Answer Sheet

1	2π	14	4π
2	$\frac{\pi}{6}$	15	$(0, 4\pi)$
3	$(\frac{\pi}{6}, \frac{13\pi}{6})$	16	Use Graph Paper
4	See GP	17	Use Test Sheet neither
5		18	$y = 25 \sin(120\pi t)$
6	1	19	10.5
7	none	20	0.7
8	$(0, 1)$	21	3 & 7 3 mins
9	See GP	22	50 mph
10		23	Use Test Sheet
11	1	24	Use Test Sheet
12	$(-\frac{1}{2}, \frac{1}{2})$	25	Use Test Sheet
13	Use Graph Paper	26	Use Test Sheet

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East Los Angeles College
Department of Mathematics
Math 241
Test 2

Show your work for credit

$$y = sec\left(x - \frac{\pi}{6}\right)$$

Determine:

1. The period
2. The phase shift, if any.
3. The interval of one cycle.
4. Sketch one cycle of the curve.
5. Sketch the reciprocal cosecant curve.

$$y = 2csc(2\pi x)$$

Determine:

6. The period
7. The phase shift, if any.
8. The interval of one cycle.
9. Sketch one cycle of the curve.
10. Sketch the reciprocal secant curve.

$$y = \tan(\pi x)$$

Determine:

11. Period
12 Interval of one cycle
13. Sketch the curve

$$y = 3cot\left(\frac{1}{4}x\right)$$

Determine:

14. Period
15. Interval of one cycle
16. Sketch the curve

Show that the following functions are even, odd, or neither.

17. $f(x) = x^3 - \cos(x)$

$$f(-x) = (-x)^3 - \cos(-x)$$

$$= -x^3 - \cos(x)$$

$$= -1 \cdot [x^3 + \cos(x)]$$

$$\neq -f(x)$$

ie, f is neither.

Find a function that models the simple harmonic motion having the given properties and assuming displacement is 0 at t=0.

18. Amplitude is 25 cm and frequency is 60 Hz

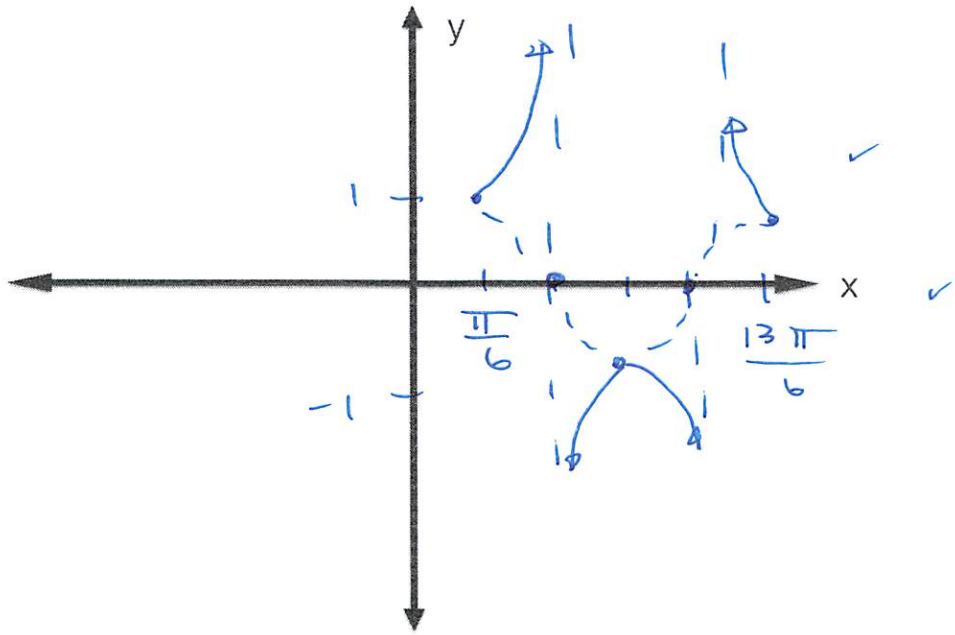
19. Find the arc length that subtends a central angle of 120^o in a circle of radius 5 ft.

20. Determine the area of a sector with central angle of 40^oin a circle of radius 5 meters.

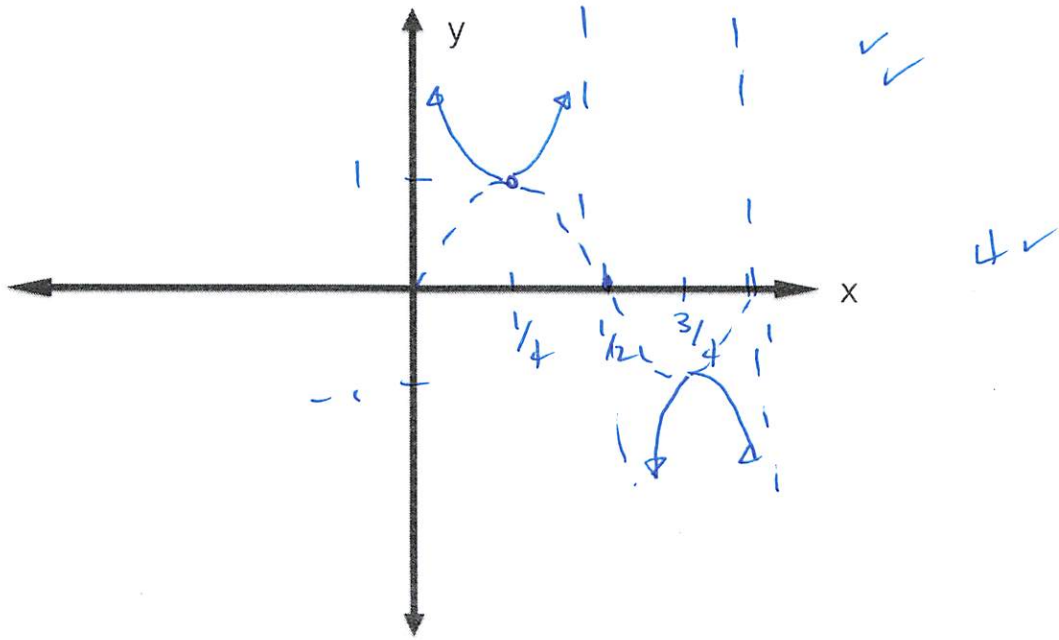
21. City A lies at a latitude 35^oN and City B lies on the same meridian at a latitude of 15^oS. How far apart are the cities?

22. The wheels of car have a 28-inch diameter and are rotating at 600 rpm. Determine the linear speed of the car in miles per hour.

5.



10.



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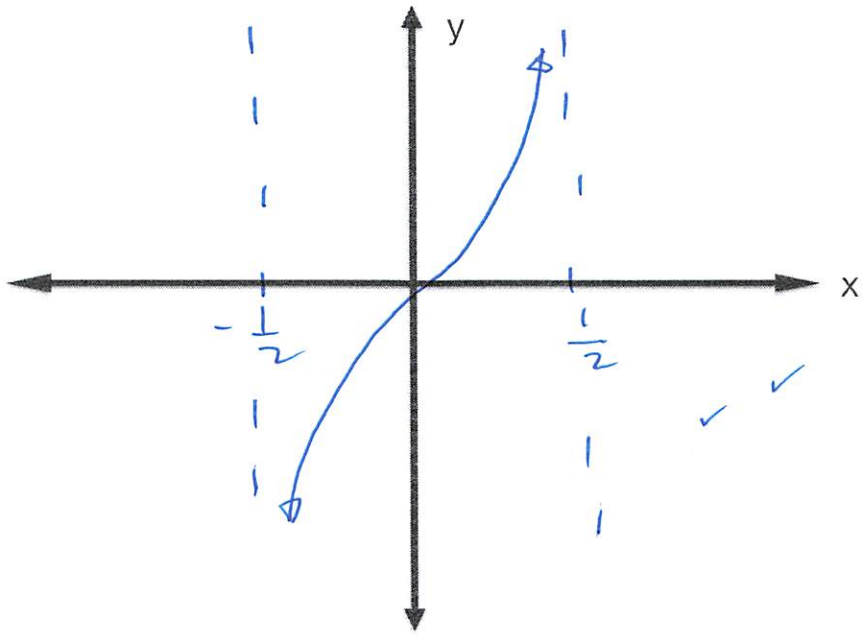

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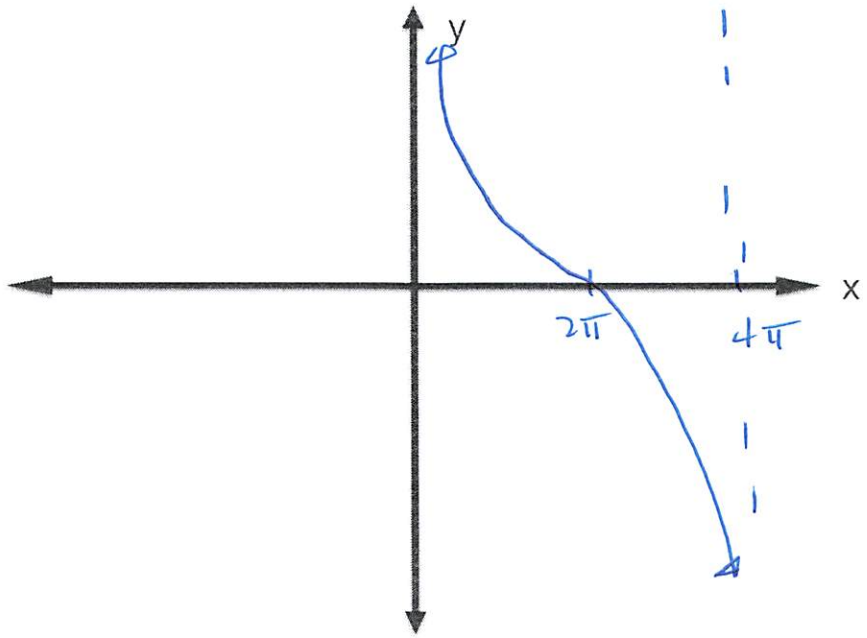
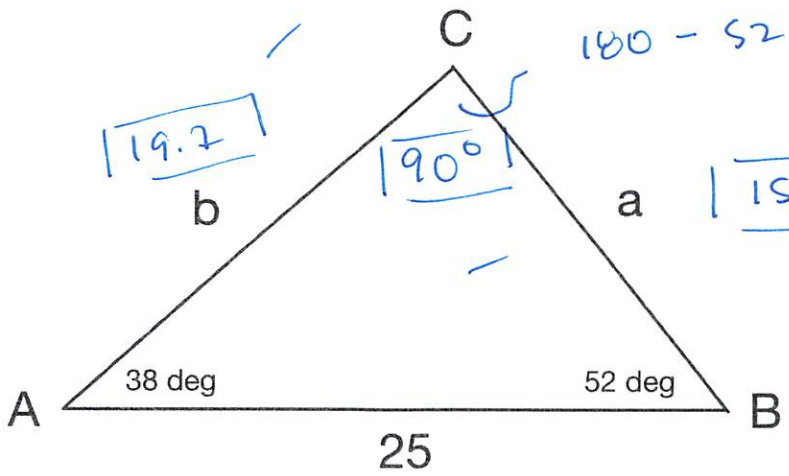


Solve the following triangles

23.



180 − 52 − 38

19.7

90°

15.4

ASA

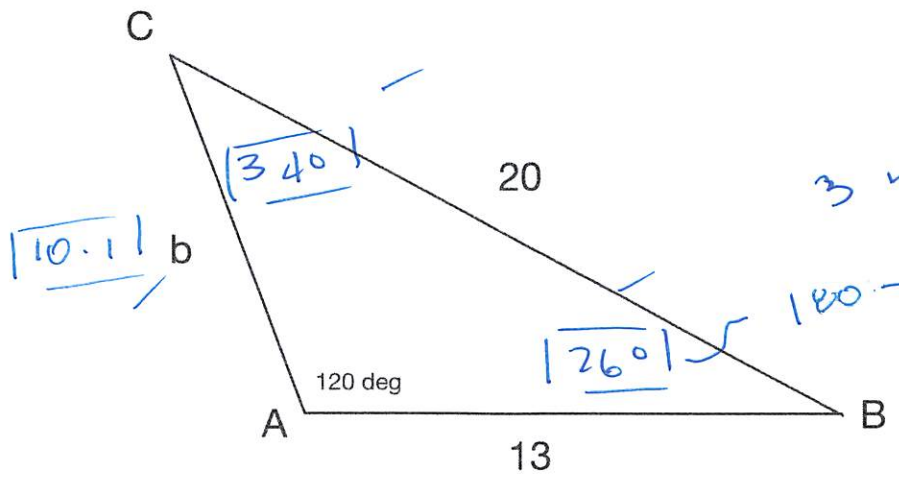
$\frac{\sin(90^\circ)}{25} = \frac{\sin(38)}{a}$ or $a = \frac{25\sin(38^\circ)}{\sin(90^\circ)}$

$a = 15.4$

$\frac{\sin(52)}{b} = \frac{\sin(90^\circ)}{25}$ or $b = \frac{25\sin(52^\circ)}{\sin(90^\circ)}$

$b = 19.7$

24.



SSA

$$\frac{\sin(120)}{20} = \frac{\sin(C)}{13} \quad \text{or} \quad \sin(C) = \frac{13\sin(120)}{20}$$

$$\sin(C) \approx 0.563 \; ; \; C = \sin^{-1}(0.563)$$

$$C_1 \approx 34^\circ \; ; \; C_2 \approx 180 - 34$$

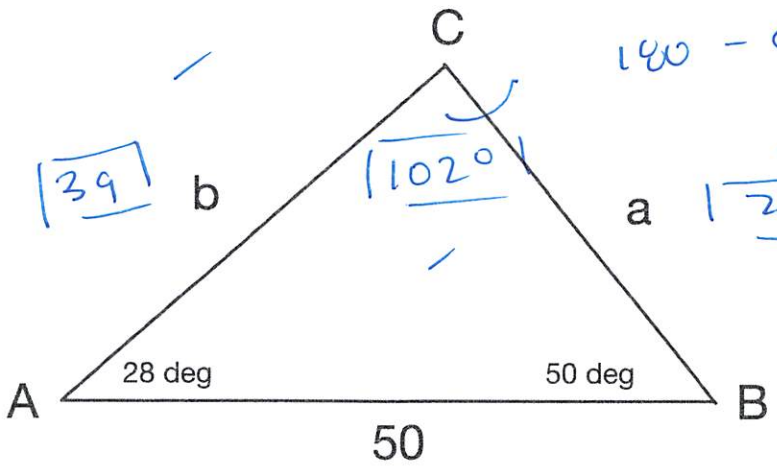
$C_2 \approx 146^\circ$ impossible

$$\frac{\sin(26^\circ)}{b} = \frac{\sin(120^\circ)}{20}$$

$$b = \frac{20\sin(26^\circ)}{\sin(120^\circ)}$$

$$b \approx 10.1$$

25.



180 - 50 - 28

102°

39

24

3

ASA ; Law of Sines:

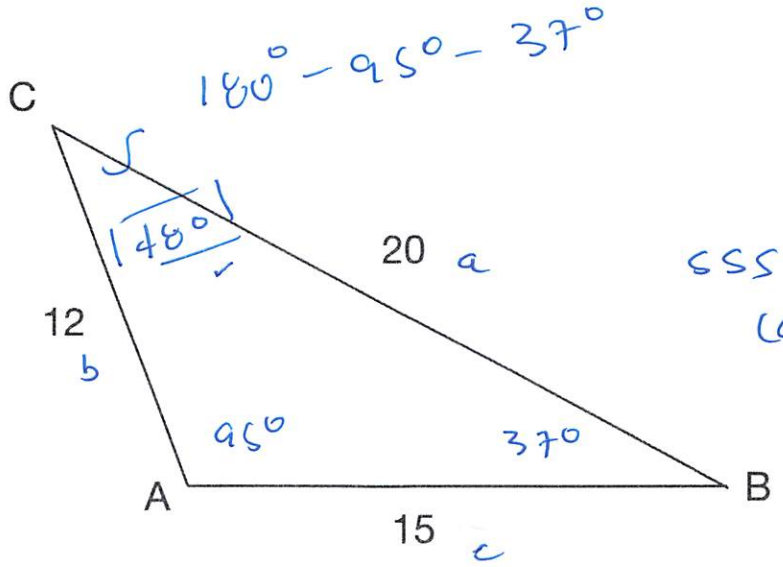
$$\frac{\sin(102^\circ)}{50} = \frac{\sin(28^\circ)}{a} \quad \text{or} \quad a = \frac{50\sin(28^\circ)}{\sin(102^\circ)}$$

$$\boxed{a \approx 24}$$

$$\frac{\sin(50^\circ)}{b} = \frac{\sin(28^\circ)}{24} \; ; \; b = \frac{24\sin(50^\circ)}{\sin(28^\circ)}$$

$$\boxed{b \approx 39}$$

26.



SSS

Law of Cosines

$$\cos(A) = \frac{b^2 + c^2 - a^2}{2bc}$$

$$\cos(A) = \frac{12^2 + 15^2 - 20^2}{2 \cdot 12 \cdot 15}$$

$$A = \cos^{-1}\left(\frac{12^2 + 15^2 - 20^2}{2 \cdot 12 \cdot 15}\right) ; \quad \underline{A \approx 95^\circ}$$

$$\cos(B) = \frac{a^2 + c^2 - b^2}{2 \cdot ac}$$

3 ✓

$$\cos(B) = \frac{20^2 + 15^2 - 12^2}{2 \cdot 20 \cdot 15}$$

$$B = \cos^{-1}\left(\frac{20^2 + 15^2 - 12^2}{2 \cdot 20 \cdot 15}\right) ; \quad \underline{B \approx 37^\circ}$$

math 241 Test 2

(1) $p = \frac{2\pi}{k}$; $p = \frac{2\pi}{1} = 2\pi$

(2) $b = \frac{\pi}{6}$ (3) $(b, b+p)$

$\left(\frac{\pi}{6}, \frac{\pi}{6} + 2\pi\right)$

$\left(\frac{\pi}{6}, \frac{\pi}{6} + \frac{2\pi \cdot 6}{6}\right)$

$\left(\frac{\pi}{6}, \frac{13\pi}{6}\right)$

(4) See Graph paper

(6) $p = \frac{2\pi}{2\pi} = 1$ (7) none

(5) $(0, p) = (0, 1)$ (9) See graph paper

(11) $p = \frac{\pi}{k}$; $p = \frac{\pi}{\pi} = 1$

(12) $\left(-\frac{\pi}{2k}, \frac{\pi}{2k}\right) = \left(-\frac{\pi}{2\pi}, \frac{\pi}{2\pi}\right)$

$= \left(-\frac{1}{2}, \frac{1}{2}\right)$ (13) See Graph

(14) $P = \frac{\pi}{k} = \frac{\pi}{1/4} = 4\pi$

(15) $(0, \frac{\pi}{k}) = (0, \frac{\pi}{1/4})$

$= \boxed{(0, 4\pi)}$

(17) neither

(18) $y = a \sin(\omega t)$

$a = 25 \quad f = \frac{1}{P} = \frac{1}{2\pi/\omega} = \omega/2\pi$

$60 = \frac{\omega}{2\pi}$; $\omega = 60 \cdot 2\pi$

$\omega = 120\pi$

$\boxed{y = 25 \sin(120\pi t)}$

(19) $s = r\theta$; $s = 5 \quad 120^\circ \cdot \frac{\pi}{1500}$

$s = \frac{5 \cdot 120 \cdot \pi}{180} = \frac{5 \cdot 12 \cdot \pi}{18}$

$s = \frac{5 \cdot 12 \cdot 3.14}{15} \approx \boxed{10.5\ m}$

(20) $A = \frac{1}{2} r^2 \theta$

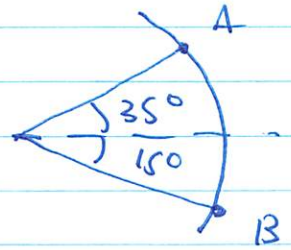
$= \frac{1}{2} 5^2 \cdot 40^\circ$

$= \frac{25}{2} \cdot 40^\circ \cdot \frac{\pi}{180^\circ}$

$= \frac{25 \cdot 40}{2 \cdot 180} \pi$

$= \frac{25 \cdot 40 \cdot 3.14}{2 \cdot 180} \approx \boxed{8.7 \text{ m}^2}$

(21)



$s = r\theta$

$s = 3980 \text{ mi} \cdot 50^\circ$

$s = 3950 \text{ mi} \cdot 50^\circ \cdot \frac{\pi}{180^\circ}$

$s = \frac{3950 \cdot 50 \cdot 3.14}{180}$

$\boxed{s \approx 3473 \text{ miles}}$

(22) $v = r\omega$

$v = 14 \text{ inch} \cdot 600 \frac{\text{rev}}{\text{min}}$

$d = 28 \text{ inch}$

$r = 14 \text{ inch}$

$$v = 14 \cdot 600 \text{ inch} \cdot \frac{\text{rev}}{\text{min}} \cdot \frac{2\pi}{1 \text{ rev}} \cdot \frac{60 \text{ min}}{1 \text{ h}}$$

$$= 14 \cdot 600 \cdot 2\pi \cdot 60 \cdot \frac{\text{inch}}{\text{h}} \cdot \frac{1 \text{ ft}}{12 \text{ inch}}$$

$$= \frac{14 \cdot 600 \cdot 2\pi \cdot 60}{12} \frac{\text{ft}}{\text{h}} \cdot \frac{1 \text{ mi}}{5280 \text{ ft}}$$

$$= \frac{14 \cdot 600 \cdot 2\pi \cdot 60}{12 \cdot 5280} \frac{\text{mi}}{\text{h}}$$

$$\approx \boxed{50 \text{ mph}}$$

Correct	Points
42	150
41	146
40	143
39	139
38	136
37	132
36	129
35	125
34	121
33	118
32	114
31	111
30	107
29	104
28	100
27	96
26	93
25	89
24	86
23	82
22	79
21	75
20	71
19	68
18	64
17	61
16	57
15	54
14	50
13	46
12	43
11	39
10	36
9	32
8	29
7	25
6	21
5	18