MTH 111 Practice 3 Answers

1. 8/3
2. $2\sqrt{5/3}$
3. $50e^{.053\cdot 100} = 10017.$
4. $\pi/6$
5. 34.85^o
6. $-4/5$
7. 3π
8. 3/2 units to the left (Note: problem should have read "...y=3cos(2x)")
9. 6
10. $\frac{2\cdot(5/13)(12/13)}{(12/13)^2-(5/13)^2} = 120/119$
11. a) $200e^{.053t}$
b) Solve $500 = 200e^{.053t}$, answer $t = 17.3$ (years)
d) Solve $500 = 200e^{r\cdot 10}$, answer $r = .0916$, so interest rate should be 9.16%.
12. Amplitude of 4 would produce variation of sin(..) between -4 and 4 so use $A = 4$ and $B = 2$ to get variation between -2 and 6. Period is $2\pi/C$ so use $C = \pi$ for period 2. So $f(x) = 4\sin(\pi x - D) + 2$. Now $f(0) = 0$ means that $4\sin(-D) + 2 = 0$ or $\sin(-D) = -2/4 = -1/2$, so use $D = \pi/6$
Answer: $f(x) = 4\sin(\pi x - \frac{\pi}{6}) + 2$.
14 Let θ be the angle subtended by the arc. Then $\sin(\theta) = (8/5)/2 = 4/5$, so we determine that $\theta = .92729$ radians. Since the radius of the circle is 2, the arc has length $2 \cdot .92729 = 1.855$.
15. a) $(1 - \cos t)(1 + \cos t) = 1 - \cos^2 t = \sin^2 t$
b) $\cos^4 x - \sin^4 x = (\cos^2 x - \sin^2 x)(\cos^2 x + \sin^2 x) = \cos^2 x - \sin^2 x = \cos(2x)$.
16. $\sin A = \sqrt{1 - \frac{4}{9}} = \frac{\sqrt{5}}{3}$ and $\cos B = -\sqrt{1 - \frac{9}{16}} = -\frac{\sqrt{7}}{4}$ where we need the minus sign because B is in the second quadrant. Then
a) $\cos(2A) = \frac{4}{9} - \frac{5}{9} = -\frac{1}{9}$ using $\cos(2A) = \cos^2 A - \sin^2 A$
b) $\sin(A + B) = \sin A\cos B + \sin B\cos A = -\frac{\sqrt{5}}{3}\frac{\sqrt{7}}{4} - \frac{3}{4}\frac{2}{3} = -\frac{(\sqrt{35}+6)}{12}$
17. $\sin(75^o) = \sin(30^o)\cos(45^o) + \sin(45^o)\cos(30^o) = \frac{1}{2}\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}\frac{\sqrt{3}}{2} = \frac{\sqrt{2}+\sqrt{6}}{4}$