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# **VCE<sup>®</sup> General Mathematics**

## **Unit 3 and 4 Practice Written Examination 1**

# **SOLUTIONS**

**Solution Pathway**

Below are sample answers. Please consider the merit of alternative responses.

| Question | Correct Answer | Explanation                                                                     |
|----------|----------------|---------------------------------------------------------------------------------|
| 1        | B              | $\frac{\sum x}{n} = \frac{7014}{15} = 467.6$                                    |
| 2        | D              | $470 = \frac{7014 + x}{16}$ gives $x = 506$                                     |
| 3        | B              | Range is 882, not an option. IQR is 488                                         |
| 4        | C              | 1.13 and 1.94 is 81.5% of the data, thus 303 puppies                            |
| 5        | B              | $Z = \frac{2.13 - 1.67}{0.27} = 1.7037$                                         |
| 6        | E              | 2 above the mean, and 1 below is 81.5%                                          |
| 7        | B              | 12 data points, between 6 <sup>th</sup> and 7 <sup>th</sup> is the median, 94.5 |
| 8        | B              | $y - 122 = 5.5(x - 19)$ gives $y = 5.5x + 17.5$                                 |
| 9        | A              | $122 - 116 = 6$                                                                 |
| 10       | A              | Positive graph, both variables increasing                                       |
| 11       | E              | After squaring the y values and doing a regression E is the answer              |
| 12       | C              | r value is -0.9370                                                              |
| 13       | E              | At month 6 each year there is a minimum, and the data is on the increase        |
| 14       | C              | Median of 116.5, 80.75, 62.15, 75.16, and 88.75 is 80.75                        |
| 15       | B              | $4 - (1.31 + 0.57 + 1.08) = 1.04$                                               |
| 16       | B              | $deseasonalised = \frac{216}{1.08} = 200$                                       |
| 17       | D              | After 7 steps D is the answer                                                   |
| 18       | A              | $\frac{36000}{3} = 12000, \frac{7100}{12000} = 0.59166$                         |

|           |          |                                                                                                                                                                                                                                            |
|-----------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>19</b> | <b>A</b> | $\text{simple: } 19000 + \left( \frac{19000 \times 6.3 \times 2}{100} \right) = 21394$ $\text{complex: } 19000 \left( 1 + \frac{\frac{5.7}{12}}{100} \right)^{24} = 21288.5439$                                                            |
| <b>20</b> | <b>A</b> | $\left[ \left( 1 + \frac{5.7}{100(12)} \right)^{12} - 1 \right] 100 = 5.8513$                                                                                                                                                              |
| <b>21</b> | <b>C</b> | $(1.00525 - 1) \cdot 12 \cdot 100 = 6.3$                                                                                                                                                                                                   |
| <b>22</b> | <b>D</b> | <p>Setting interest as 6.3, payment as 5824.30, future value as 0 and initial as -873654 gives the amount owing before the last payment as 4597.48</p> <p>Setting 4597.48 as the initial for 1 period gives a final payment of 4621.62</p> |
| <b>23</b> | <b>C</b> | The setting from question 22, show 296 months, that is 24 years 8 months                                                                                                                                                                   |
| <b>24</b> | <b>A</b> | 1645 is the interest earned of the initial value, thus perpetuity                                                                                                                                                                          |
| <b>25</b> | <b>D</b> | Inverse of A is $\begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$ , the same as the transpose of D                                                                                                                       |
| <b>26</b> | <b>E</b> | Subbing in 1,1 into any position gives E as the only option                                                                                                                                                                                |
| <b>27</b> | <b>C</b> | Product being multiplication gives C                                                                                                                                                                                                       |
| <b>28</b> | <b>D</b> | When adding the 2-steps gives A=1, B=5, C=0 and D=2, second is D                                                                                                                                                                           |
| <b>29</b> | <b>A</b> | 60% survive birth not 40%                                                                                                                                                                                                                  |
| <b>30</b> | <b>B</b> | $30 \times .1 = 3$                                                                                                                                                                                                                         |
| <b>31</b> | <b>A</b> | A has the highest total percentage                                                                                                                                                                                                         |
| <b>32</b> | <b>D</b> | After 3 weeks S3 is, $s_3 = \begin{bmatrix} 1026 \\ 624 \end{bmatrix}$                                                                                                                                                                     |
| <b>33</b> | <b>D</b> | Euler's formula is $v + f = e + 2$ , $v = 6 - 3 + 2 = 5$                                                                                                                                                                                   |
| <b>34</b> | <b>D</b> | Graph has a Euler trail, Hamiltonian Path and Hamiltonian Cycle                                                                                                                                                                            |
| <b>35</b> | <b>A</b> | Min spanning tree is 91                                                                                                                                                                                                                    |

|           |          |                                                                                                                              |
|-----------|----------|------------------------------------------------------------------------------------------------------------------------------|
| <b>36</b> | <b>E</b> | Min cut is cut 5, thus the max flow                                                                                          |
| <b>37</b> | <b>B</b> | Shortest path is $9+12+18$                                                                                                   |
| <b>38</b> | <b>E</b> | Solving results in David with Air Hockey, Seth with Downball, Jess with Cricket, Mark with E-Sports and Remi with basketball |
| <b>39</b> | <b>A</b> | I is preceded by F and B, which is $4+12=16$                                                                                 |
| <b>40</b> | <b>C</b> | To get to 40, reducing C by 3, and k by 2 is 2100                                                                            |

## Quick Marking Grid

| Question  |          |          |          |          |          | Question  |          |   |          |          |   | Question  |          |          |          |          |          | Question  |          |          |          |          |          |
|-----------|----------|----------|----------|----------|----------|-----------|----------|---|----------|----------|---|-----------|----------|----------|----------|----------|----------|-----------|----------|----------|----------|----------|----------|
| <b>1</b>  | A        | <b>B</b> | C        | D        | E        | <b>17</b> | A        | B | C        | <b>D</b> | E | <b>25</b> | A        | B        | C        | <b>D</b> | E        | <b>33</b> | A        | B        | C        | <b>D</b> | E        |
| <b>2</b>  | A        | B        | C        | <b>D</b> | E        | <b>18</b> | <b>A</b> | B | C        | D        | E | <b>26</b> | A        | B        | C        | D        | <b>E</b> | <b>34</b> | A        | B        | C        | <b>D</b> | E        |
| <b>3</b>  | A        | <b>B</b> | C        | D        | E        | <b>19</b> | <b>A</b> | B | C        | D        | E | <b>27</b> | A        | B        | <b>C</b> | D        | E        | <b>35</b> | <b>A</b> | B        | C        | D        | E        |
| <b>4</b>  | A        | B        | <b>C</b> | D        | E        | <b>20</b> | <b>A</b> | B | C        | D        | E | <b>28</b> | A        | B        | C        | <b>D</b> | E        | <b>36</b> | A        | B        | C        | D        | <b>E</b> |
| <b>5</b>  | A        | <b>B</b> | C        | D        | E        | <b>21</b> | A        | B | <b>C</b> | D        | E | <b>29</b> | <b>A</b> | B        | C        | D        | E        | <b>37</b> | A        | <b>B</b> | C        | D        | E        |
| <b>6</b>  | A        | B        | C        | D        | <b>E</b> | <b>22</b> | A        | B | C        | <b>D</b> | E | <b>30</b> | A        | <b>B</b> | C        | D        | E        | <b>38</b> | A        | B        | C        | D        | <b>E</b> |
| <b>7</b>  | A        | <b>B</b> | C        | D        | E        | <b>23</b> | A        | B | <b>C</b> | D        | E | <b>31</b> | <b>A</b> | B        | C        | D        | E        | <b>39</b> | <b>A</b> | B        | C        | D        | E        |
| <b>8</b>  | A        | <b>B</b> | C        | D        | E        | <b>24</b> | <b>A</b> | B | C        | D        | E | <b>32</b> | A        | B        | C        | <b>D</b> | E        | <b>40</b> | A        | B        | <b>C</b> | D        | E        |
| <b>9</b>  | <b>A</b> | B        | C        | D        | E        |           |          |   |          |          |   |           |          |          |          |          |          |           |          |          |          |          |          |
| <b>10</b> | <b>A</b> | B        | C        | D        | E        |           |          |   |          |          |   |           |          |          |          |          |          |           |          |          |          |          |          |
| <b>11</b> | A        | B        | C        | D        | <b>E</b> |           |          |   |          |          |   |           |          |          |          |          |          |           |          |          |          |          |          |
| <b>12</b> | A        | B        | <b>C</b> | D        | E        |           |          |   |          |          |   |           |          |          |          |          |          |           |          |          |          |          |          |
| <b>13</b> | A        | B        | C        | D        | <b>E</b> |           |          |   |          |          |   |           |          |          |          |          |          |           |          |          |          |          |          |
| <b>14</b> | A        | B        | <b>C</b> | D        | E        |           |          |   |          |          |   |           |          |          |          |          |          |           |          |          |          |          |          |
| <b>15</b> | A        | <b>B</b> | C        | D        | E        |           |          |   |          |          |   |           |          |          |          |          |          |           |          |          |          |          |          |
| <b>16</b> | A        | <b>B</b> | C        | D        | E        |           |          |   |          |          |   |           |          |          |          |          |          |           |          |          |          |          |          |