

Math 111 Final Practice

1) Evaluate. Use radians where appropriate. Give exact answers (do not use a calculator)

- | | |
|---------------------------|------------------------------|
| a) $\tan(210^\circ)$ | b) $\sin(-150^\circ)$ |
| c) $\cos(7\pi/6)$ | d) $\csc(5\pi/4)$ |
| e) $y = \arccos(0)$ | f) $y = \sin^{-1}(-1)$ |
| g) $\sin(-4\pi/3)$ | h) $y = \cos^{-1}(-1/2)$ |
| i) $\tan(3\pi/2)$ | j) $\sec(\pi/2)$ |
| k) $\sin(\cos^{-1}(1/2))$ | i) $\sin^{-1}(\sin(7\pi/6))$ |

2) Find all values of θ , if θ is in the interval $[0^\circ, 360^\circ)$. No calculators.

- | | |
|------------------------|--|
| a) $\sin \theta = 1/2$ | b) $\sin \theta = -\frac{\sqrt{3}}{2}$ |
|------------------------|--|

3) Graph. Label all intercepts and asymptotes (dash in asymptotes and label the intercept with a value on the axis).

- | | |
|------------------------|----------------------------|
| a) $g(x) = e^{-x} + 3$ | b) $f(x) = -\log_2(x - 2)$ |
|------------------------|----------------------------|

4) Solve. No calculators.

- | | |
|--|---|
| a) $2\sin^2 x - \sin x - 1 = 0$ on $[0, 2\pi)$ | b) $\cos^2 x = \frac{\sqrt{3}}{2}$ on $[0, 2\pi)$ |
| c) $\sin(2x) = 1/2$ on $[0, 2\pi)$ | d) $\sin(2x) = \sin(x)$ |

5) Find the linear function f such that $f(1) = 8$ and $f(-2) = -5$. No decimals!!

6) Simplify. Do not use decimals.

a) $\frac{\frac{5}{x+h} - \frac{5}{x}}{h}$

b) $(8x)^{-2}(6x^3)^2$

7) Solve. Give exact answers and show work algebraically. **Do not use decimals.** <5 pts each>

a) $5\left|\frac{4}{5}x + 2\right| + 3 = 6$

b) $\sqrt{7x+5} + 3 = x$

c) $e^{2x} - 2e^x - 8 = 0$

d) $\log_5(x+1) - \log_5(x-3) = 2$

e) $9^{2x} = 27^{2x+1}$

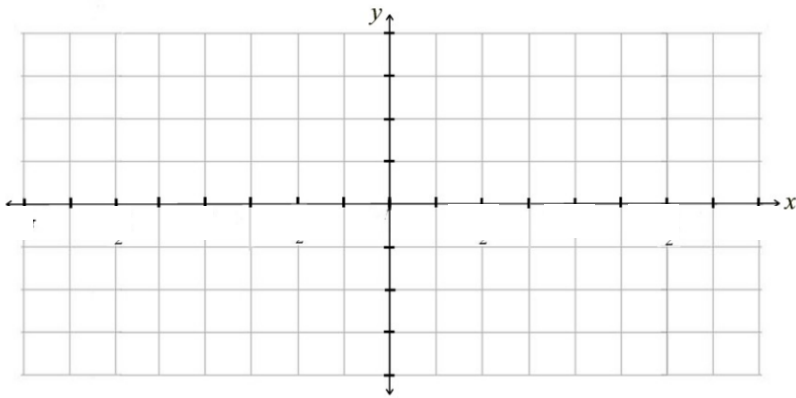
f) $49x^{-2} - 64 = 0$

g) $2\ln(2+7x) = 4$

h) $x^{\frac{2}{3}} - x^{\frac{1}{3}} = 6$

h) $8x^2 + 2x - 3 \geq 0$. Write solution in interval notation. Show work algebraically!

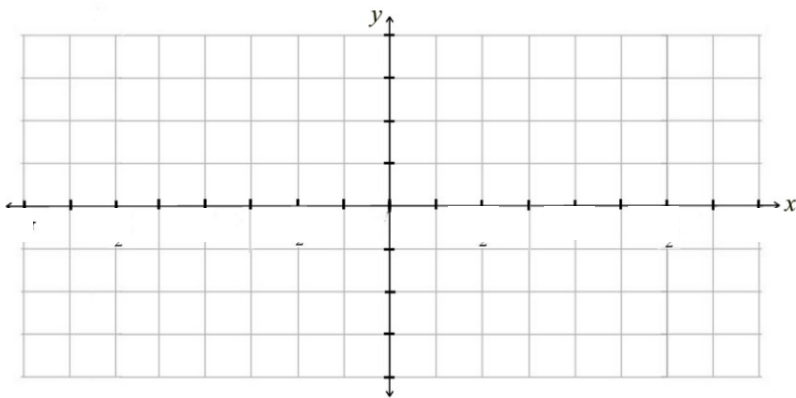
- 8) a) Graph $y = -2\cos(3x)$ over 1 period. Label at least 4 tick marks on the x-axis and one on the y



Answer the following:

- a) Amplitude:
- b) Phase shift:
- c) Period:
- d) Range:

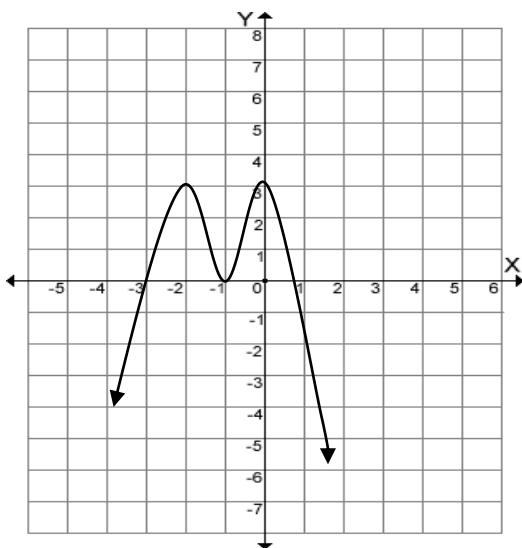
- 4b) Graph $y = \sin(\pi x) + 1$ over 1 period. Label at least 4 tick marks on the x-axis and one on the y.



Answer the following:

- a) Amplitude:
- b) Period
- c) Range:

- 5) Use the graph to answer the questions:



- a) Give the interval(s) on which $y=f(x)$ is decreasing.
- b) Give the coordinates of the relative extrema or write none.

Relative maxima:

Relative minima:

- c) Give the domain (in interval notation)
- d) Give the range in interval notation.

- e) Approximate the zeros

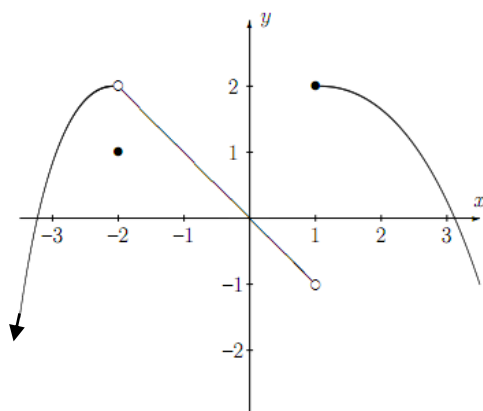
6) Find the domain (use interval notation)

a) $f(x) = \sqrt{3+x}$

b) $f(x) = \frac{7x+1}{2x^2-8}$

c) $f(x) = \tan(x)$

7)



Use the graph to answer the following

a) $\lim_{x \rightarrow 0} f(x) =$

b) $\lim_{x \rightarrow 1^+} f(x) =$

c) $\lim_{x \rightarrow 1^-} f(x) =$

d) $\lim_{x \rightarrow 1} f(x) =$

e) $f(-2) =$

f) $\lim_{x \rightarrow -2^+} f(x) =$

g) $\lim_{x \rightarrow -\infty} f(x) =$

h) $f(1) =$

i) $\lim_{x \rightarrow -2^-} f(x) =$

j) $\lim_{x \rightarrow -2} f(x) =$

8a) Graph: $f(x) = \frac{2x-3}{2x-4}$. Label the y-intercept, zeros, and dash in the HA and VA.

8b) Graph $f(x) = -x^4 - 2x^3 + 15x^2$

a) Give the y-intercept

b) Zeros | Multiplicity | Tangent or cross through?

Zeros	Multiplicity	Tangent or cross through?

c) Write the end behavior:

d) Graph. Label all intercepts!

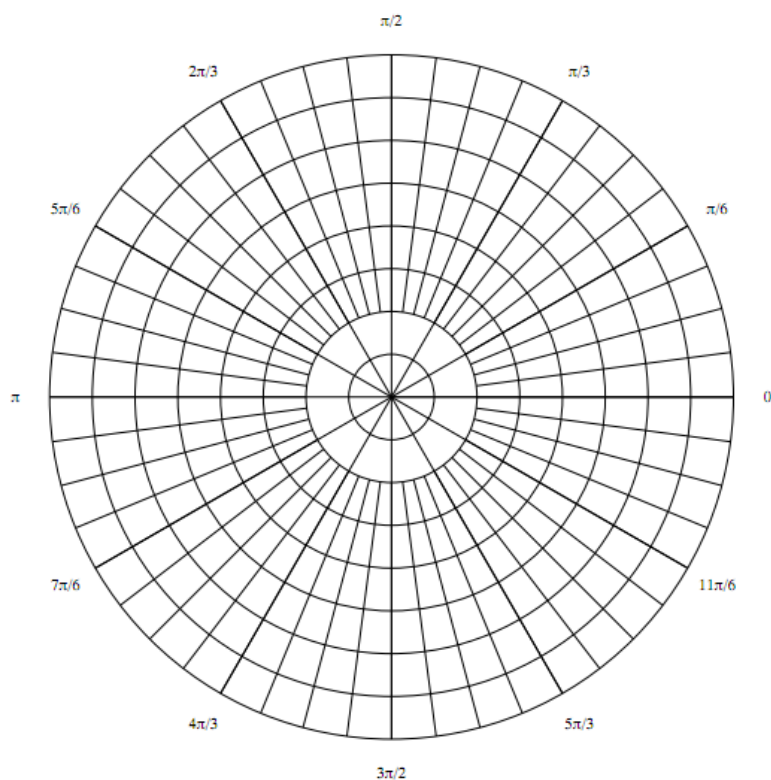
9) Prove. Put reasons next to each step.

a) $\frac{1}{\sqrt{1-\sin x}} = \frac{\sqrt{1+\sin x}}{\cos x}$

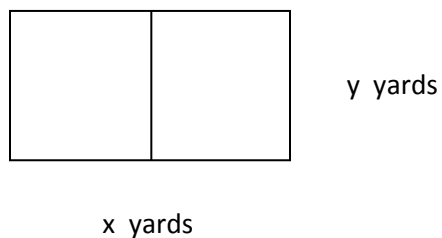
b) $\sin\left(\frac{\pi}{2} - x\right) = \cos x$

c) $\frac{1}{1-\sin x} = \sec^2 x + \tan x \sec x$

- 10) Graph: $y=3+3\sin\theta$



- 11) A rectangular corral is enclosed with 80 yards of fence. Find the area of the corral in terms of y .



- 12) Evaluate the following limits. Show your work algebraically, where required:

a) $\lim_{x \rightarrow \infty} (-2x^3 + 8x - 7)$

b) $\lim_{x \rightarrow -\infty} \frac{3x^3 - 5x}{4x^3 - 25}$

c) $\lim_{x \rightarrow 4} \frac{x - 4}{\sqrt{x} - 2}$

d) $\lim_{x \rightarrow \pi} \frac{\sec x}{2x}$

- 13) If $g(x) = 2x^2 - 4x$, find:

a) $\frac{g(x+h) - g(x)}{h}$

b) $\lim_{h \rightarrow 0} \frac{g(x+h) - g(x)}{h}$

14) If $\cos(x) = 2/5$, x in quadrant 1, find:

a) $\sin(x)$

b) $\tan(x)$

c) $\sec(x)$

d) $\sin(2x)$

15) Decompose into partial fractions

a) $\frac{11x+26}{x^2+7x+6}$

b) $\frac{8x^2-x+15}{(x+1)(x^2+5)}$