2021 Year 4 Mid-Year Examination Mathematics 2 Answer Key

1 $m \le -30$ or $m \ge 2$

2 $ac < -8$ and $a > 0$.

3 $x = \frac{\pi}{3}$ or $\frac{2\pi}{3}$

4 $\frac{2x^2 + x - 5}{(x-1)^2} = 2 + \frac{5}{(x-1)} - \frac{2}{(x-1)^2}$

5 $x = 5\sqrt{5}$ (or 11.2) or $x = \frac{1}{25}$

6(ii) $-5 < x < \frac{3}{7}$

7(i) $a = 2,\ b = 1$

8 $a = 4,\ b = 3$

9(ii) $\tan A = 2$ or $\tan A = -\frac{1}{2}$

10(ii) $k = 0.638$ (3 s.f)

10(iii) As the temperature of the meat is $14.8^{\circ}C$ and it exceeds $5^{\circ}C$, it has a high risk of bacterial contamination.

11(a) $y = \frac{5\pi}{4} - 1,\quad \frac{7\pi}{4} - 1$

11(b) $x = 48.2^{\circ}, -48.2^{\circ}$

12(a) – 12

13(i) $p = 2$ and $q = -12$

13(iia) No. He is wrong as
Degree of Remainder < Degree of Divisor
Since Divisor is of degree 2, degree of $\mathrm{h}(x)$, which is the remainder, is 1 or 0.

13(iib) $\mathrm{g}(x) = 3x - 2,\ \mathrm{h}(x) = 21x - 14$

14(ii) $d = 4\sqrt{2}\sin(\theta - 45°)$

14(iii) No.

15(i) $\mathrm{g}(x) = -\frac{1}{2}(x-1)^2 + \frac{9}{2}$

15(iii) Largest value of k is 1.

15(iv)

$\mathrm{h}^{-1} : x \mapsto 1 - \sqrt{9 - 2x},\ x \in \mathbb{R},\ 0 < x \le 4.5$

16(i) $\frac{2\pi}{3}$ $\frac{6}{7}$

16(ii) 2

16(iii) $\mathrm{f}(x) = -2\sin 3x - 1$

16(v) 5

17(i) $\frac{3}{2}$ sec

17(iii) $y = 40\cos\left(\frac{4\pi}{3}x\right)$