

MATH HONORS 2: SEMESTER 2 REVIEW - Answers

1) (a) a^{10}

(b) $\frac{7a^4c\sqrt{c}}{b^2}$

(c) $x - y^3$

(d) $\sqrt{x^{9a}}$ (or $x^4\sqrt{x^a}$)

(e) $3a$

2) A shift to the right by 5 units and a shift downwards by 3 units

3) Approximately 7163 (or 7160) people would be expected to visit the island in the year 2010

4) $x = 1.7$

5) \$2818.40 (or \$2818, or \$2820)

6) 1.96 weeks (or 2 weeks)

7) (a) $PQ = \begin{bmatrix} 3 & 2 & -2 & -1 \\ -3 & 3 & 3 & -2 \end{bmatrix}$

(b) Graph

(c) The matrix P caused a reflection across the line $y = x$

8) $X = \frac{2}{3}A^{-1}CB^{-1}$

9) $\begin{bmatrix} 5 & 10 \\ -8 & 10 \end{bmatrix}$

10) $B = \begin{bmatrix} 1 & -3 \\ 2 & -3 \end{bmatrix}$

11) (a) $|A| = 11$

(b) $A^{-1} = \frac{1}{11} \begin{bmatrix} 4 & 1 \\ -3 & 2 \end{bmatrix}$ (or $\begin{bmatrix} \frac{4}{11} & \frac{1}{11} \\ \frac{-3}{11} & \frac{2}{11} \end{bmatrix}$)

(c) A singular matrix means that it has no inverse, occurring when the matrix's determinant is equal to zero. Since the determinant of matrix A is 11 which is not equal to zero, matrix A is non-singular.

12) $m = p, n = q$

13) The augmented matrix $\left[\begin{array}{ccc|c} 3 & -a & 2 & 4 \\ 1 & 2 & -3 & 1 \\ -1 & -1 & 1 & 12 \end{array} \right]$ row reduces to $\left[\begin{array}{ccc|c} 3 & -a & 2 & 4 \\ 0 & 6+a & -11 & -1 \\ 0 & 0 & -2a-1 & 13a+79 \end{array} \right]$.

For a unique solution to exist, $-2a - 1$ is not equal to zero, so $a \neq -\frac{1}{2}$

14) (a) $x = \frac{1}{36}$

(b) $x = \frac{3}{2}$

(c) $x = 10$

(d) $x = 44$

15) 43.2 mg

16) $x = \frac{\ln 18 + 5}{3}$

17) $\frac{-7\pi}{5}$

18) $x = \frac{-\pi}{4}$

19) (a) $x = \frac{5\pi}{8}, \frac{7\pi}{8}$

(b) $x = -\frac{\pi}{4}, -\frac{2\pi}{3}, \frac{\pi}{3}, \frac{3\pi}{4}$

20) Use calculator to check your graph.

21) Proof – answer is given

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23) $A = -2, C = 1$

24) $A = 0.8, B = 0.5, D = -1.2$

25) $\frac{3\sqrt{3}-2}{2\sqrt{3}+3}$ [Hint: use sum identity with $\frac{\cos(\theta+30^\circ)}{\sin(\theta+30^\circ)}$]

26) $\frac{\sqrt{2+\sqrt{3}}-\sqrt{2-\sqrt{2}}}{2}$ [Hint: use half-angle identities]

27) 5.16 degrees

28) 52.6 yards

29) (a) about 90.0 degrees

(b) 51.7 square kilometers

30) 67 ways $[(7 \times 5) + (4 \times 8)]$

31) 37.5% $[6\left(\frac{1}{2}\right)^4]$

32) 51.3% $[(.75)(.60) + (.25)(.25)]$