

Show all necessary steps clearly, neatly, and systematically to receive full credit.

1. (3 pts) Convert $20^{\circ}08'12''$ to a decimal in degree. Round to two decimal places.
2. (3 pts) Convert 20.812° to $D^{\circ}M'S''$ form. Round to the nearest second.
3. (3 pts) Convert 215° to radians.
4. (3 pts) Convert $-\frac{11\pi}{6}$ to degrees.
5. (5 pts) Find the remaining five trigonometric functions of the acute angle θ : $\csc \theta = \frac{13}{5}$.

6. (3 pts each) Use the identities and theorem to find exact value.

a. $\tan 35^\circ \sec 55^\circ \cos 35^\circ$

b. $\cos 35^\circ \sin 55^\circ + \cos 55^\circ \sin 35^\circ$

7. (5 pts) Find the exact value.

a. $\sin^2\left(\frac{\pi}{4}\right) \div \tan\left(\frac{\pi}{6}\right) \cdot \sec\left(\frac{\pi}{3}\right)$

b. $\csc^2\left(\frac{\pi}{4}\right) \cos 60^\circ + \tan\left(\frac{\pi}{3}\right)$

8. (5 pts) Solve: $\log_6(x+3) = 1 - \log_6(x+4)$.

9. (5 pts) Solve: $16^x + 4^{x-1} - 3 = 0$.

10. (3,3,6 pts) A circle with radius 32 yards.

a. Find the length of the arc of the circle of radius r subtended by the central angle $\theta = 225^\circ$. Round to two decimal places.

b. Find the area of the sector of the circle of radius r formed by the central angle $\theta = 225^\circ$. Round to two decimal places.

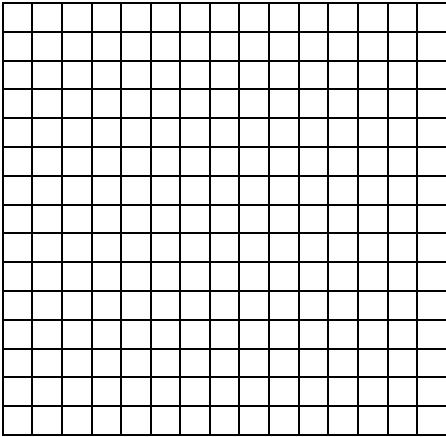
c. If an object takes 5 minutes to travel the distance in part a, find its linear speed and angular speed.

11. (8 pts) How many years will it take for an initial investment of \$25000 to grow to \$80000? Assume a rate of interest of 7% compounded quarterly.

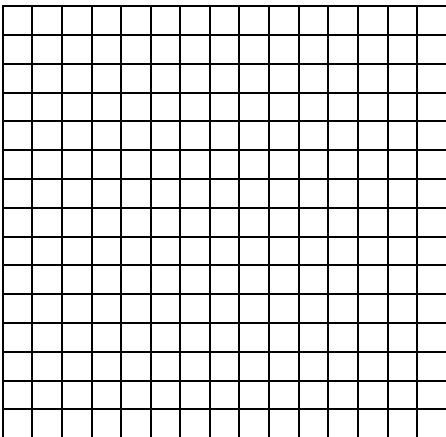
12. (8 pts) Reacting with water in acidic solution at $35^{\circ}C$, sucrose ($C_{12}H_{22}O_{11}$) decomposes into glucose $C_6H_{12}O_6$ and fructose ($C_6H_{12}O_6$) according to the law of uninhibited decay. An initial amount of 0.40 M of sucrose decomposes to 0.36 M in 30 minutes. How much sucrose will remain after 2 hours? How long will it take until 0.10 M of sucrose remains?

13. (5,3 pts) Graph by transformation using $f(x) = \log_3 x$.

a. Graph $f(x) = -\log_3 \left[\frac{1}{2}(x+4) \right] - 5$. Label asymptote.



b. Graph $f^{-1}(x)$ using part a. Label asymptote.



14. (5 pts each) Let $f(x) = \frac{x}{x+1}$, $g(x) = \log(x+1)$, $h(x) = \sqrt{x+3}$.

a. Find domain of $(f \circ h)(x)$.

b. Find domain of $(g \circ f)(x)$.

c. Find domain of $(h \circ f)(x)$.