Question 7

Binomial expansion of $(z-2)^3$

$(z-2)^3 = {}^3C_0(z^3)(-2)^0 + {}^3C_1(z^2)(-2)^1 +$
${}^3C_2(z^1)(-2)^2 + {}^3C_3(z^0)(-2)^3$

$= (1 \times z^3 \times 1) + (3 \times z^2 \times -2) + (3 \times z \times 4) +$
$(1 \times 1 \times -8)$

$= z^3 - 6z^2 + 12z - 8$

Answer = $z^3 - 6z^2 + 12z - 8$

Question 3

Note: Dot product takes in two vectors to give a number while Cross product takes in two vectors and gives a vector.

Therefore all the first three options will return another vector since it is cross product.

Only $(v \times v) \cdot (u \times w)$ will result likely 3.

SOLUTION

Question 4

Geometric Sequence = 0.2, 1, 5, 25 ..., 390625

G.P = ar^{n-1}

last term = nth term = 390625

first term = a = 0.2

Common ratio = $r = \frac{r_2}{r_1} = \frac{r_3}{r_2}$

$r = \frac{1}{0.2} = \frac{5}{1} = 5$

Therefore, $0.2 \times 5^{n-1} = 390625$

divide both sides by 0.2

$5^{n-1} = 1953125$

$5^{n-1} = 5^9$

divide both sides by 5

$n - 1 = 9$

$n = 9 + 1$

$n = 10$

Answer = 10

Question 6

$P \propto \frac{1}{q^2}$

Therefore, $P = \frac{k}{q^2}$ where k = constant

$\therefore k = pq^2$

$p = 8, q = 3$

$k = 8 \times 3^2 = 8 \times 9$

$k = 72$

When $q = 2$, $p = ?$

$\therefore k = pq^2$

$p = \frac{k}{q^2} = \frac{72}{2^2} = \frac{72}{4}$

$p = 18$

Answer = 18