

Answers to LIFE Final Exam Review

1. $\cos x \sqrt{4 + 5 \sin^4 x}$
2. 93
3. $-\frac{1}{4\pi}$ ft/min
4. $t = \frac{5 \ln(\frac{1}{10})}{\ln(\frac{2}{3})} \approx 28.4$ years
5. $w = \frac{20}{\sqrt{3}}$, $d = \frac{20\sqrt{2}}{\sqrt{3}}$ cm
6. $\left(\frac{3}{\sqrt{265}}\right) \mathbf{i} + \left(\frac{16}{\sqrt{265}}\right) \mathbf{j}$
7. $\cos^{-1}\left(\frac{3}{\sqrt{10}}\right)$
8. $\mathbf{r}(t) = (2t)\mathbf{i} + \left(3 + \frac{3}{2}t\right)\mathbf{j}$
9. $\left(-\frac{\pi}{\sqrt{\pi^2 + 1}}\right) \mathbf{i} + \left(-\frac{1}{\sqrt{\pi^2 + 1}}\right) \mathbf{j}$
10. $y - 1 = -\frac{1}{4e}(x - e)$
11. $-\frac{1}{8}$
12. $a = -3$, $c = 22$
13. $-\frac{1}{4}$
14. $\frac{3}{2}$
15. $\frac{4}{5}$
16. $\left(\frac{9}{4}, \frac{2}{3}\right)$
17. $\frac{1}{2}$
18. $\frac{x}{\sqrt{1 - x^2}}$
19. $f(x) = 3 \sin^{-1} x + 3 \ln x + \frac{1}{6}x^2 + 3 \ln 2 - \frac{\pi}{2} - \frac{1}{24}$
20. f has a relative maximum at the point $(3, 6)$. The tangent line is horizontal and the function is concave down at that point.
21. $\frac{13}{9}$

22. 78

23. $\frac{2}{x} + 4 + 2ex^{2e-1} + \pi^x \ln \pi$

24. $-\frac{1}{2}$

25. $(x^2 - 1)e^{-1/2x^2}$

26. $-\infty$

27. $\frac{\cos(4x) + 8x \sin(4x)}{\cos^3(4x)}$

28. (0, 9)