

Math 375
Spring 2026
Exam 2, March 13

No books, notes, scratch paper, phones.
Please show all your work and clearly mark your answers.
Problems are 10 points unless noted.
If a problem is too hard, move on to an easier one.
No calculators on problems 1-8.

Page	Pts	Possible
1		10
2		10
3		10
4		20
5		10
6		25
7		15
Total		100

Name (printed):

Key

Name (signature):

Score for the
class so far:

_____ out of _____ points

Percent:

_____ %

Approximate letter grade:

To earn a grade of _____ I would need about
of the points in the rest of the class.

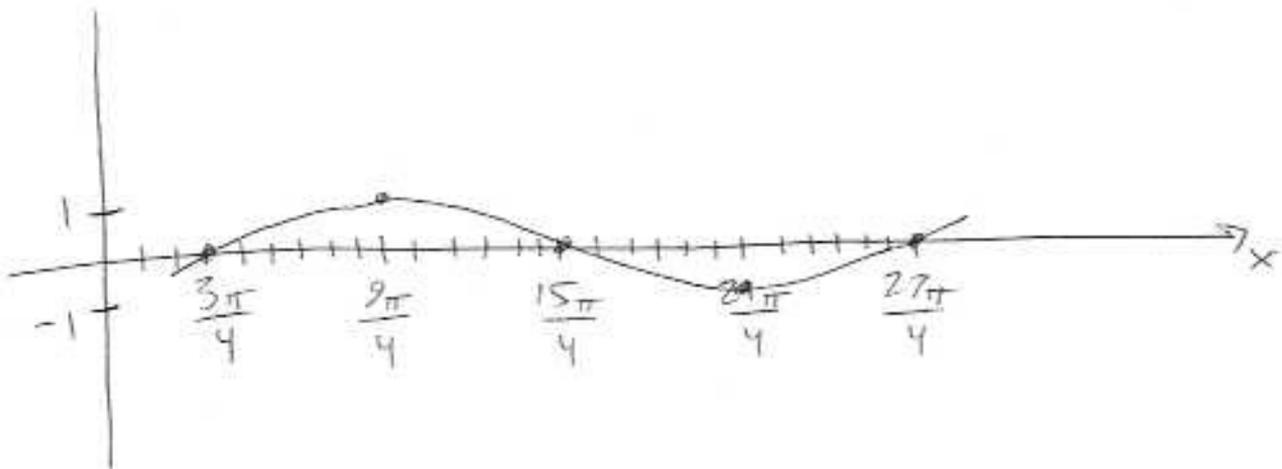
$$0 \leq \frac{x}{3} - \frac{\pi}{4} \leq 2\pi$$

1) Graph $y = \sin\left(\frac{x}{3} - \frac{\pi}{4}\right)$

$$0 \leq 4x - 3\pi \leq 24\pi$$

(5 pts)

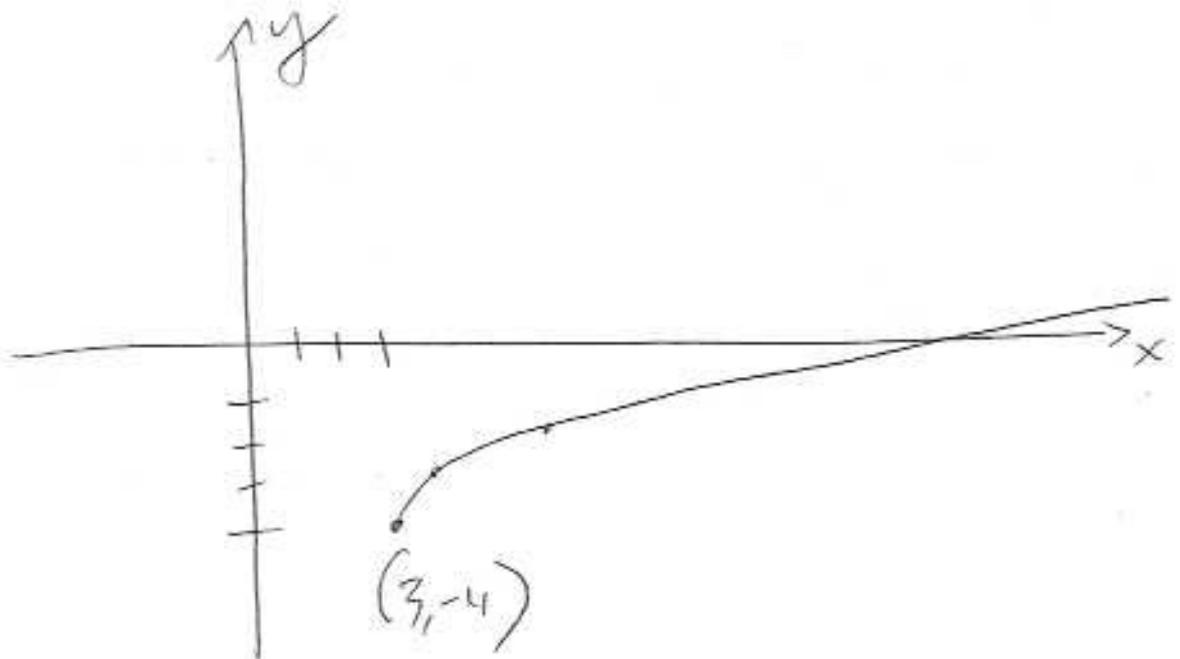
$$\frac{3\pi}{4} \leq x \leq \frac{27\pi}{4}$$



2) Graph $y = \sqrt{x-3} - 4$

(5 pts)

Right shift 3
Down 4



3) Prove that $f(x) = \frac{1}{x-5}$ and $g(x) = \frac{1}{x} + 5$ are inverse functions.

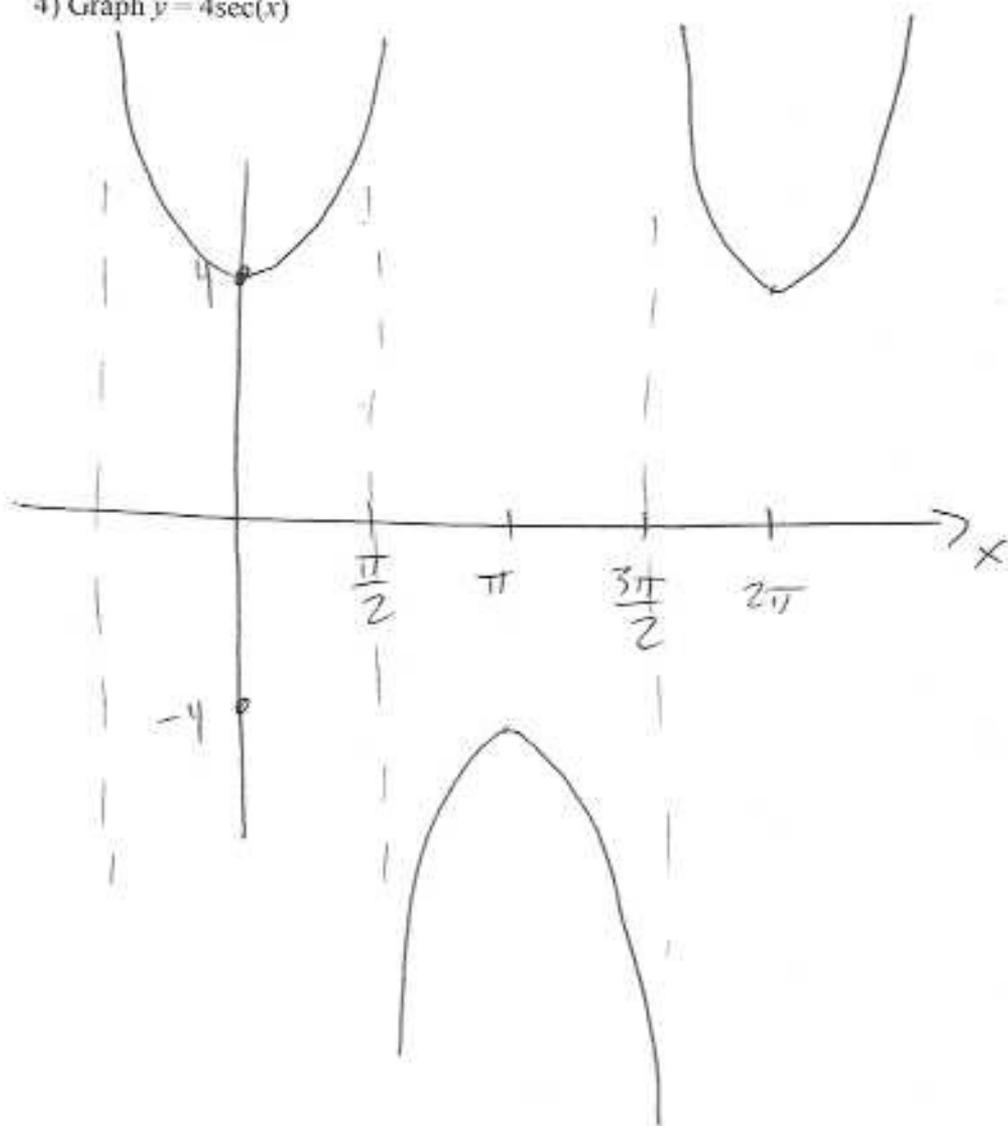
(5 pts)

$$f(g(x)) = f\left(\frac{1}{x} + 5\right) = \frac{1}{\frac{1}{x} + 5 - 5} = \frac{1}{\frac{1}{x}} = x \quad \checkmark$$

$$g(f(x)) = g\left(\frac{1}{x-5}\right) = \frac{1}{\frac{1}{x-5}} + 5 = x - 5 + 5 = x \quad \checkmark$$

4) Graph $y = 4\sec(x)$

(5 pts)



5) Find these exact values. Use radians unless degrees are indicated.

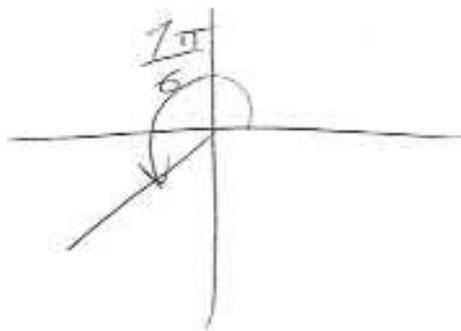
a) $\sin\left(\frac{7\pi}{6}\right)$

b) $\cot(60^\circ)$

c) $\arctan(1)$

d) $\arcsin\left(-\frac{1}{2}\right)$

a)



$$\sin\left(\frac{7\pi}{6}\right) = -\frac{1}{2}$$

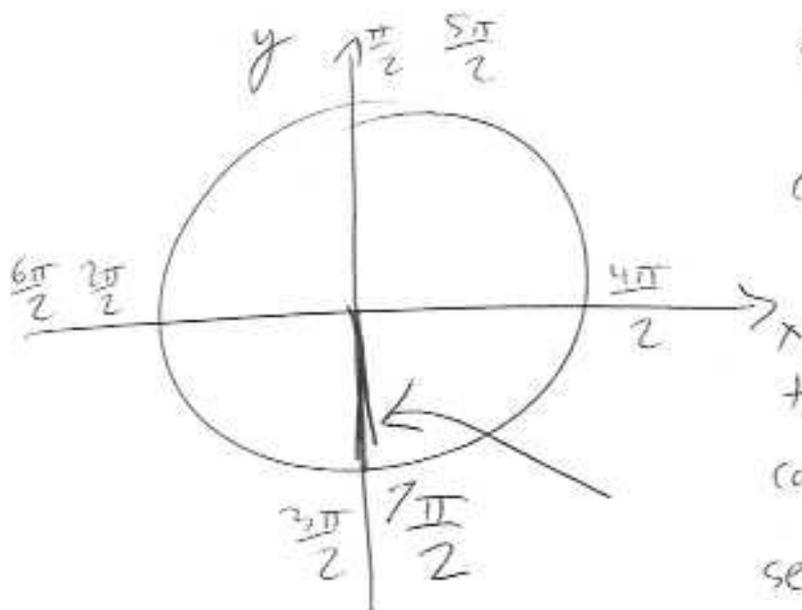
b) $\cot 60^\circ = \frac{1}{\sqrt{3}}$

c) 45° or $\frac{\pi}{4}$

d) $-30^\circ = -\frac{\pi}{6}$

$$90^\circ \cdot 7 = 630^\circ$$

- 6)a) Convert $\frac{7\pi}{2}$ to degrees.
 b) Draw this angle on a unit circle.
 c) Find all of the trig functions of $\frac{7\pi}{2}$.



$$\sin\left(\frac{7\pi}{2}\right) = -1$$

$$\cos\left(\frac{7\pi}{2}\right) = 0$$

$$\tan\left(\frac{7\pi}{2}\right) = \text{undef}$$

$$\cot\left(\frac{7\pi}{2}\right) = 0$$

$$\sec\left(\frac{7\pi}{2}\right) = \text{undef}$$

$$\csc\left(\frac{7\pi}{2}\right) = -1$$



- 7) Find an equation of a trig function with period $\frac{3\pi}{2}$, maximum 10, and minimum -4.

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

$$B = \frac{2\pi}{P} = \frac{2\pi}{\frac{3\pi}{2}} = \frac{4}{3}$$

$$14$$

$$\text{Amp} = 7$$

$$\text{Shift up} = 3$$

$$f(x) = 3 + 7\sin\left(\frac{4}{3}x\right)$$

- 8) a) Write the domain of cosecant. Use degrees or radians.
b) Find two values where $\sin(\theta) = 1$. Use degrees or radians.
c) Which trig functions are positive in quadrant 4? Write them.
d) Which are negative in quadrant 4? Write them.

+3 a) $\theta \neq 0, \pm 180^\circ, \pm 360^\circ, \dots$

+3 b) $90^\circ, 450^\circ, \text{ or } -270^\circ$

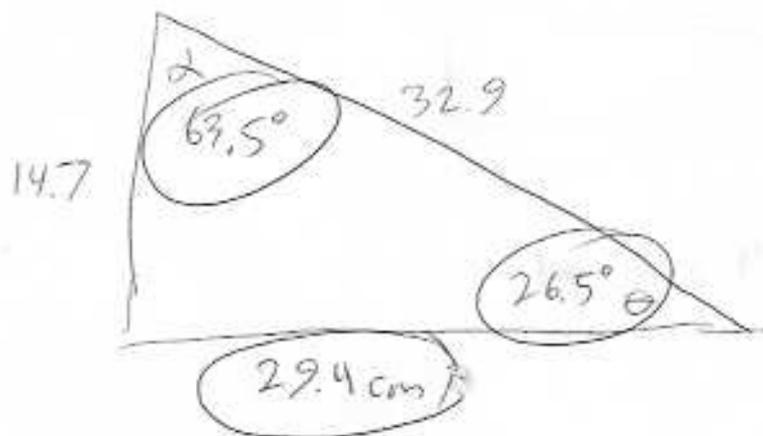
+4 { c) cosine, secant

+4 { d) sine, cosecant, tangent, cotangent

Name:

Key

9) A right triangle has hypotenuse 32.9 cm, and one leg is 14.7 cm. Solve the triangle.



10) Find these values and write answers to 4 decimal places:

- 3 a) $\sin(49^\circ 30')$
 3 b) $\tan(1.33)$
 4 c) $\arccos(0.93)$

a) 0.7604

b) 4.0723

c) 21.565° or 0.376 radians

11) A wheel spins 7.00 revolutions per second. The rim of the wheel moves 2.93 meters per second. Find the diameter. (5 pts)



$$\left(\frac{7}{s}\right)(c) = 2.93 \text{ m/s}$$

$$c = 0.41857$$

$$d = .133 \text{ m}$$

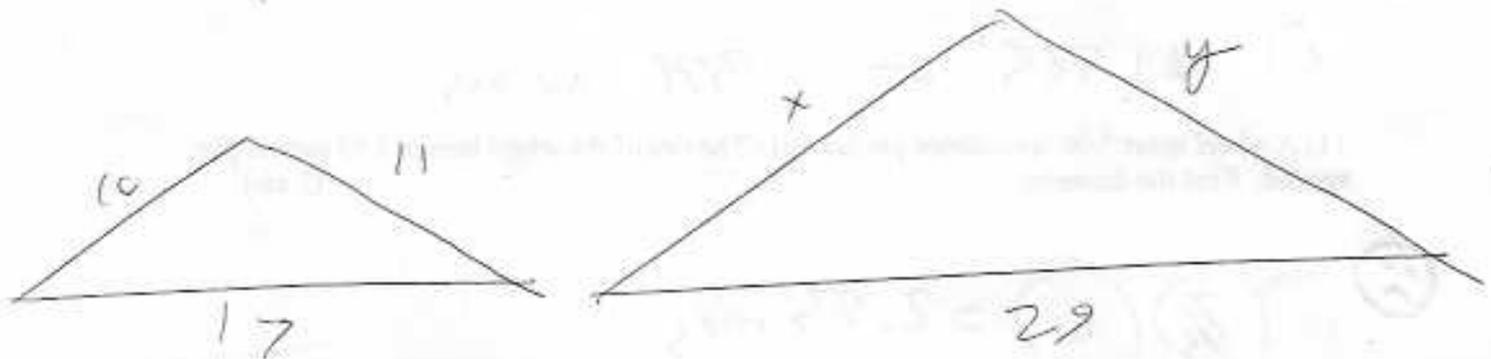
- 12) A sign 100 feet away from you makes an angle of 2.7° . Find the width of the sign. (5 pts)



$$\sin(2.7^\circ) = \frac{x}{100} \quad 4.7 \text{ feet}$$

- 4 13)a) A triangle has sides that are 10 cm, 11 cm, and 17 cm. Is this a right triangle? Write yes or no, and explain your reasoning.
 6 b) The triangle from part (a) is similar to a larger triangle. The longest side on the larger triangle is 29 cm. Find the lengths of the other two sides, rounded to tenths.

No, $10^2 + 11^2 = 221$ $17^2 = 289$
 P.T. does not hold



$$\frac{10}{x} = \frac{17}{29}$$

$$x = 17.1 \text{ cm}$$

$$\frac{11}{y} = \frac{17}{29}$$

$$y = 18.8 \text{ cm}$$