Paper 2 Answers

1(a) $-1\frac{3}{13}$ (b) $\frac{3x+1}{9}$ (c) $y = \pm\sqrt{\frac{3r-5x}{x}}$ (d) 7

2(a)(i) \$1040 (ii) \$5649.28 (iii) \$128.04

2(b)(i) Interest Rate: 1.45 should be divided by 4 and not 12.

Value of *n*: power n should be 12 and not 3.

2(b)(ii) $\$x\left(1+\frac{1.45\div4}{100}\right)^{12}$ (iii) x = \$12 000

2(b)(iv) Amount = \$12 622

Yes, he should have invested the money compounded on a yearly basis as he would have earned more interest.

3(a) $\begin{pmatrix}159 & 175\\ 230 & 215\\ 205 & 223\end{pmatrix}$ (b) $(8 \quad 25 \quad 12)$ (c) $(9482 \quad 9451)$

3(d) The elements represent the total cost of all shoes to be purchased from Joe Sporting House and Mikasa Sports respectively.

3(e)(i) $\begin{pmatrix}0.9 & 0\\ 0 & 0.85\end{pmatrix}$ (ii) $(8533.8 \quad 8033.35)$

Manager should buy from Mikasa Sports as it is cheaper.

4(a) $8n + 15$ (ii) 8n is a multiple of 4 but 15 is not. Therefore, $8n + 15$ is not a multiple of 4.

4(b)(i) $\frac{1}{5}$ (ii) $k = 9$ (iii) $n = 21$

5(a) $p = 2, q = 2$ (c) gradient $= -1.875$ (d)(ii) $y = 2x - 2$ (d)(iii) $A = -3, \quad B = 4$

6(a) $\frac{100}{x}$ h (b) $\frac{100}{x-10}$ h (d) $x = 50$ or -40 (e) $2\frac{1}{2}$ h

7(a)(i) 39, 45 (ii) 8.28 (iii) 0.950

7(a)(iv) This is because we do not know the exact mass of each infant.

7(a)(v) 90th percentile: Daniel's infant weighs 9.45 kg. Therefore, his infant is obese.

7(b)(i) $\frac{25}{47}$ (ii)(a) $\frac{153}{1081}$ (ii)(b) $\frac{112}{1081}$

8(b) $\angle EVF = 53.6°$ (c) 843 cm^2

9(a) $\angle RBC = 90°$ as tangent *BC* is perpendicular to radius *RB*.

$\therefore \Delta ABC$ is a right-angled triangle (b) 90°

9(c) $\angle ABC = 90°$, $\angle ADR = 90°$ (tangent perpendicular to radius), $\angle BAC$ is common

ΔADR is similar to ΔABC (AA Similarity) (d) 28.2cm^2

10(a) \$7 (b) \$1068.63 (c) Cost of 1 shirt = \$16.71

Amt to charge: sensible amount above \$16.71 To cover labour costs, overheads, earn profit etc.

Answer Key for 2020 4E5N Prelim (E Math paper 1)

1(a) 1.34% , 0.3^2 , $\frac{1}{\pi}$, $\sqrt{2}$

1(b) $\frac{1}{50}$

2(a) $\frac{6x}{y^3} \times x^2y^4 = 6x^3y$

2(bi) $(2^x)^3 = 5^3 = 125$

2b(ii) $\frac{2}{2^x} = \frac{2}{5}$

3(a) $2 \times 3^2 \times 11$

3(b) $x = 2 \times 3^2 \times 5 = 90$

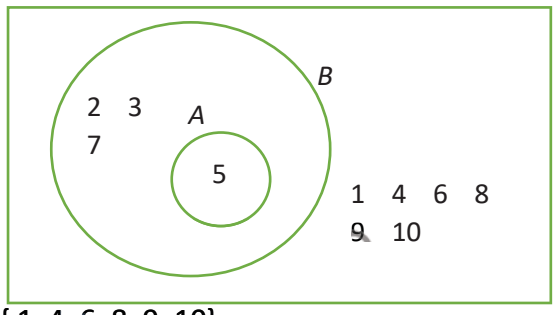
4(a) $(2 + 3x)(1 - 2x)$

(b) $(3xy - 1)(3x - 1)$

5(a) Vertical axis does not start from zero and seems to suggest that the number of students studying in the library in 2018 is three times of 2016

5(b) Disagree. The total enrolment for each year is not given and hence we are unable to calculate the percentage of students studying in the library each year. Thus it is not right to draw such conclusion.

6(a)



6(bi) { 1 ,4, 6, 8, 9, 10}

(bii) {2, 3 , 7}

7a) $k = 5$

7b) $-1 \leq x \leq 3$

8a) $\angle ABC = 180° - 20° = 160°$

8b) $\angle ACB = \frac{180° - 160°}{2} = 10°$

9a) 1 : 25 000

9b) Area = $58 \times 0.0625 = 3.625km^2$

10) $x = \frac{9+y}{12}$

11a) sub (0, -2), c= -2

a =1 , b = 1

11b) $y = (x + \frac{1}{2})^2 - 2\frac{1}{4}$

Turning point $\left(-\frac{1}{2}, -2\frac{1}{4}\right)$

12a) $x = \frac{1.8 \times 64}{9} = 12.8$

12b) 3800 + $\frac{9.5}{100} \times 3800 = 4161$

12c) Profit = $1400

13a) $y = -6$

13b) Equation is $y = -\frac{4}{5} + 4$

13c) $\left(12\frac{1}{2}, -6\right)$

14a) $\angle BAO = 90° - 61° = 29°$

14b) $\angle AOC = 180° - 2(26°) = 128°$

14c) $\angle ABC = 128° \div 2 = 64°$

14d) $\angle CDA = 180° - 64° = 116°$

15a) Radius small cone = $\sqrt[3]{\frac{216}{343}} \times 14 = 12cm$

15b) Area ratio is $6^2 : 7^2 = 36 : 49$

16a) h = 4

16b) $y = 2^3 + 4 = 12$

17a) Median (Science) = 33

17b) $x = 6$

17c) Disagree :

Median for Math is 26 which is lower than 33, hence performed better for Science.

Disagree :

Range (Science) = 39 which is lower than range (Math) , hence more consistent for Science.

18a) 210°

18b) $BC = \sqrt{32^2 + 45^2 - 2(32)(45)cos40°}$

= 29.0 km

18c) $AD = \frac{32sin30°}{sin110°} = 17.0\ km$

18d) Time is 2.22pm or 14 22

19a) $\angle AOB = \frac{11}{48} \times 2\pi = 1.4399$

19b) Radius = 7.36 cm

20a) $y = -6$

20c) Since min value of curve is approx -6.2, when

k< -6.2, there will be no solution.

20di) Line to be inserted is $y = 2x + 4$

20dii) Draw line $y = 2x + 4$

$x = -2.8\ or\ 1.30$