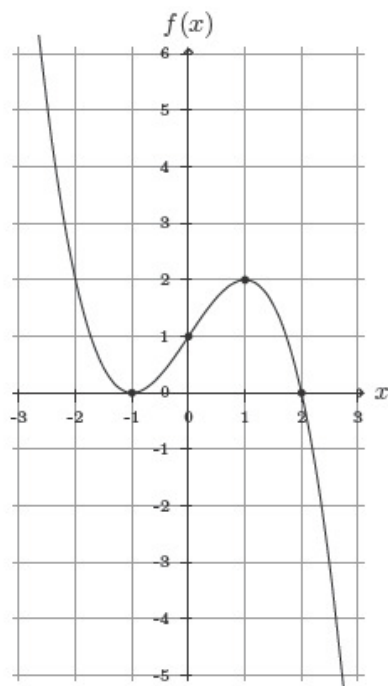


20. (6 points) Find the domain, range, intercepts, sign (where $f(x)$ is positive/negative) and extrema (local max/min) of the following function.



21. (6 points) Solve the following exponential equations for x .

(a) $9^{x+4} = 27^{5x-3}$

(b) $3(2 + e^{\frac{x}{4}}) = 27$

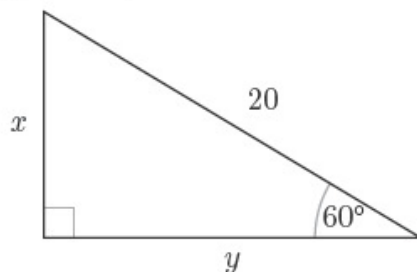
(c) $2^{x+2} = 3$

22. (3 points) Let θ be an acute angle of a right triangle.

Given $\tan(\theta) = \frac{1}{2}$, find the exact values of $\sin(\theta)$ and $\sec(\theta)$.

23. (2 points) Given $\sec(\theta) = \frac{2}{\sqrt{3}}$, find the acute angle θ .

24. (3 points) Find the exact values of x and y .



Algebra and Functions (201-016-50) Autumn 2015

20. Let $f(x) = x^2 + 6x + 4$. Find: a. $f(2)$; b. $f(\frac{1}{3})$; c. $f(a)$; d. $f(a+h)$;
e. the value(s) of x for which $f(x) = -4$.

22. Solve each equation for x . Where possible, express your answer without using logarithms.

a. $3^{2x-3} = 5^{3-x}$

b. $2(e^{2x/3} - 4) = 7$

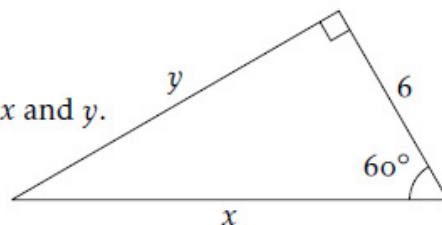
c. $\log_2(x^2 - 2x) = 3$

d. $2^x + \frac{24}{2^x} = 11$

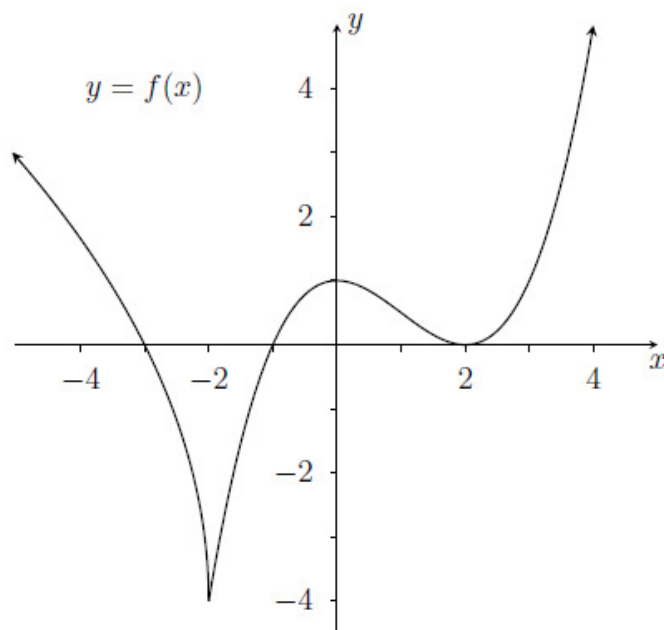
23. Given that $\sin \vartheta = \frac{7}{9}$ and ϑ is an acute angle of a right-angled triangle, find the exact values of $\cos \vartheta$, $\tan \vartheta$, $\cot \vartheta$, $\csc \vartheta$ and $\sec \vartheta$.

24. Given that $\cot \vartheta = \sqrt{3}$, find the acute angle ϑ .

25. In the right-angled triangle below, find the exact values of x and y .



19. Give the domain, range, intercepts, sign (where f is positive/negative) and extrema (local max/min) of the function f whose graph is displayed below.

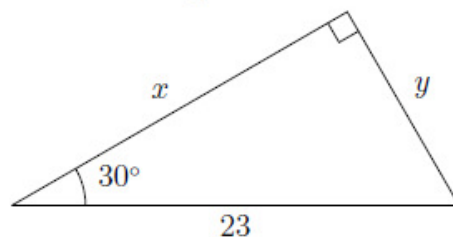


20. Let $f(x) = -x^2 + 5x - 1$.
- Evaluate $f(0)$.
 - Evaluate $f(2)$.
 - Evaluate $f\left(\frac{1}{3}\right)$.
 - For which values of h is $f(2+h) = f(2) + f(h)$?

21. Given that θ is an acute angle in a right triangle such that $\tan \theta = \frac{8}{3}$, find the exact values of $\sin \theta$, $\cos \theta$, $\cot \theta$, $\sec \theta$ and $\csc \theta$.

22. Given $\csc \theta = \sqrt{2}$, find the acute angle θ .

23. Find the exact values of x and y in the triangle below.



24. Solve each equation for x .

- $5^{2+x} = 125$
- $1 = \frac{9^x}{3^5}$
- $2(e^{2x} + 2) = 7$

December 2016

Algebra and Functions - 201-016-50

21. Evaluate each logarithm.

(a) $\log_4 \frac{1}{16}$

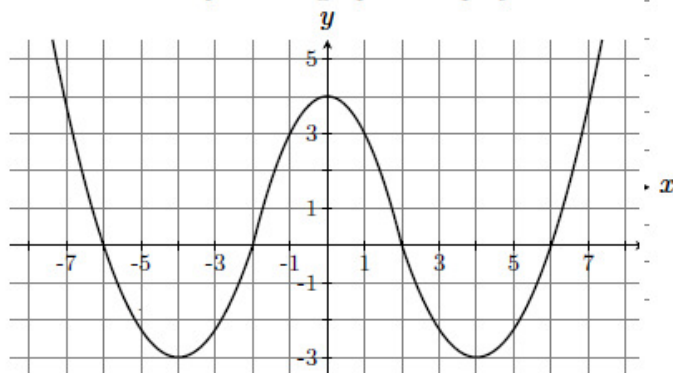
(b) $\ln e^3$

22. Solve each equation for x .

(a) $4e^{3x} - 5 = 27$

(b) $5^{2x-3} = \frac{1}{25}$

27. Give the domain, range, intercepts, sign (where f is positive/negative) and extrema (local max/min) of the function f whose graph is displayed below.



7. Let $f(x) = 2x^3 - 5x + 3$. (a) Evaluate $f(3)$. (b) Evaluate $f\left(-\frac{1}{2}\right)$.