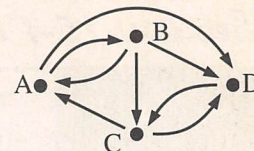
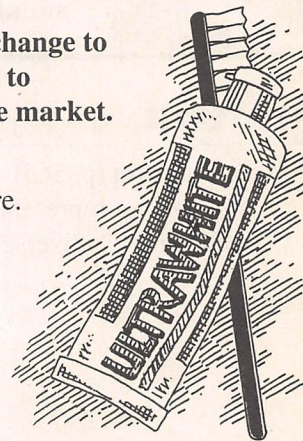


The diagram at the right shows the paths of communication between four computers in an office.



- Write the matrix T that models this network. Label the rows and columns in alphabetical order. Then find T^2 .
- Which computer has the greatest number of two-step paths to it?

Each year 5% of the people that use UltraWhite toothpaste change to another brand and 10% of those using another brand switch to UltraWhite. Currently UltraWhite has 30% of the toothpaste market.



- Write a transition matrix T .
- Write a 1×2 matrix M_0 describing the current market share.
- What will UltraWhite's market share be in 2 years?

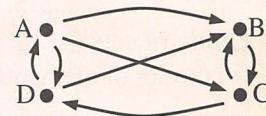
Consider the transformation $T: (x, y) \rightarrow (2x + y, x)$.

- Write the transformation matrix.
- Find the images of $A(0, 0)$, $B(0, 6)$, and $C(8, 0)$.

MIXED REVIEW

Chapters 1–14

- Solve the system $\begin{cases} 8x - 7y = 56 \\ 5x - 4y = 20 \end{cases}$ by using a matrix equation.
- Consider the series $5 + 10 + \dots$. Find the sum of the first 20 terms if the series is (a) arithmetic and (b) geometric.
- Find the measure of $\angle A$ and the area of $\triangle ABC$, given $A(0, 0, 0)$, $B(1, 1, 1)$, and $C(1, -5, 1)$.
- If $z = 2\sqrt{3} - 2i$, find z^8 and the two square roots of z .
- The diagram at the right illustrates a communication network. Find the matrix that represents the number of ways messages can be sent using *at most* one relay.



Evaluate.

- $\sum_{n=1}^{\infty} 4 \cdot \left(-\frac{2}{3}\right)^n$
- $\tan(\cos^{-1} 0.8)$
- $\ln \sqrt[4]{e^5} + \log_4 32$

- The transformation $T: (x, y) \rightarrow (6x - 2y, -3x + y)$ maps every point of the plane onto a line. Find the slope and an equation of the line. Then find the transformation matrix.
- An airplane heading southwest at 500 knots encounters a wind of 50 knots blowing toward the east. Find the resultant speed and direction of the plane.
- Let α and β be acute angles with $\sin \alpha = \frac{3}{5}$ and $\cos \beta = \frac{15}{17}$. Find $\sin(\alpha - \beta)$, $\cos 2\alpha$, and $\sin \frac{1}{2}\beta$.



- Find $\lim_{n \rightarrow \infty} \frac{\sin n\pi}{n}$ and $\lim_{n \rightarrow \infty} \frac{n}{\sin n\pi}$.
- Find the first 6 terms of the sequence defined recursively by $t_1 = 2$, $t_n = t_{n-1} + (2n - 1)$. Find an explicit definition for the sequence.