

Unit 3 Practice Test

The following formulas will be provided on the quiz.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

$$a^2 + b^2 = c^2$$

Problems 1 – 4: Find the discriminant, number of solutions, and type of solution(s).

1. $5x^2 + 6x - 1 = 0$

2. $9x^2 - 42x + 49 = 0$

3. $x^2 - 2 = x$

4. $3x^2 = x - 8$

Discriminant = _____

Discriminant = _____

Discriminant = _____

Discriminant = _____

Number of Solutions = _____

Number of Solutions = _____

Number of Solutions = _____

Number of Solutions = _____

Type of Solutions _____

Type of Solutions _____

Type of Solutions _____

Type of Solutions _____

Problems 5 – 6: Find all possible rational roots for each polynomial function.

5. $f(x) = 9x^3 + 3x^2 - x + 5$

6. $f(x) = 3x^3 + x^2 - 7x + 6$

7. Which answer contains all zeros for $f(x) = 3x^3 - 2x^2 - 9x - 4$

A. $x = 4, x = \frac{5 + \sqrt{23}}{6}, x = \frac{5 - \sqrt{23}}{6}$

B. $x = -1, x = \frac{5 + \sqrt{73}}{6}, x = \frac{5 - \sqrt{73}}{6}$

C. $x = 1, x = \frac{5 + \sqrt{23}}{6}, x = \frac{5 - \sqrt{23}}{6}$

October 1, 2015

8. Which answer contains all zeros for $f(x) = 2x^3 + 5x^2 - 2x + 3$

A. $x = 1, x = \frac{1 + \sqrt{7}}{4}, x = \frac{1 - \sqrt{7}}{4}$

B. $x = -1, x = \frac{1 + i\sqrt{7}}{4}, x = \frac{1 - i\sqrt{7}}{4}$

C. $x = -3, x = \frac{1 + i\sqrt{7}}{4}, x = \frac{1 - i\sqrt{7}}{4}$

D. $x = -3, x = \frac{-1 + i\sqrt{7}}{4}, x = \frac{-1 - i\sqrt{7}}{4}$

9. Given $P(x) = 3x^3 + 5x^2 + 4x + 2$ evaluate $P(\frac{1}{3})$ 10. Determine whether $(x + 4)$ is a factor of $P(x) = 2x^3 + 10x^2 + 5x - 12$ Find the root of $P(x)$? _____ Find the zero of $P(x)$? _____ x -intercept? _____

11. Solve the equation by factoring.

$$x^3 - 5x^2 - 24x = 0$$

12. Solve the equation by factoring.

$$x^4 - 13x^2 + 36 = 0$$

13. Factor $x^3 + 8$

14. Factor $8y^3 - 27$

15. Find the following for each polynomial.

$$f(x) = 4x^7 + 5x^4 + 2$$

$$f(x) = -7x^6 + 2x^2 - 3x$$

Degree: _____

Degree: _____

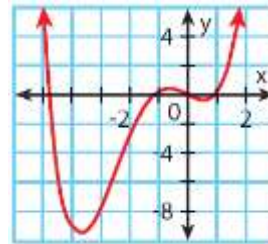
Leading Coefficient: _____

Leading Coefficient: _____

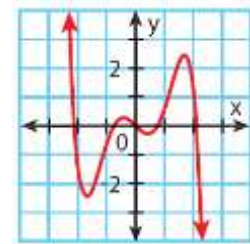
End Behavior: _____

End Behavior: _____

16. Identify whether each graph has an odd or even degree and a positive or negative leading coefficient.



Degree: _____



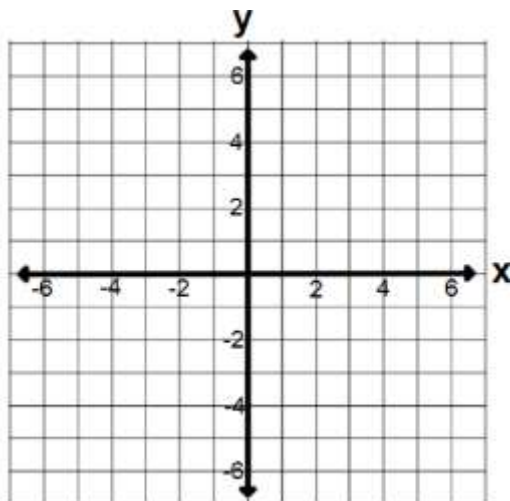
Degree: _____

Leading Coefficient: _____ Leading Coefficient: _____

Equation	Solution (zeros)	x -int.	Multiplicity for each zero	Graph at x -axis	End Behavior	Maximum turning points
#17 $P(x) = (x-1)^2(x-3)$				(Use BOX 1)	Degree = _____ Leading Coefficient = _____ Graph Comparison (circle one) $y = x^2$ / $y = -x^2$ / $y = x^3$ / $y = -x^3$ End Behavior (Use BOX 2): _____	
#18 $P(x) = \frac{1}{12}(x+2)^2(x-3)^2$				(Use BOX 1)	Degree = _____ Leading Coefficient = _____ Graph Comparison (circle one) $y = x^2$ / $y = -x^2$ / $y = x^3$ / $y = -x^3$ End Behavior (Use BOX 2): _____	

BOX 1	Determine if the graphs do one of the following at the given x-intercepts.	
	A: The graph crosses the x -axis at the x -intercept. (ODD MULTIPLICITY)	
	B: The graph touches the x -axis and turns around at the x -intercept. (EVEN MULTIPLICITY)	
BOX 2	C: As $x \rightarrow +\infty, f(x) \rightarrow +\infty$ (Rises Right)	E: As $x \rightarrow +\infty, f(x) \rightarrow -\infty$ (Falls Right)
	D: As $x \rightarrow -\infty, f(x) \rightarrow +\infty$ (Rises Left)	F: As $x \rightarrow -\infty, f(x) \rightarrow -\infty$ (Falls Left)

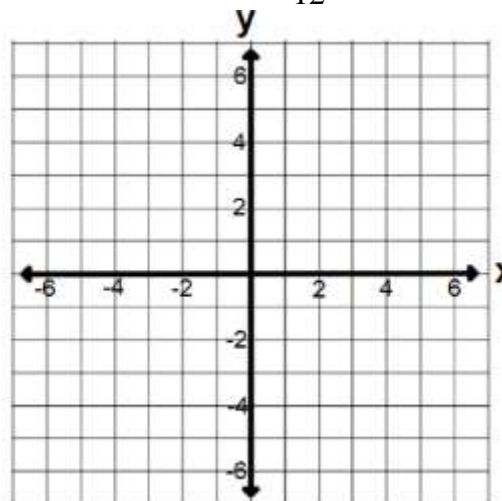
17. Graph $P(x) = (x-1)^2(x-3)$



y-intercept

Additional Points

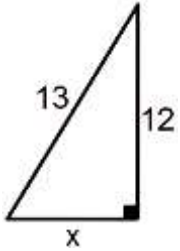
18. Graph $P(x) = \frac{1}{12}(x+2)^2(x-3)^2$



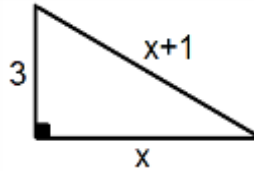
y-intercept

Additional Points

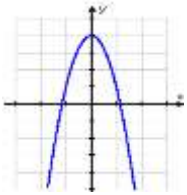
19. Find the unknown side of the right triangle.



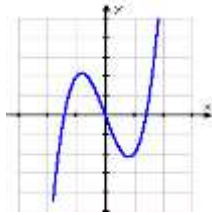
20. Find the unknown sides of the right triangle.



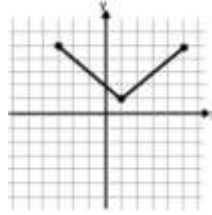
21. Determine whether each graph represents an even function, odd function, or neither.



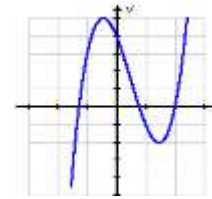
A. _____



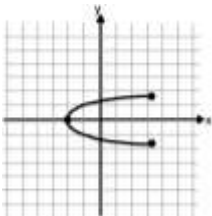
B. _____



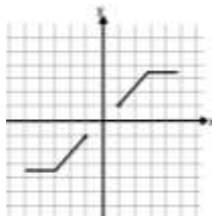
C. _____



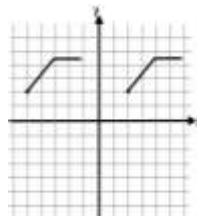
D. _____



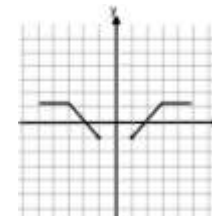
E. _____



F. _____



G. _____



H. _____

22. Determine which equations represent even functions, odd functions, or neither.

A. $g(x) = 6x^4 + 9x^2 + 5$

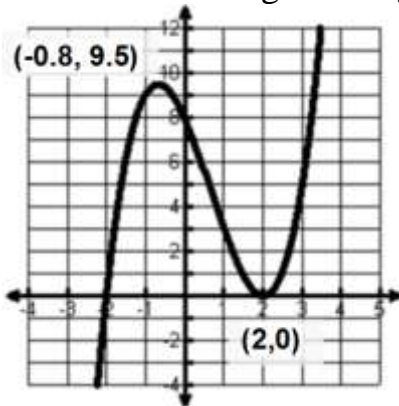
B. $h(x) = x^2 - 3x^4$

C. $f(x) = 5x^3 + 4x$

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

E. $f(x) = -x^9 + 5x^5 + 2$

23. Find the following for the graph.



Local Maxima _____

Local Minima _____

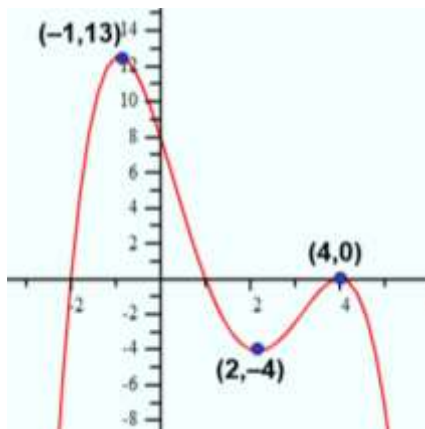
Domain _____

Range _____

Increasing _____

Decreasing _____

24. Find the following for the graph.



Local Maxima _____

Local Minima _____

Domain _____

Range _____

Increasing _____

Decreasing _____