TRIGONOMETRY EXAM 1B NAME

Show work as necessary on this test or separate paper.
Turn in all work sheets. (Give answers to nearest hundredth unless specified otherwise.)

1. Express $35^\circ\ 17'\ 47''$ in degrees to the nearest thousandth.

2. Express 120° in radians (exact form!)

3. Express 74° in radians (decimal form).

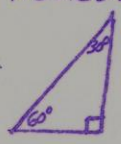
4. Express 1^R in degrees.

5. Find the angular velocity of the hour hand of a clock in radians per hour.

6a) Find the length of the arc s of a circle of radius 42.6 cm. corresponding to an angle of 75°
b) Find the area of the sector. ($A = \frac{1}{2}\theta r^2$)

7. A record is turning at 45 rev. per minute.
a) If the radius is 6 cm., find the linear velocity of a particle of dust on the edge of the record.
E.C. b) How long will it take the dust to travel 100 meters?

8. Label the triangles: a) 

b) 

9. Give exact form. If $\cos\theta = \frac{1}{3}$, find a) $\sin\theta$ b) $\tan\theta$ c) $\sec\theta$.
(Draw triangle, find missing side)

10. If $\sin\theta = -.7$, θ in QIII, find in exact form and decimal form: a) $\cos\theta$ b) $\tan\theta$ c) $\sec\theta$
(No ll. surg.!)

12 Give exact values: a) $\cos 45^\circ$ b) $\cos 315^\circ$ c) $\tan 120^\circ$
d) $\sin 120^\circ$ e) $\tan 90^\circ$ f) $\sin \frac{5\pi}{4}$

13. Give answers to decimal: a) $\sin 38^\circ$ b) $\cos 2.94^R$ c) $\tan \frac{3\pi}{8}$
d) $\frac{8.5 \sin 48.2^\circ}{\sin 38.6^\circ}$ e) $(\sin 45.9^\circ)^2 + (\cos 45.9^\circ)^2$
f) $\cot 98.3^\circ$ g) $\csc 44.9^R$ h) $\frac{1}{\sec \frac{\pi}{8}}$

1.
2.
3.
4.
5.
6a)
b)
7a)
E.C. b.
9a)
b)
c)
10a) ;
b) ;
c) ;
12a)
b)
c)
d)
e)
f)
13a)
b)
c)
d)
e)
f)
g)
h)

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Show all work:

14. How tall is a flagpole that casts a 35m. shadow when the sun is 37° above the horizontal?

In 15-17, derive formulas, given:

$\sin(x+y) = \sin x \cos y + \cos x \sin y$
$\sin(x-y) = \sin x \cos y - \cos x \sin y$
$\cos(x+y) = \cos x \cos y - \sin x \sin y$
$\cos(x-y) = \cos x \cos y + \sin x \sin y$

15. $\sin\left(\alpha + \frac{\pi}{2}\right) =$

16. $\cos\left(\frac{3\pi}{2} - \alpha\right) =$

17. $\tan(\pi - \alpha) =$

In 18-21, graph for $0 \le x \le 2\pi$:

18. $y = \sin x$ 19. $y = \cos x$ 20. $y = \tan x$ 21. $y = \sec x$

TRIG EXAM 1B Solutions

1. $\frac{17}{60} + \frac{47}{3600} + 35 = 35.296^\circ$

2. $120^\circ \times \frac{\pi}{180} = \frac{2\pi}{3}$ R

3. $74^\circ \times \frac{\pi}{180} = 1.29$ R

4. $1\text{R} \times \frac{180^\circ}{\pi\text{R}} = 57.30^\circ$

5. $\frac{1 \text{ Rev}}{12 \text{ hr.}} = \frac{2\pi \text{ R}}{12 \text{ hr}} = \frac{\pi}{6}$ R/hr.

6a) $s = r\theta$ (θ in radians)

$75^\circ = 75^\circ \times \frac{\pi}{180^\circ}$ R

$s = 42.6 \times 75 \times \frac{\pi}{180} = 55.76$ cm.

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

$= \frac{1}{2} \times 75 \times \frac{\pi}{180} \times 42.6^2 = 1187.76 \text{ cm}^2$

7a) $\omega = 45 \frac{\text{Rev}}{\text{min}} = 90\pi$ R/min.

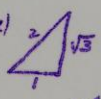
$v = r\omega$

$= 6 \times 90\pi = 1696.46$ cm/min

b) $d = rt$, so $t = \frac{d}{r}$

$t = \frac{100 \text{ m}}{16.9646 \text{ m/min}} = 5.895$ min.

8a) 

b) 

9. $\cos\theta = \frac{1}{3}$ 

$1^2 + x^2 = 3^2$

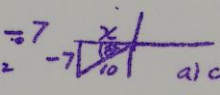
$x^2 = 8$

$x = \pm 2\sqrt{2}$

a) $\sin\theta = \frac{2\sqrt{2}}{3}$

b) $\tan\theta = 2\sqrt{2}$

c) $\sec\theta = 3$

10. $\sin\theta = -\frac{7}{10}$ 

$x^2 + 7^2 = 10^2$

$x^2 = 51$

$x = \pm\sqrt{51} = -\sqrt{51}$

a) $\cos\theta = -\frac{\sqrt{51}}{10}$

b) $\tan\theta = \frac{7}{\sqrt{51}}$

c) $\sec\theta = -\frac{10}{\sqrt{51}}$

12a) $\frac{1}{\sqrt{2}}$ d) $\frac{\sqrt{3}}{2}$

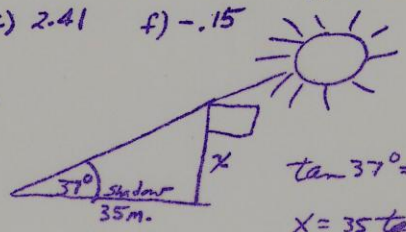
b) $\frac{1}{\sqrt{2}}$ e) ∞

c) $-\sqrt{3}$ f) $-\frac{1}{\sqrt{2}}$

13a) .62 d) 10.16 g) 1.26

b) −.98 e) 1 h) .92

c) 2.41 f) −.15

14. 

$\tan 37^\circ = \frac{x}{35}$

$x = 35 \tan 37^\circ$

$= 26.37$ m.

15. $\sin\left(\alpha + \frac{\pi}{2}\right) = \sin\alpha\cos\frac{\pi}{2} + \sin\frac{\pi}{2}\cos\alpha$

$= \sin\alpha \cdot 0 + 1 \cdot \cos\alpha$

$= \cos\alpha$

16. $\cos\left(\frac{3\pi}{2} - \alpha\right) = \cos\frac{3\pi}{2}\cos\alpha + \sin\frac{3\pi}{2}\sin\alpha$

$= 0 \cdot \cos\alpha + (-1)\sin\alpha$

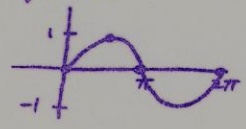
$= -\sin\alpha$.

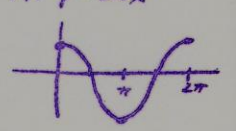
17. $\tan(\pi - \alpha) = \frac{\sin(\pi - \alpha)}{\cos(\pi - \alpha)} =$

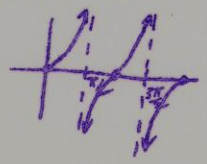
$= \frac{\sin\pi\cos\alpha - \cos\pi\sin\alpha}{\cos\pi\cos\alpha + \sin\pi\sin\alpha}$

$= \frac{0 \cdot \cos\alpha - (-1)\sin\alpha}{-1 \cdot \cos\alpha + 0 \cdot \sin\alpha}$

$= \frac{\sin\alpha}{-\cos\alpha} = -\tan\alpha$.

18. $y = \sin x$ 

19. $y = \cos x$ 

20. $y = \tan x$ 

21. $y = \sec x$