11. At one point as Elena climbs a ladder, she finds that the number of rungs above her is twice the number below her (not counting the rung she is on). After climbing 5 more rungs, she finds that the number of rungs above and below her are equal. How many more rungs must she climb to have the number below her be four times the number above her?

A. 5 B. 6 C. 7 D. 8 E. 9

12. If $\sin\theta - \cos\theta = 0.2$ and $\sin 2\theta = 0.96$, find $\sin^3\theta - \cos^3\theta$.

A. 0.25 B. 0.276 C. 0.28 D. 0.296 E. 0.30

13. How many asymptotes does the function $g(x) = \dfrac{x}{10\sqrt{100x^2-1}}$ have?

A. 0 B. 1 C. 2 D. 3 E. 4

14. For how many solutions of the equation $x^2 + 4x + 6 = y^2$ are both x and y integers?

A. 0 B. 1 C. 2 D. 3 E. an infinite number

15. The sum of the squares of the four integers r, s, t, and u is 685, and the product of r and s is the opposite of the product of t and u. Find $|r|+|s|+|t|+|u|$.

A. 39 B. 41 C. 43 D. 45 E. 47

16. You pass through five traffic signals on your way to work. Each is either red, yellow, or green. A red is always immediately followed by a yellow; a green is never followed immediately by a green. How many different sequences of colors are possible for the five signals?

A. 42 B. 48 C. 54 D. 60 E. 66

17. How many different ordered pairs of integers with $y \neq 0$ are solutions for the system of equations $6x^2y + y^3 + 10xy = 0$ and $2x^2y + 2xy = 0$?

A. 1 B. 2 C. 3 D. 4 E. 5

18. The graph of the equation $x + y = x^3 + y^3$ is the union of a

A. line and an ellipse B. line and a parabola C. parabola and an ellipse
D. pair of lines E. line and a hyperbola

19. A four-digit number each of whose digits is 1, 5, or 9 is divisible by 37. If the digits add up to 16, find the sum of the last two digits.

A. 2 B. 6 C. 10 D. 12 E. 14

20. In ΔABC, $AB = 5$, $BC = 8$, and $\angle B = 90°$. Choose D on $\overline{AB}$ and E on $\overline{BC}$ such that $BD = 3$ and $BE = 5$. Find the area common to the interiors of ΔABC and the rectangle determined by $\overline{BD}$ and $\overline{BE}$.

A. 1111/80 B. 1113/80 C. 1117/80 D. 1119/80 E. 1121/80