them between two consecutive integers.

a) $\log_2 100$ b) $\log_2 200$ c) $\log_{10} 2014$ d) $\log_5 2014$ e) $\log_2\left(\dfrac{1}{3}\right)$

11. Re-write each of the following as an exponential statement.

a) $x = \log_7(2y-1)$

b) $3 = \log_B(A-1)$

c) $p = \log_q T$

d) $x + 2 = \log_a(x^2+1)$

e) $2 = \log_x 20$

12. Solve each of the following basic logarithmic equations.

a) $\log_3(2x-7) = 2$

b) $\log_3(x^2-19) = 4$

c) $\ln(1-3x) = 28$

d) $\ln(2x+1) = -3$

e) $\log_2(3x+4) = -1$

f) $3\log_2(7x-1) - 2 = 10$

g) $\dfrac{2}{3}\log_2(x+2) - 1 = 7$

h) $\dfrac{2\log_2(x+2) - 1}{3} = 7$

13. Re-write each of the following as a logarithmic statement. Assume that all variables represent positive numbers.

a) $3^{x-2} = 60$ b) $10^{2x-5} = 2012$ c) $\left(\dfrac{1}{3}\right)^{a+1} = b-2$ d) $A^B = C$

14. Solve each of the following basic exponential equations.

a) $2^x = \dfrac{1}{16}$

b) $2^x = -8$

c) $2^x = \dfrac{1}{\sqrt{2}}$

d) $2^x = 21$

e) $2^x = -4$

f) $3^{5x-1} = \sqrt{27}$

g) $3^{5x-1} = -9$

h) $3^{5x-1} = \dfrac{1}{9}$

i) $3^{5x-1} = 40$

j) $e^{2x+8} = 0$

k) $e^{2x+8} = \dfrac{1}{e^5}$

l) $e^{2x+8} = 1$

m) $e^{2x+8} = 10$

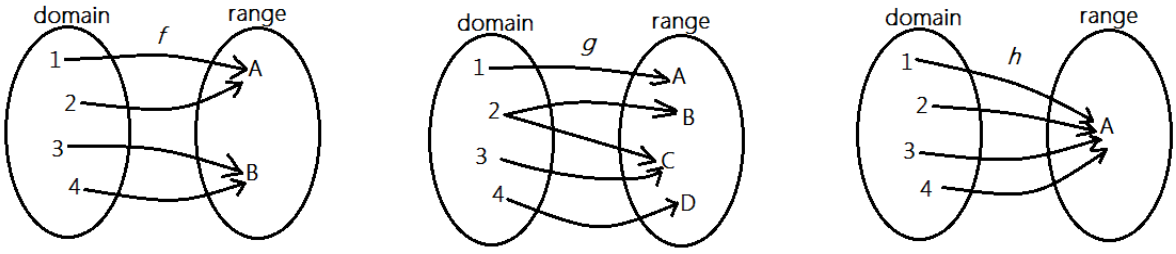
15. Solve each of the following equations. Make sure to check your solutions.

a) $\dfrac{2x+1}{5} - \dfrac{x-1}{3} = 2x + 16$ b) $(2x-1)^2 - (x-2)^2 = x+1$ c) $x^3 = x^2$

16. Solve each of the following inequalities.

a) $3x^2 \geq 15x$ b) $28x + 88 \leq -2x^2$ c) $\dfrac{1}{3}x^2 < 4x - 12$ d) $\dfrac{1}{3}x^2 \leq 4x - 12$

17. The picture shows three relations, f, g, and h. Which are functions?



18. The sum of a and three times b is 100. What is the smallest possible value of $a^2 - (2b)^2$?

19. Find the height of a tree if the angle of elevation of its top changes from $15°$ to $25°$ as the observer advances 120 ft toward its base.

20. Convert each of the following decimals to a fraction of two integers.
    a) 2.04 b) $0.\overline{24}$ c) $4.\overline{175}$ d) $0.3\overline{57}$

21. Compute the area and perimeter of a regular 12−sided polygon written into a circle with radius 9 cm. Present the exact value and approximation of your answer.

22. Find all points of intersections of $(x+4)^2 + (y-4)^2 = 25$ and $(x-10)^2 + (y-2)^2 = 125$.

23. Consider the circle $(x-10)^2 + (y-2)^2 = 125$. Find the equation of the tangent line drawn to the circle at $(0, 7)$.

24. A circle has a radius of 10 units. A point P is 17 units away from the center of the circle. Find the measure of the angle formed by the tangent lines drawn from P to the circle.

25. Suppose that C_1 is a circle with radius 12 units and C_2 is a circle with radius 15 units. The distance between the centers is 20 units.
    a) Find the exact value and approximate value for the angle formed by the common tangent lines drawn to the circles.
    b) Compute the distance between the two points of tangency on a common tangent line.

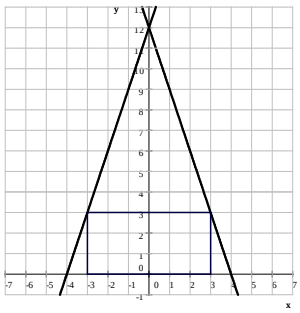
26. Suppose that $f(x) = (x-1)^2 + 1$ and $g(x) = \frac{1}{2}x + 3$. Compute each of the following.

    a) $f(2) + f(3)$
    b) $f(2+3)$
    c) $f(2) + g(2)$
    d) $3f(2)$
    e) $f(3 \cdot 2)$
    f) $f(g(2))$
    g) $g(f(2))$
    h) $f(f(f(3)))$
    i) $g(g(4))$
    j) $f(4)\, g(4)$
    k) $f(3 + g(2))$
    l) $g(2)^{f(2)}$

27. Let $f(x) = \dfrac{x-2}{x+5}$ and $g(x) = \dfrac{5x+2}{-x+1}$. Compute each of the following.

    a) $f(0)$
    b) $g(0)$
    c) $g(1)$
    d) $g\left(\sqrt{2}\right)$
    e) $f\left(\sqrt{20}\right)$
    f) $f(g(0))$
    g) $g(f(3))$
    h) $f(1+3)$
    i) $f(1) + f(3)$
    j) $2f(5)$
    k) $f(2 \cdot 5)$

28. Let l_1 and l_2 denote the lines $y = 3x + 12$ and $y = -3x + 12$, respectively. Let R be a rectangle with vertical and horizontal sides, where one horizontal side is on the x−axis and the vertices connecting the other horizontal side lie on the lines l_1 and l_2, above the x−axis. What is the maximal value of the area of such a rectangle?



29. A citrus grower estimates that if 60 orange trees are planted, the average yield per tree will be 400 oranges. The average yield will decrease by 4 oranges per tree for each additional tree planted on the same acreage. Find the total number of trees the grower should plant to maximize yield.

30. Let f be the function defined by $f(x) = x^2 - 4x + 9$.

    a) Compute $f(3)$. b) Is it true that $f(2+3) = f(2) + f(3)$? c) Simplify $f(2a)$

31. An arch is in the shape of a semicircle. At a point along the base 2 feet from an end of the arch, the height of the arch is 8 feet. Find the maximum height of the arch.

32. Prove each of the following identities.

    a) $1 + \tan^2 x = \sec^2 x$

    b) $\dfrac{\cot x - 1}{\cot x + 1} = \dfrac{1 - \tan x}{1 + \tan x}$

    c) $\sin^2 x \cos^3 x = \left(\sin^2 x - \sin^4 x\right) \cos x$

    d) $(\sin x + \cos x)^2 = 1 + 2 \sin x \cos x$

    e) $\cos x (\sec x - \cos x) = \sin^2 x$

    f) $\dfrac{\sin x}{1 - \cos x} = \dfrac{1 + \cos x}{\sin x}$

    g) $\dfrac{1 + \sin x}{1 - \sin x} - \dfrac{1 - \sin x}{1 + \sin x} = 4 \tan x \sec x$

33. Simplify each of the following.

    a) $\log_3 (\tan 60°)$ b) $\ln (\tan 225°)$ c) $\log_8 (\sin 30°)$ d) $\log_2 (\sin 45°)$

34. Graph each of the following.

    a) $f(x) = \dfrac{1}{2}x^2 + 2x - \dfrac{5}{2}$ b) $y = 2^x$ c) $(x-2)^2 + (y-1)^2 = 25$ d) $f(x) = \dfrac{1}{x}$

35. Write an equation for the line that

    a) passes through $P(3, -8)$ and is parallel to $2x - 3y = 12$.
    b) passes through $P(3, -8)$ and is perpendicular to $2x - 3y = 12$.
    c) passes through $P(-4, 1)$ and $Q(2, -3)$.

36. a) The population of a city has increased by 4% during the last year. If the population now is 13 977 600, how big was it a year ago, before the raise?

    b) Express two raises, one by 15% and one by 40% as a single increase. What percentage of a change is this?

37. We are standing on the top of a 1200 feet tall building and throw a small object upward. The object's distance, measured in feet, after t seconds is

$$h(t) = -16t^2 + 352t + 1200$$

    a) How long will it take for the object to hit the ground?
    b) What is the highest point that the object reaches?

38. Suppose that m and n are real number such that m is 5 greater than twice n. Find each of the following.

    a) the smallest value of $n^2 + m^2$ b) the smallest value of nm c) the greatest value of $n^2 - m^2$

39. a) Find the exact and approximate values of the smaller angle that is formed between the positive part of the $x-$axis and the line $y = 2x - 1$.

    b) Find an equation for the straight line that passes through the point $P(4, -2)$ and forms a 60° angle with the positive part of the $x-$axis.

40. a) We have a jar of 300 coins, all nickels and dimes. All together, they are worth $23.50. How many nickels and how many dimes are there in the jar?

    b) 75 people showed up on the party. If there were 9 more men than woman present, how many men were there?

    c) How many liters of a 20% alcohol solution is needed to be mixed with 18 liters of a 5% alcohol solution so that the resulting mixture is a 10% solution?

d) the register contained 38 more ten-dollar bills than five-dollar bills. How much of each was there in the register if the total value of these bills was \$695?

e) We invested a total of \$7000 in two different stocks, stock A and stock B. Stock A made a profit of 8% but Stock B had a loss of 2%. How much was invested in each stock if the combined investment resulted in a profit of \$410?

f) A bank offers the following checking account: a monthly fee of \$5 and a fee of 3 cents for each checks cashed. A company that uses this account just paid \$13.85 for last month. How many checks were cashed in that month?

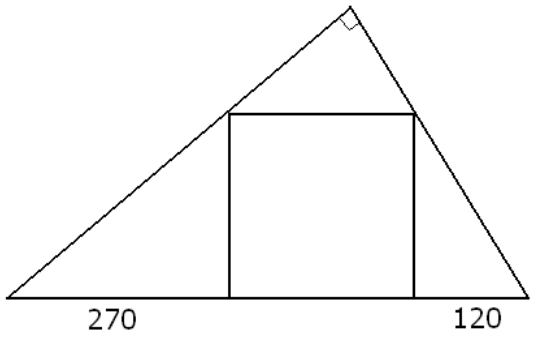
41. a) One number is four less than three times another. Find these numbers if their product is 160.

b) A number is $\frac{7}{12}$ larger than its own reciprocal. Find this number.

c) The opposite of a number is 30 less than the square of the number. Find this number.

d) A number is one larger than its own reciprocal. Find this number. (The positive one you will find is actually a famous number, also called the golden ratio.)

42. The picture shows a square within a right triangle.
a) Find the length of the sides in the square.
b) Compute the angles in the triangle.



Answers

1.) a) $-\frac{b^2}{2a}$ b) $\frac{a^4}{b}$ c) $\frac{a^4b^2-a}{ab+b^2}$ d) $\frac{1}{9}$ e) $-\frac{55}{72}$ f) $\frac{1}{256}$ g) $\frac{a^6}{b^3}$ h) 1 i) -4
j) $\frac{1}{4}$ k) $\frac{1}{4}$ l) $-\frac{1}{4}$ m) undefined n) $\frac{a^2}{b^6}$ o) ab 2.) $\frac{3\pm 2\sqrt{3}}{3}$

3.) a) undefined b) $-\frac{1}{8}$ c) 1 d) $\frac{\sqrt{5}+3}{4}$ e) -8 f) 2 g) $\sqrt{3}+2$

4.) a) $-\frac{1}{2}$ b) $\frac{3}{2}$ c) 3 d) $\frac{3}{2}$ e) -3 f) $\frac{1}{3}$ g) 6 h) $\frac{3}{2}$ i) undefined j) $-\frac{2}{3}$ k) -3
l) -5 m) 0 n) undefined o) 17 p) undefined q) $-\frac{3}{4}$ r) $\frac{2}{7}$ s) 8 t) 8

5.) a) A b) A^2 c) $\sqrt{A}$ d) $\frac{1}{A}$ e) B f) $\frac{1}{B}$ g) B^3 h) $\frac{1}{B^2}$ i) $\frac{1}{C^6}$ j) $\frac{1}{\sqrt{C^3}}=\frac{1}{\left(\sqrt{C}\right)^3}$

6.) a) $\frac{\sqrt{3}}{2}$ b) $\sqrt{2}$ c) $\frac{\sqrt{3}}{2}$ d) 1 e) $\frac{\sqrt{3}}{3}$ f) 2 g) 2 h) $\frac{\sqrt{2}}{2}$ i) $\frac{2\sqrt{3}}{3}$ j) $\frac{\sqrt{3}}{3}$

7.) 80 8.) a) $x^{1/32}$ b) $\frac{1}{32}$

9.) a) $\dfrac{1-\sqrt{6}}{2}$ b) $\dfrac{1}{2}-\dfrac{1}{4}\sqrt{3}$ c) 1 d) 1 e) 2 f) 1 g) 4 h) $\dfrac{1}{2}$ j) $\dfrac{1}{2}$ k) $\sqrt{2}-\dfrac{4}{3}$ l) $\sqrt{3}-2$

10.) a) $6<\log_2 100<7$ b) $7<\log_2 200<8$ c) $3<\log_{10} 2014<4$ d) $4<\log_5 2014<5$

e) $-2<\log_2\left(\dfrac{1}{3}\right)<-1$

11.) a) $7^x=2y-1$ b) $B^3=A-1$ c) $q^p=T$ d) $a^{x+2}=x^2+1$ e) $x^2=20$

12.) a) 8 b) ± 10 c) $\dfrac{1}{3}-\dfrac{e^{28}}{3}$ d) $\dfrac{1}{2e^3}-\dfrac{1}{2}$ e) $-\dfrac{7}{6}$ f) $\dfrac{17}{7}$ g) 4094 h) 2046

13.) a) $x-2=\log_3 60$ b) $2x-5=\log_{10} 2012$ c) $a+1=\log_{1/3}(b-2)$ d) $B=\log_A C$

14.) a) -4 b) no solution c) $-\dfrac{1}{2}$ d) $\log_2 21$ e) no solution f) $\dfrac{1}{2}$ g) no solution

h) $-\dfrac{1}{5}$ i) $\dfrac{1}{5}(1+\log_3 40)$ j) no solution k) $-\dfrac{13}{2}$ l) -4 m) $\dfrac{1}{2}(-8+\ln 10)$

15.) a) -8 b) $-1,\dfrac{4}{3}$ c) $0,1$ 16.) a) $(-\infty,0]\cup[5,\infty)$ b) $\left[-7-\sqrt{5},-7+\sqrt{5}\right]$ c) no solution d) 6

17.) f and h are functions 18.) -8000 19.) 75.588 461 ft 20.) a) $\dfrac{51}{25}=2\dfrac{1}{25}$ b) $\dfrac{8}{33}$ c) $4\dfrac{175}{999}=\dfrac{4171}{999}$

d) $\dfrac{354}{990}$ 21.) $P=216\sin 15^\circ$ cm $\approx 55.904\,91$ cm $A=972\sin 15^\circ\cos 15^\circ$ cm$^2\approx 243$ cm^2 22.) $(0,7)$ and $(-1,0)$

23.) $y=2x+7$ 24.) $2\sin^{-1}\left(\dfrac{10}{17}\right)\approx 72.063\,758^\circ$ 25.) a) $2\sin^{-1}\left(\dfrac{3}{20}\right)\approx 17.253\,853^\circ$ b) $\sqrt{391}$ unit

26.) a) 7 b) 17 c) 6 d) 6 e) 26 f) 10 g) 4 h) 257 i) $\dfrac{11}{2}$ j) 50 k) 37 l) 16

27.) a) $-\dfrac{2}{5}$ b) 2 c) undefined d) $-7\sqrt{2}-12$ e) $\dfrac{14}{5}\sqrt{5}-6$ f) 0 g) 3 h) $\dfrac{2}{9}$ i) $-\dfrac{1}{24}$

j) $\dfrac{3}{5}$ k) $\dfrac{8}{15}$ 28.) 24 unit^2

29.) if we plant 80 trees, then we will obtain a maximal yield of 25 600 oranges.

30.) a) $f(3)=6$ b) $f(5)=14$ and $f(2)+f(3)=11$ c) $f(2a)=4a^2-8a+9$ 31.) 17 feet

32.) a) $1+\tan^2 x=\sec^2 x$

$$\text{LHS}=1+\tan^2 x=1+\frac{\sin^2 x}{\cos^2 x}=\frac{\cos^2 x}{\cos^2 x}+\frac{\sin^2 x}{\cos^2 x}=\frac{1}{\cos^2 x}=\sec^2 x=\text{RHS}$$

b) $\dfrac{\cot x-1}{\cot x+1}=\dfrac{1-\tan x}{1+\tan x}$

$$\text{LHS}=\frac{\cot x-1}{\cot x+1}=\frac{\dfrac{1}{\tan x}-1}{\dfrac{1}{\tan x}+1}\cdot\frac{\tan x}{\tan x}=\frac{1-\tan x}{1+\tan x}=\text{RHS}$$

c) $\sin^2 x\cos^3 x=\left(\sin^2 x-\sin^4 x\right)\cos x$

$$\text{RHS}=\left(\sin^2 x-\sin^4 x\right)\cos x=\sin^2 x\left(1-\sin^2 x\right)\cos x=\sin^2 x\cos^2 x\cos x=\text{LHS}$$

d) $(\sin x+\cos x)^2=1+2\sin x\cos x$

$$\text{LHS}=(\sin x+\cos x)^2=\sin^2 x+\cos^2 x+2\sin x\cos x=1+2\sin x\cos x=\text{RHS}$$

e) $\cos x\,(\sec x - \cos x) = \sin^2 x$

$$\text{LHS} = \cos x\,(\sec x - \cos x) = \cos x\left(\frac{1}{\cos x} - \cos x\right) = 1 - \cos^2 x = \sin^2 x = \text{RHS}$$

f) $\dfrac{\sin x}{1-\cos x} = \dfrac{1+\cos x}{\sin x}$

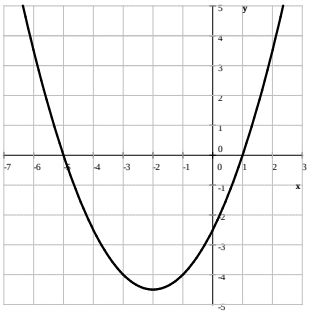
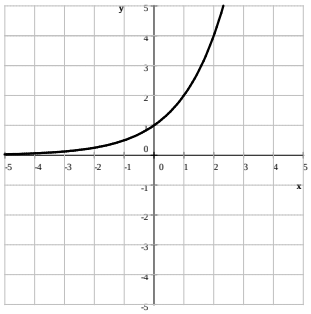
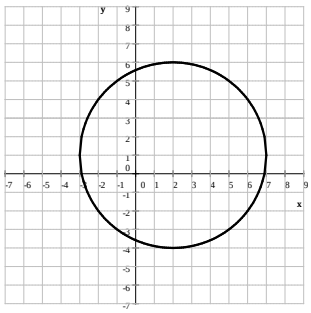
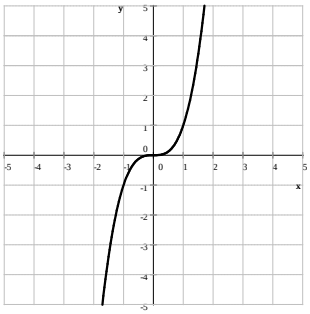
$$\text{LHS} = \frac{\sin x}{1-\cos x} = \frac{\sin x}{1-\cos x}\cdot\frac{1+\cos x}{1+\cos x} = \frac{\sin x\,(1+\cos x)}{1-\cos^2 x} = \frac{\sin x\,(1+\cos x)}{\sin^2 x} = \frac{1+\cos x}{\sin x} = \text{RHS}$$

g) $\dfrac{1+\sin x}{1-\sin x} - \dfrac{1-\sin x}{1+\sin x} = 4\tan x \sec x$

$$\begin{aligned}\text{LHS} &= \frac{1+\sin x}{1-\sin x} - \frac{1-\sin x}{1+\sin x} = \frac{(1+\sin x)^2 - (1-\sin x)^2}{(1-\sin x)(1+\sin x)} = \frac{\left(1+\sin^2 x + 2\sin x\right) - \left(1+\sin^2 x - 2\sin x\right)}{1-\sin^2 x} \\ &= \frac{1+\sin^2 x + 2\sin x - 1 - \sin^2 x + 2\sin x}{\cos^2 x} = \frac{4\sin x}{\cos^2 x} = 4\frac{\sin x}{\cos x}\frac{1}{\cos x} = 4\tan x \sec x = \text{RHS}\end{aligned}$$

33.) a) $\dfrac{1}{2}$ b) 0 c) $-\dfrac{1}{3}$ d) $-\dfrac{1}{2}$

34.) a) $f(x) = \dfrac{1}{2}x^2 + 2x - \dfrac{5}{2}$ b) $y = 2^x$ c) $(x-2)^2 + (y-1)^2 = 25$ d) $f(x) = \dfrac{1}{x}$

35.) a) $\dfrac{2}{3}(x-3) = y+8$ or $y = \dfrac{2}{3}x - 10$ b) $-\dfrac{3}{2}(x-3) = y+8$ or $y = -\dfrac{3}{2}x - \dfrac{7}{2}$

c) $-\dfrac{2}{3}(x+4) = y-1$ or $-\dfrac{2}{3}(x-2) = y+3$ or $y = -\dfrac{2}{3}x - \dfrac{5}{3}$

36.) a) 13 440 000 b) 61% increase 37.) a) 25 seconds b) 3136 feet

38.) a) 5, when $n = -2$ and $m = 1$ b) $-\dfrac{25}{8}$, when $n = -\dfrac{5}{4}$ and $m = \dfrac{5}{2}$ c) $\dfrac{25}{3}$, when $n = -\dfrac{10}{3}$ and $m = -\dfrac{5}{3}$

39.) a) $\tan^{-1} 2 \approx 63.434949$ b) $y + 2 = \sqrt{3}\,(x-4)$

40.) a) 130 nickels and 170 dimes b) 42 c) 9 liters d) 21 five-dollar bills and 59 ten-dollar bills

e) \$5500 in Stock A and \$1500 in Stock B f) 295

41.) a) 8 with 20 and $-\dfrac{20}{3}$ and -24 b) $-\dfrac{3}{4}$ and $\dfrac{4}{3}$ c) -6 and 5 d) $\dfrac{1-\sqrt{5}}{2}$ and $\dfrac{1+\sqrt{5}}{2}$

42.) a) 180 b) $\alpha = \tan^{-1}\left(\dfrac{180}{270}\right) \approx 33.6900675°$ $\beta = \tan^{-1}\left(\dfrac{180}{120}\right) \approx 56.3099325°$

Last revised: February 25, 2015