Describe the end behavior of the polynomial function by finding $\lim_{x \to \infty} f(x)$ and $\lim_{x \to -\infty} f(x)$.

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

Find the exact zeros of the function.

23) $f(x) = x^3 - 49x$

24) $f(x) = 3x^3 - 12x^2 - 15x$

Find the zeros of the polynomial function and state the multiplicity of each.

25) $f(x) = -4x^2(x - 9)(x + 4)^3$

26) $f(x) = 3(x + 8)^2(x - 8)^3$

Solve the problem.

27) $A(x) = -0.015x^3 + 1.05x$ gives the alcohol level in an average person's blood x hrs after drinking 8 oz of 100-proof whiskey. If the level exceeds 1.5 units, a person is legally drunk. Would a person be drunk after 7 hours?

28) The polynomial $G(x) = -0.006x^4 + 0.140x^3 - 0.53x^2 + 1.79x$ measures the concentration of a dye in the bloodstream x seconds after it is injected. Does the concentration increase between 13 and 14 seconds?

Write a sentence that expresses the relationship in the formula, using the language of variation or proportion.

15) $f = \frac{m^2 v}{r}$, where f is the centripetal force of an object of mass m moving along a circle of radius r at velocity v

16) I = PRT, where I is the simple interest on a principal of P dollars at a rate of interest R per year

Solve the problem. Round as appropriate.

17) The shadow cast by an object on a sunny day varies directly as the height of the object. If a person 66 inches tall casts a shadow 67 inches long, how tall is a tree which casts a shadow 37 feet in length?

18) The intensity I of light varies inversely as the square of the distance D from the source. If the intensity of illumination on a screen 5 ft from a light is 3 foot-candles, find the intensity on a screen 20 ft from the light.

19) The period of vibration P for a pendulum varies directly as the square root of the length L. If the period of vibration is 4.5 sec when the length is 81 inches, what is the period when L = 2.25 inches?

20) The weight of a body above the surface of the earth is inversely proportional to the square of its distance from the center of the earth. What is the effect on the weight when the distance is multiplied by 4?

2.3.1/2.3.2: I can find and interpret the zeros of a polynomial function.

Describe the end behavior of the polynomial function by finding $\lim_{x \to \infty} f(x)$ and $\lim_{x \to -\infty} f(x)$.

21) $f(x) = -x^3 - 6x^2 - 4x + 3$

9) A projectile is thrown upward so that its distance above the ground after t seconds is $h = -16t^2 + 672t$. After how many seconds does it reach its maximum height?

2.2.1: I can identify a power function and write inverse/direct variation equations.

Write the statement as a variation function equation. Use k as the constant of variation.

10) John kept track of the time it took him to drive to college from his home and the speed at which he drove. He found that the time t varies inversely as the speed r.

Write the statement as a power function equation. Use k as the constant of variation.

11) The height h of a triangle with a fixed area varies inversely as the base b.

Determine if the function is a power function. If it is, then state the power and constant of variation.

12) $f(x) = 2x2/5$

Write the statement as a variation function equation. Use k as the constant of variation.

13) The cost c of a turkey varies directly as its weight w.

Write the statement as a power function equation. Use k as the constant of variation.

14) The surface area of a sphere S varies directly as the square of its radius r.

Variation, Quadratics, and Polynomials Test Name________________________________

2.1.2: I can write and apply quadratic functions by finding the vertex and zeros.

Find the vertex of the graph of the function.

1) $f(x) = (x - 8)^2 - 1$

Find the vertex of the graph of the function.

2) $f(x) = -4x^2 - 32x - 63$

Write the quadratic function in vertex form.

3) $y = x^2 - 8x + 23$

4) $y = x^2 + 4x + 7$

Find the axis of the graph of the function.

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

6) $f(x) = 3x^2 + 30x + 77$

Write an equation for the quadratic function whose graph contains the given vertex and point.

7) Vertex (–5, –5), point (–3, –1)

Solve the problem.

8) The stadium vending company finds that sales of hot dogs average 28,000 hot dogs per game when the hot dogs sell for $2.50 each. For each 25 cent increase in the price, the sales per game drop by 2000 hot dogs. Determine a function $R(x)$ that models the total revenue per game, where x is the number of $0.25 increases in the price of a hot dog.