|  |
| --- |
| Mathematics 3200 TestChapter 3: Polynomial Functions |
|  |
| NAME:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |
| SECTION A: Selected Response. Place the LETTER of your response in the \_\_\_\_ at the right. | 12 pts |
|  |
| 1. | Which represents a quartic polynomial function with leading coefficient negative and with one zero of multiplicity 2 and two zeroes of multiplicity 1? | 1.\_\_\_\_\_\_ |
|  |  |  |
|  | A |  | B |  |
|  | C |  | D |  |
|  |
|  |
| 2. | Which value of N is correct in the synthetic division shown | 2.\_\_\_\_\_\_ |
|  |  |  |  |  |
|  | A | -2 | B | -20 |
|  | C | 12 | D | 16 |
|  |
| 3. | What is the remainder when $(4x^{4}-7x^{3}+x-2)$ is divided by $x+1$ | 3.\_\_\_\_\_\_ |
|  |  |  |
|  | A | $$-14$$ | B | $$-4$$ |
|  | C | $$8$$ | D | $$12$$ |
|  |
| 4. | A cubic polynomial function has the following characteristics: P(-2) = 0, P(3) = 0, P(1) = 0 and P(2) > 0Which description for this function is correct? | 4.\_\_\_\_\_\_ |
|  |  |  |
|  | A | Negative leading coefficient and negative y-intercept |
|  | B | Negative leading coefficient and positive y-intercept |
|  | C | Positive leading coefficient and negative y-intercept |
|  | D | Positive leading coefficient and positive y-intercept |
|  |
|  |
| 5. | Given that $x-3$ is a factor of $x^{4}+kx^{3}-7x²+22x+6k$, what is the value of $k$ | 5.\_\_\_\_\_\_ |
|  |  |  |
|  | A | $$-\frac{16}{11}$$ | B | $$\frac{16}{11}$$ |
|  | C | $$-\frac{22}{9}$$ | D | $$\frac{22}{9}$$ |
|  |
| 6. | Which equation represents the graph shown?  |  | 6.\_\_\_\_\_\_ |
|  |  |  |
|  | A | $$y=\left(x-4\right)\left(x-1\right)^{2}(x+1)$$ |
|  | B | $$y=-\left(x-4\right)\left(x-1\right)^{2}(x+1)$$ |
|  | C | $$y=\left(x+4\right)\left(x+1\right)^{2}(x-1)$$ |
|  | D | $$y=-\left(x+4\right)\left(x+1\right)^{2}(x-1)$$ |
|  |  |  |
|  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| 7. | According to the Intergal Zeroes Theorem, which is not a possible integral zero of $$P\left(x\right)=x^{3}+7x²-12x+24$$ | 7.\_\_\_\_\_\_ |
|  |  |  |
|  | A | -4 | B | 9 |
|  | C | 3 | D | -8 |
|  |  |  |  |  |
|  |
| 8. | When a polynomial *P*(*x*) is divided by $(x-2)$, the quotient is $(x²-4x+6)$ and the remainder is $-7$. What is the polynomial? | 8.\_\_\_\_\_\_ |
|  |  |  |
|  | A | $$x^{3}-6x^{2}+14x-5$$ | B | $$x^{3}-6x^{2}+7x+2$$ |
|  | C | $$x^{3}-6x²+14x-19$$ | D | $$x^{3}-6x²+21x-26$$ |
|  |
| 9. | The graph of $P\left(x\right)=ax^{5}+bx^{3}+cx²+dx+e$. Which statement about the values of *a* and *e* is correct? | 9.\_\_\_\_\_\_ |
|  |  |  |  |  |
|  | A | $a>0$ and $e<0$ |  |  |
|  | B | $a>0$ and $e>0$ |  |  |
|  | C | $a<0$ and $e<0$ |  |  |
|  | D | $a<0$ and $e>0$ |  |  |
|  |  |  |  |  |
| 10. | Which interval describes where the function is negative? | 10.\_\_\_\_\_\_ |
|  |  |
|  |  |
|  | A | $$x\in \left(-\infty ,-4\right)∪\left(0,2\right)∪(6,\infty )$$ |  |  |
|  | B | $$x\in \left(-\infty ,-4\right]∪\left[0,2\right]∪[6,\infty )$$ |  |  |
|  | C | $$x\in \left(-4,0\right)∪\left(2,6\right)$$ |  |  |
|  | D | $$x\in \left[-4,0\right]∪[2,6]$$ |  |  |
|  |
|  |
| 11. | Which statement about $P\left(x\right)=-x^{5}+5x^{3}-4 $is false? | 11.\_\_\_\_\_\_ |
|  |  |  |  |  |
|  | A | The end behaviour of its graph is “up in quadrant 2 and down in quadrant 4”. |
|  | B | It is an odd function. |
|  | C | It has a zero at $x=1$ |
|  | D | The y-intercept is (0, -4) |
|  |
| 12. | What are the zeroes of the function $P\left(x\right)=x^{3}-3x²-16x+48$ | 12.\_\_\_\_\_\_ |
|  |  |  |  |  |
|  | A | $x=3$, $x=\pm 4$ | B | $x=-3$, $x=\pm 4$ |
|  | C | $x=-4$, $x=\pm 3$ | D | $x=4$, $x=\pm 3$ |

|  |
| --- |
| Section B: Asnwer ALL questions in the space provided. Algebraic methods are required. Full credit will only be awarded if correct answers are supported by appropriate workings. |
|  |  |
| 1. | Algebraically determine the zeroes of the polynomial function $P\left(x\right)=x^{3}-x²-14x+24$ | 4 pts |
|  |  |
|  |  |
|  |  |
| 2. | Complete the following for the polynomial function $P\left(x\right)=-2x^{4}-10x^{3}+8x²+40x$ | 10 pts |
|  |  |
|  | (a) | Describe the end behaviour of this function. |  |
|  | (b) | Algebraically determine all intercepts |  |
|  | (c) | Create a sign table to show where the function is positive and where it is negative. |  |
|  | (d) | Sketch its graph on the axes provided, labelling all intercepts. |  |
|  |  |  |
| 3. | The polynomial function $P\left(x\right)=4x^{4}-7x^{3}+mx^{2}+nx+6$ has $\left(x-1\right)$ as one of its factors. When it is divided by $\left(x+1\right)$, the remainder is 30. Algebraically determine the values of $m$ and $n$. | 4 pts |
|  |  |  |  |  |
|  |  |  |  |  |
| 4. | An open top box is made from a 16 m by 12 m rectangular piece of sheet metal by cutting congruent squares of length $x $from each corner and folding up the sides. Identify any restrictions on $x$ and algebraically determine what size squares must be removed to produce a box with a volume of $192 m^{3}$. | 6 pts |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |