SM 3H

# Review for Unit 1 Test

2023-2024

SCORE: /

Name _____ Date _____ Period _____

**Describe the end behavior of each polynomial using limit notation, without using a graphing calculator.**

1. $f(x)=(x+3)(x-1)(2x-5)$

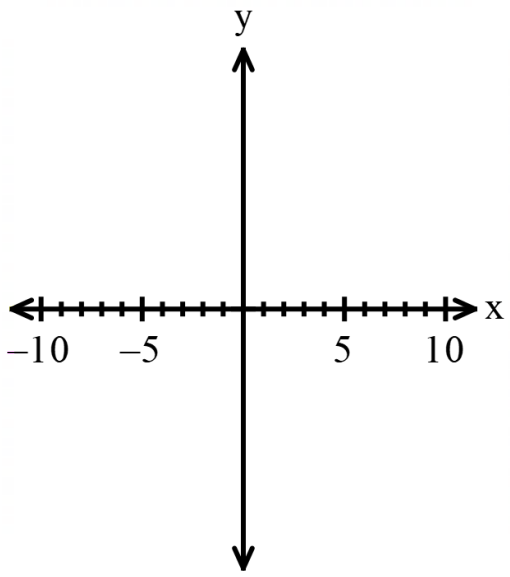
2. $f(x)=-(x+4)^2(x-2)$

3. $f(x)=-2x^3-3x^2+36x-58$

4. $f(x)=3x^4-7x^3+16x^2-15x+65$

**State the degree and list the zeros of the polynomial. State the multiplicity of each zero and determine whether the graph crosses or touches the x-axis at the corresponding x-intercept. Then sketch a graph.**

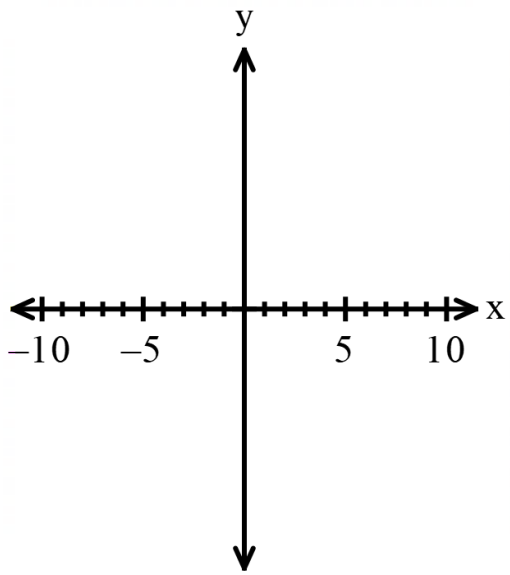
5. $f(x)=-2x^5(x-7)$ Degree: _____




| Zero | Multiplicity | Touch/Cross |
|---|---|---|
| | | |
| | | |

$\lim_{x\to-\infty} f(x)=$ $\lim_{x\to+\infty} f(x)=$

6. $f(x)=(x-1)^2(x-4)^3(x+3)^2$ Degree: _____




| Zero | Multiplicity | Touch/Cross |
|---|---|---|
| | | |
| | | |
| | | |

$\lim_{x\to-\infty} f(x)=$ $\lim_{x\to+\infty} f(x)=$

**Multiply the expression using the polynomial identities.**

7. $(2x+3y)^2$

8. $(2x-y)^3$

9. $(x-5)(x+6)$

10. $(4x+3i)(4x-3i)$

**Factor the expressions using the polynomial identities.**

11. $64x^2-25$

12. $x^3-125$

13. $x^2-4x-21$

14. $-9x^2+39x+30$

**Use the quadratic formula to solve each equation. Show work!**

15. $x^2 - 17x = -72$

16. $5x^2 - 3x + 1 = 0$

**Simplify the expression. Show work!**

17. $(x+5)(2x-1) - (3x^2 - 16x + 3)$

**Divide *f(x)* by *d(x)* using long division. *W*rite answer in fraction form. According to the Factor Theorem, is $d(x)$ a factor of $f(x)$? Show work!**

18. $f(x) = 2x^3 - 3x^2 + 4x - 8, \quad d(x) = x - 1$ Yes or No

**Divide using synthetic division. Write answer in fraction form. Show work!**

19. $\dfrac{2x^3 + 3x^2 + 4x - 10}{x + 1}$

**Write an equation in factored form and standard form for the function with the given zeros. Show work! (Remember an equation must include the $f(x)$.)**

20. $x=3,\ x=-5,\ x=0$

Factored Form: _____

Standard Form: _____

**Factor to find the zeros of each of the following polynomials.**

21. $f(x) = -x^3 - 4x^2 - 3x$

22. $f(x)=x^2-6x-16$

**Use the Rational Zeros Theorem to write a list of all potential rational zeros. Show work!**

23. $f(x)=3x^3+43x^2+43x+27$

**Using the given zero, find all of the zeros and write a factored form of *f(x)*. Show work!**

24. $3i,$ is a zero of $f(x)=x^4-x^3+7x^2-9x-18$

**Write a polynomial function of minimum degree in standard form with real coefficients whose zeros include those listed. Show work!**

25. $x=-2,\ x=1+2i$

**26. Find all of the real zeros of the function, finding exact values whenever possible. Identify each zero as rational or irrational. Write the function in factored form. Show work!**

$f(x)=x^3+x^2-2x-2$

| Zeros | Rational/Irrational |
|---|---|
| | |
| | |
| | |
| | |

**Factored form: _____**

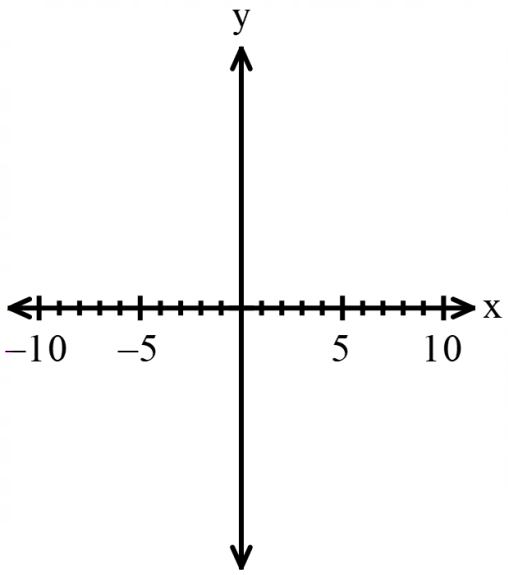
**27. Write a polynomial function of minimum degree in <u>factored form</u> with real coefficients whose zeros and their multiplicities include those listed. Find the <u>degree of the polynomial</u>, the <u>*x*-intercepts</u>, <u>end behaviors</u> (using limit notation) and <u>sketch the graph.</u> Show work!**

leading coefficient: $-3$

$x = 0$ (multiplicity 1)

$x = 2$ (multiplicity of 2),

$x = -1$ (multiplicity of 1)




Factored form: _____

Degree: _____

End behaviors (write using limit notation):

_____ _____

$x$-intercepts (write as ordered pair): _____

**28. Use synthetic division to see if the given values are upper bounds, lower bounds, or neither one. Explain how you know.**

$f(x) = 2x^3 - 3x^2 + x - 4$

a) $k = -2$ b) $k = 3$