AP CALCULUS

PRETEST

USE CALCULATORS ONLY WHEN ABSOLUTELY NECESSARY.

Determine an equation for each line:

1. y-intercept of -4 and slope of $\frac{5}{3}$ 1. _____

2. slope of -2.5 and passes through $(2, 3)$ 2. _____

3. passes through $(-1, 2)$ and $(7, 0)$ 3. _____

Factor Completely:

4. $2(3y - 5)^2 - 7(3y - 5) - 15$ 4. _____

5. $x^6 - 27$ 5. _____

6. $625x^4 - 1$ 6. _____

7. Find the annual per cent growth that would increase an amount by a factor of five in ten years. 7. _____

8. Simplify: $a^2 + a + 1 - \dfrac{a^3}{a-1}$ 8. _____

9. Simplify: $\dfrac{\sqrt{5}+2\sqrt{3}}{\sqrt{5}-2\sqrt{3}}$ 9. _____

10. Solve for z if $2x + 2yz + y + xz = 0$. 10. _____

11. A child 1.4 m tall is walking away (on level ground) from a 4 m high streetlight. Express the length of her shadow D as a function of her distance from the base of the light L. 11. _____

12. Evaluate $\dfrac{3^x + 3^y}{3^{xy}}$ if $x = 2$ and $y = -2$. 12. _____

13. If $f(x) = 2x + 1$ and $g(x) = \dfrac{x-1}{2}$, then find: $f\,[g(x)]$ 13. _____

14. Find $f^{-1}(x)$ given $f(x) = x^2 - 12x + 21$. 14. _____

15. An amount of water at room temperature is placed in a kettle. In 8 minutes the kettle comes to a boil. If T_p is the temperature of the water in the kettle t minutes after it was plugged in, then sketch a possible graph of $T_p = f(t)$ for $t \geq 0$ 15. _____

16. A box with a square base has a volume of 800 ^{3}. If the length of one of the sides of the base is x, determine an expression for the total surface area of the box. 16. _____

17. The height h of a stone thrown straight up with a velocity of 12 m/sec is given by the relation $h = -5t^2 + 12t$. What is the maximum height the stone will reach? 17. _____

18. A parallelogram has two adjacent sides of 10 cm and 15 cm. It also has an acute angle of 60°. What is the length of the longer diagonal? Answer exactly. 18. _____

19. Determine the area of the parallelogram in the question above. 19. _____

20. Determine the slope of the terminal arm of a 150° standard position angle. 20. _____

21. Determine the area of the triangle formed by the x-axis and the lines $y = \frac{1}{3}x + 1$ and $y = -x + 5$. 21. _____

22. A small tank is in the form of an inverted right circular cone. The diameter of a cone is 24 cm. When filled to a height of 10 cm, the volume of water in the cone is 30π cubic centimetres. How much more water is required to fill the cone? $V = \frac{1}{3}\pi r^2 h$ 22. _____

23. A 20 m ladder and a 15 m ladder are both leaning against a building. The bottom of the longer ladder is 7 m farther from the building than the bottom of the short ladder, but both ladders reach the same distance up the building. Determine this distance. 23. _____

24. Determine a polynomial equation of lowest degree that has integral coefficients and roots -2, 0 and 5. 24. _____

25. Determine a fourth degree polynomial equation that has integral coefficients and the same roots as the question above. 25. _____

26. Solve $x^3 + x^2 - 9x - 9 < 0$. 26. _____