

More problems for section 4.8 of *Essentials of Precalculus with Calculus Previews* by Zill and Dewar, 6e.

1. Find all solutions t in the interval $(-\infty, \infty)$. Tip: first solve for $\sin t$ or $\cos t$. Then find all solutions t in some interval of length 2π , say $[0, 2\pi)$ or $[-\pi, \pi)$. Then find all solutions in $(-\infty, \infty)$.

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|---|--|---|
| a. $1 - \sin t - 2 \cos^2 t = 0$ | b. $3 \cos t - 2 \sin^2 t = 0$ | c. $\sin^2 t + 3 \sin t + 2 - \cos^2 t = 0$ |
| d. $1 - \cos^2 t = 0$ | e. $\cos^2 t - 3 = 0$ | f. $2 \sin^2 t - 2 \cos^2 t = 1$ |
| g. $2 \cos^2 t - 2 \sin^2 t + 1 = 0$ | h. $2 \sin^2 t - 2 \cos^2 t + 1 = 0$ | i. $\sin^2 t - \cos^2 t = 0$ |
| j. $\sin^4 t - \cos^4 t = 0$ | k. $\sin t \cos^2 t - \sin t = 0$ | l. $\cos^3 t - \cos t = 0$ |
| m. $2 \sin^4 t - 3 \sin^2 t + 1 = 0$ | n. $2 \sin t \cos^2 t - \sin t = 0$ | o. $4 \sin^4 t + \sin^2 t - 3 = 0$ |
| p. $\cos^2 t + 7 \cos t - 3 = \sin^2 t$ | q. $\sin t \cos t - \cos t + \frac{1}{2} \sin t - \frac{1}{2} = 0$ | r. $4 \sin^4 t - \sin^2 t - 3 = 0$ |

Answers

1a. $\sin t = -1/2$ or 1 , $t = \pi/2 + 2\pi n, 7\pi/6 + 2\pi n, 11\pi/6 + 2\pi n$ 1b. $\cos t = -2$ (no sol'ns) or $1/2$, $t = \pi/3 + 2\pi n, 5\pi/3 + 2\pi n$
 1c. $\sin t = -1/2$ or -1 , $t = 3\pi/2 + 2\pi n, 7\pi/6 + 2\pi n, 11\pi/6 + 2\pi n$ 1d. $\cos t = \pm 1$, $t = n\pi$ 1e. $\cos t = \pm\sqrt{3}$ no real sol'ns 1f. $\sin t = \pm\sqrt{3}/2$, $t = \pi/3 + 2\pi n, 2\pi/3 + 2\pi n, 4\pi/3 + 2\pi n, 5\pi/3 + 2\pi n$ 1g. $\cos t = \pm 1/2$, $t = \pi/3 + 2\pi n, 2\pi/3 + 2\pi n, 4\pi/3 + 2\pi n, 5\pi/3 + 2\pi n$.
 1h. $\sin t = \pm 1/2$, $t = \pi/6 + 2\pi n, 5\pi/6 + 2\pi n, 7\pi/6 + 2\pi n, 11\pi/6 + 2\pi n$. 1i. $\sin t = \pm 1/\sqrt{2}$, $t = \pi/4 + 2\pi n, 3\pi/4 + 2\pi n, 5\pi/4 + 2\pi n, 7\pi/4 + 2\pi n$. (This is the same as $t = \pi/4 + n\pi/2$.) 1j. same as part q. 1k. $\sin t = 0$, $t = n\pi$. 1l. $\cos t = 0$ or ± 1 , $t = n\pi/2$. 1m. $\sin t = \pm 1/\sqrt{2}$ or ± 1 , $t = \pi/2 + 2\pi n, 3\pi/2 + 2\pi n, \pi/4 + 2\pi n, 3\pi/4 + 2\pi n, 5\pi/4 + 2\pi n, 7\pi/4 + 2\pi n$. (This is the same as $t = \pi/2 + n\pi, \pi/4 + n\pi/2$.) 1n. $\sin t = 0$ or $\cos t = \pm 1/\sqrt{2}$, $t = \pi/4 + n\pi/2, 2\pi n$. 1o. $\sin t = \pm i$ (no real solns) or $\pm\sqrt{3}/2$, $t = \pi/3 + 2\pi n, 2\pi/3 + 2\pi n, 4\pi/3 + 2\pi n, 5\pi/3 + 2\pi n$. (same as $\pi/3 + n\pi, 2\pi/3 + n\pi$.) 1p. $\cos t = -4$ (no real solns) or $1/2$, $t = \pi/3 + 2\pi n, 5\pi/3 + 2\pi n$. 1q. (group to factor) $\cos t = -1/2$ or $\sin t = 1$, $t = \pi/2 + 2\pi n, 2\pi/3 + 2\pi n, 4\pi/3 + 2\pi n$. 1r. $\sin t = \pm i\sqrt{3}/2$ (no real solns) or ± 1 , $t = \pi/2 + 2\pi n, 3\pi/2 + 2\pi n$. (same as $\pi/2 + n\pi$.)