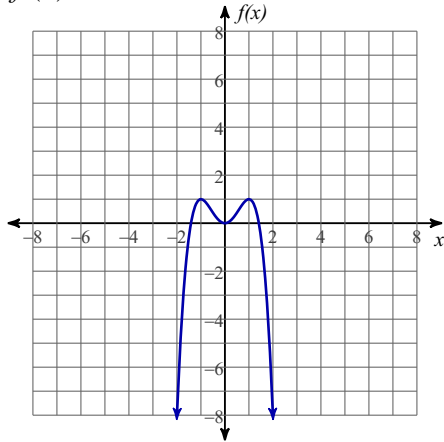


Practice Semester I Final - No Calculator

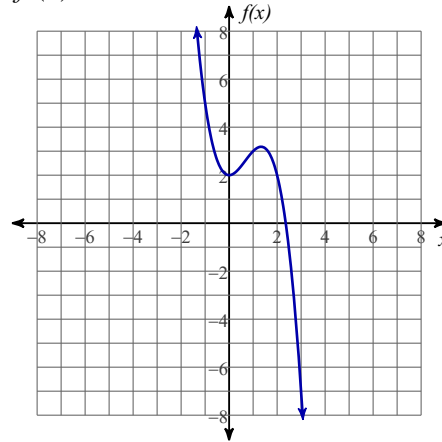
Approximate the relative extrema (max/min) of each function.

1)  $f(x) = -x^4 + 2x^2$



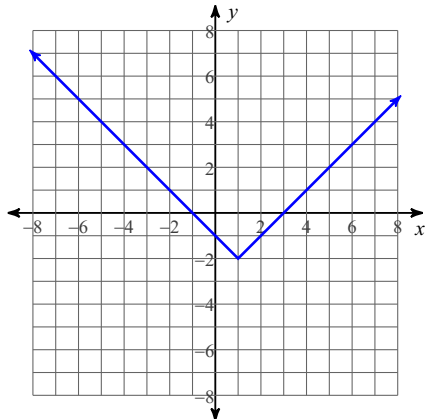
Approximate the intervals where each function is increasing and decreasing.

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



Identify the parent function  $f(x)$  and write an equation for the function given.

3)



Describe the transformations necessary to transform the graph of  $f(x)$  into that of  $g(x)$ .

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

State if the given functions are inverses.

5)  $f(x) = (x - 1)^3 - 3$   
 $h(x) = \sqrt[3]{x + 3} + 1$

Find the inverse of each function.

6)  $h(x) = \frac{2}{x + 1} - 2$

Find all zeros.

7)  $f(x) = 3x^4 - 29x^2 + 18$

8)  $f(x) = x^3 + 8$

Solve each equation/inequality. Remember to check for extraneous solutions.

9)  $\frac{3}{4m} = \frac{1}{2m} - \frac{1}{4}$

10)  $-x^2 - 3x + 40 > 0$

11)  $\frac{-3x - 53}{2x + 6} < 4$

Rewrite each equation in exponential form.

12)  $\log_{19} 361 = 2$

**Rewrite each equation in logarithmic form.**

13)  $225^{-\frac{1}{2}} = \frac{1}{15}$

**Expand each logarithm.**

15)  $\log_3 (11\sqrt{7 \cdot 10})$

**Find the reference angle.**

17)  $640^\circ$

**Convert each degree measure into radians.**

19)  $30^\circ$

**Find the inverse of each function.**

14)  $y = \log_6 (x + 3)$

**Condense each expression to a single logarithm.**

16)  $4\log_7 x - 5\log_7 y$

18)  $\frac{16\pi}{9}$

**Convert each radian measure into degrees.**

20)  $-\frac{17\pi}{4}$

**Find the exact values of the five trigonometric ratios not given.**

21)  $\sec \theta = -\frac{7\sqrt{6}}{12}$  and  $\sin \theta < 0$

**Find the exact value of each trigonometric function.**

22)  $\cos -\frac{14\pi}{3}$

23)  $\tan -\frac{7\pi}{4}$

24)  $\sin 0$

25)  $\cos 5\pi$

26)  $\sec -\frac{9\pi}{4}$

27)  $\csc \frac{9\pi}{2}$

28)  $\csc \frac{5\pi}{3}$

29)  $\sec -\frac{5\pi}{6}$

**Find the exact value of each expression.**

30)  $\tan^{-1} \sqrt{3}$

31)  $\cos^{-1} 0$

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

33)  $\sin^{-1} \frac{\sqrt{2}}{2}$

**Solve each equation for  $0 \leq \theta < 2\pi$ .**

34)  $-8\cos \theta = 4\sqrt{2}$

35)  $-3\sin \theta + \sin \theta \tan \theta = -2\sin \theta$

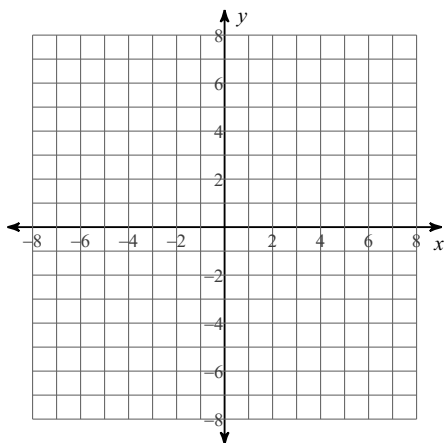
36)  $5 = -\cot^2 \theta - 4\csc \theta$

**Verify each identity.**

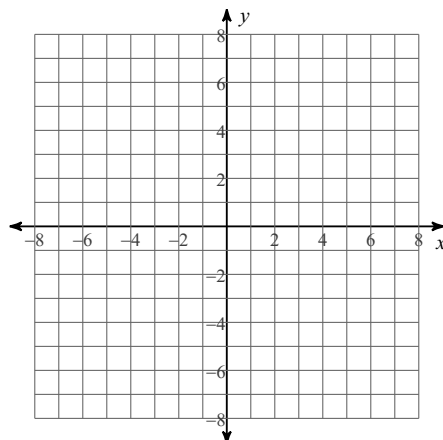
37)  $-\sin x \sec x = -\tan x$

Sketch the graph of each function.

$$38) f(x) = \begin{cases} -2, & x \leq -2 \\ 1, & -2 < x \leq 3 \\ \sqrt{x-3}, & x > 3 \end{cases}$$

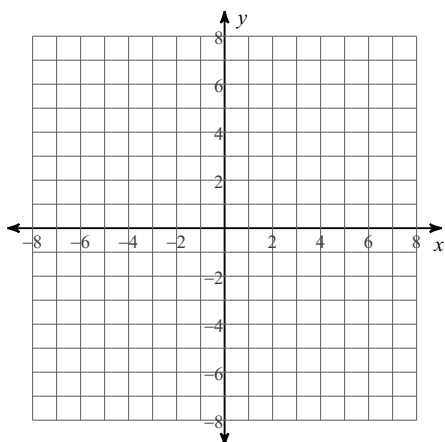


$$39) f(x) = x^3 - 3x^2 + 4$$



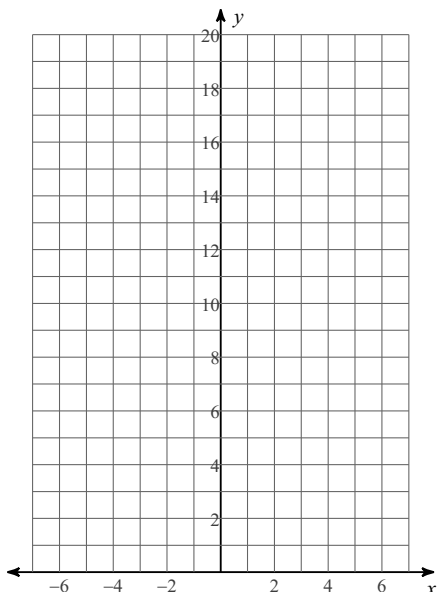
For each function, identify the holes, intercepts, and horizontal asymptote. Then sketch the graph.

$$40) f(x) = \frac{x^2 + x - 6}{4x + 16}$$



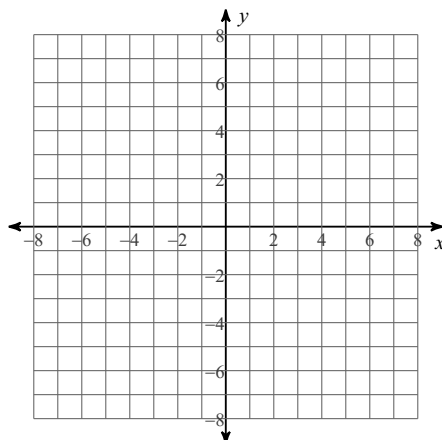
Sketch the graph of each function.

41)  $y = 2 \cdot \left(\frac{1}{3}\right)^x$



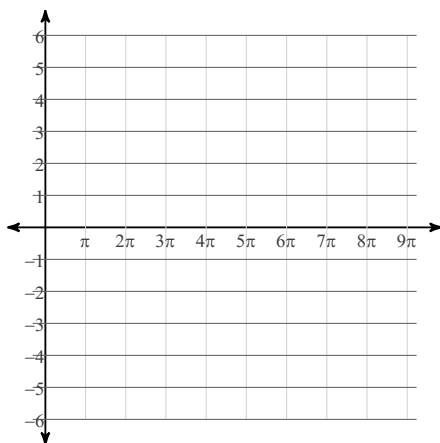
Identify the domain and range of each. Then sketch the graph.

42)  $y = \log_2(x - 3) - 2$

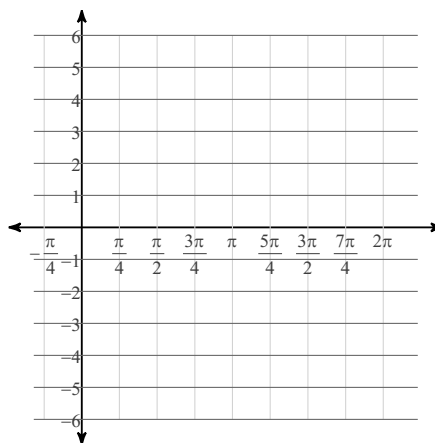


Graph each function using radians.

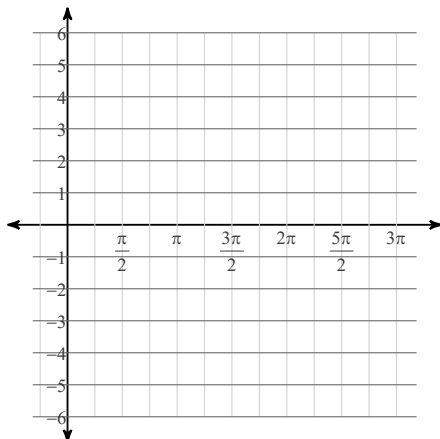
43)  $y = -1 + 4\sin\left(\frac{\theta}{3} + \frac{\pi}{6}\right)$



44)  $y = 3\cot\left(\theta + \frac{5\pi}{6}\right)$



45)  $y = \sec\left(\theta + \frac{\pi}{3}\right)$

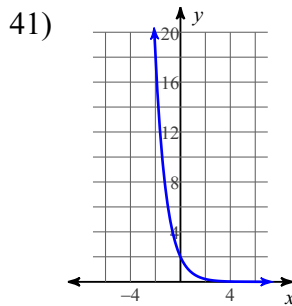
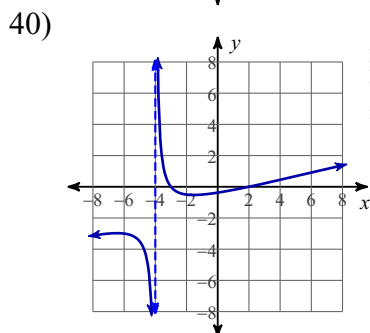
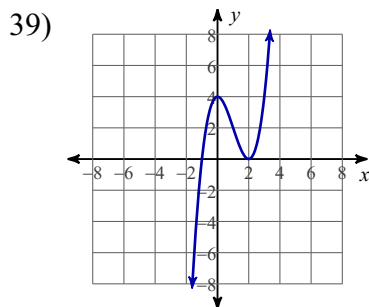
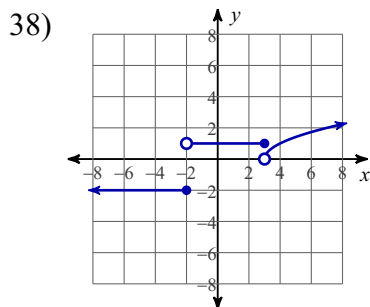


# Answers to Practice Semester I Final - No Calculator (ID: 1)

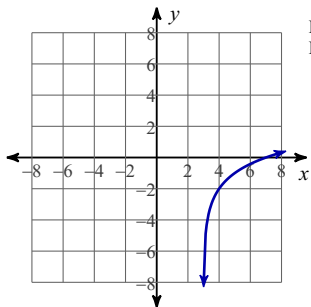
- 1) Relative minimum:  $(0, 0)$   
 Relative maxima:  $(-1, 1), (1, 1)$
- 2) Increasing:  $(0, 1.3)$  Decreasing:  $(-\infty, 0), (1.3, \infty)$
- 3) Parent:  $f(x) = |x|$       4) expand vertically by a factor of 3      5) Yes  
 $g(x) = |x - 1| - 2$       translate right 3 units
- 6)  $h^{-1}(x) = \frac{2}{x+2} - 1$       7)  $\left\{3, -3, \frac{\sqrt{6}}{3}, -\frac{\sqrt{6}}{3}\right\}$       8)  $\{-2, 1 + i\sqrt{3}, 1 - i\sqrt{3}\}$
- 9)  $\{-1\}$       10)  $(-8, 5)$       11)  $(-\infty, -7) \cup (-3, \infty)$       12)  $19^2 = 361$
- 13)  $\log_{225} \frac{1}{15} = -\frac{1}{2}$       14)  $y = 6^x - 3$       15)  $\log_3 11 + \frac{\log_3 7}{2} + \frac{\log_3 10}{2}$
- 16)  $\log_7 \frac{x^4}{y^5}$       17)  $80^\circ$       18)  $\frac{2\pi}{9}$       19)  $\frac{\pi}{6}$
- 20)  $-765^\circ$       21)  $\sin \theta = -\frac{5}{7}, \cos \theta = -\frac{2\sqrt{6}}{7}, \tan \theta = \frac{5\sqrt{6}}{12}$       22)  $-\frac{1}{2}$   
 $\csc \theta = -\frac{7}{5}, \cot \theta = \frac{2\sqrt{6}}{5}$
- 23) 1      24) 0      25) -1      26)  $\sqrt{2}$
- 27) 1      28)  $-\frac{2\sqrt{3}}{3}$       29)  $-\frac{2\sqrt{3}}{3}$       30)  $\frac{\pi}{3}$
- 31)  $\frac{\pi}{2}$       32)  $\frac{5\pi}{6}$       33)  $\frac{\pi}{4}$       34)  $\left\{\frac{3\pi}{4}, \frac{5\pi}{4}\right\}$
- 35)  $\left\{0, \frac{\pi}{4}, \pi, \frac{5\pi}{4}\right\}$       36)  $\left\{\frac{7\pi}{6}, \frac{11\pi}{6}\right\}$       37)  $-\sin x \sec x$       Use  $\sec x = \frac{1}{\cos x}$

$$-\frac{\sin x}{\cos x} \qquad \text{Use } \tan x = \frac{\sin x}{\cos x}$$

$$-\tan x \qquad \blacksquare$$

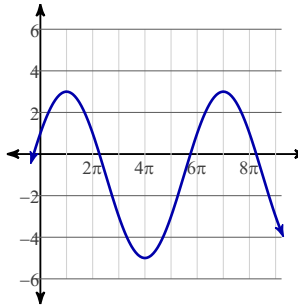


42)

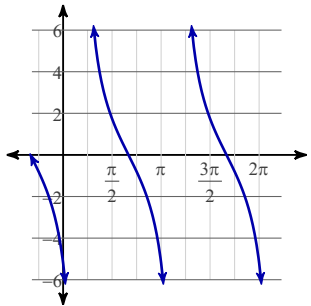


Domain:  $x > 3$   
 Range: All reals

43)



44)



45)

