1) If A is 15% of C and B is 25% of C, then what percent of B is A?

    a) 75   b) 120   c) 60

    d) 175   e) None of the above

2) It took Tim 30 minutes to walk from his home to his friend's house to pick up his bicycle. On the bike Tim is 5 times faster than on foot. How long will it take Tim to ride back home if he chooses a route back that is twice as long as the one he took walking from home?

    a) 18 min   b) 12 min   c) 6 min

    d) 15 min   e) None of the above

3) The value of $\dfrac{99 \times 101}{0.10}$ is closest to

    a) 100   b) 1,000   c) 10,000   d) 100,000   e) 1,000,000

4) Which of the following is largest

    a) 4^{40} b) 8^{26} c) 2^{76}

    d) $16^{18} \times 2^{4}$ e) $\dfrac{4^{42} + 16(32)^{16}}{64}$

5) In the picture, the triangle $\triangle ABC$ is equilateral with side length 2 and the vertex B at the origin of the Cartesian plane. The coordinates of the vertex A are

    a) $(2, \sqrt{3})$ b) $(1, \sqrt{3})$ c) $(2, \sqrt{3}/2)$

    d) $(1,2)$ e) None of the above
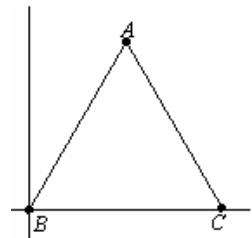
6) Let A and B be two circles such that the circumference of A is 10% of that of B. If the area of A is 5, what is the area of B?
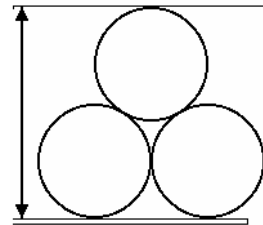
    a) 50   b) 50π c) $50\pi^2$ d) $500\pi^2$ e) None of the above

7) An isosceles triangle is inscribed inside a circle of radius 12 so that one of its sides passes through the center. What is the area of the triangle?

    a) 18   b) 36   c) 72   d) 144   e) 288

8) Three circles of the same radius r are stacked as in the figure. The height of the stack in terms of the radius r is

    a) $2r$ b) $3r$ c) $\sqrt{3}r$

    d) $(2+\sqrt{3})r$ e) $2\sqrt{3}r$

9) Let the operation $*$ be defined as $a*b = b + \dfrac{1}{a}$. The value of $(1*2)*4$ is

    a) $3\dfrac{1}{4}$ b) $2\dfrac{1}{4}$ c) $4\dfrac{1}{3}$

    d) $1\dfrac{3}{4}$ e) None of the above

10) If $b^2 + 7b = 120$, then one possible value for $b^2 - 4b$ is

    a) 125   b) 165   c) 15   d) 8   e) 32

11) Carry out the division and simplify $\dfrac{x^2-4}{x^2+2x-3} \div \dfrac{x^2-6x+8}{x^2-x-12}$

a) $\dfrac{x^2-4}{x^2+2x-3}$

b) $\dfrac{(x+2)(x-2)^2}{(x-1)(x+3)^2}$

c) $\dfrac{x-4}{x-1}$

d) $\dfrac{x+2}{x-1}$

e) None of the above

12) A store advertised 20% off fashion watches. One watch had a sale price of $ 36.76. What was the regular price?

a) $44.11   b) $29.95   c) $45.95   d) $67.17   e) None of the above

13) An operator assisted telephone call to another state costs $10.15 for 15 minutes. The same call dialed directly costs $0.60 for the first minute and $0.40 for each additional minute. How much money is saved on a 15 minute call by dialing direct?

a) $1.15   b) $2.55   c) $3.95   d) $4.55   e) None of the above

14) How long will it take a carpenter to cut a 4 in by 4 in by 8 ft piece of treated lumber into four equal pieces if each cut takes 2½ minutes?

a) 5 min   b) 7.5 min   c) 10 min   d) 12.5 min   e) None of the above

15) A health club has an initiation fee plus a monthly membership fee. Amy paid a total of $390 for six months of membership plus the initiation fee. Juan paid a total of $435 for nine months of membership plus the initiation fee. What is the initiation fee?

a) $15   b) $30   c) $250   d) $300   e) None of the above

16) The legs of a picnic table with the table top form an isosceles triangle as indicated in the picture (the parts of the legs being the equal sides). If the measure of the angle *ABC* is 80°, what is the measure of the angle *y*?

   a) 50°   b) 130°   c) 150°

   d) 100°   e) None of the above
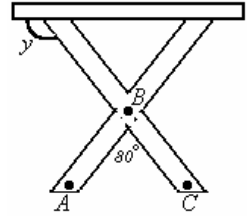
17) The expression $\dfrac{a}{\sqrt[3]{ab^2}}$ is equivalent to

  a) $\dfrac{\sqrt[3]{ab^2}}{b}$ b) $\sqrt[3]{ab}$ c) $a\sqrt[3]{ab^2}$

  d) $\dfrac{\sqrt[3]{a^2b}}{b}$ e) None of the above

18) What is the smallest prime number that is a factor of the sum of 5^{81} and 3^{29}?

  a) 3   b) 5   c) 15   d) 2   e) None of the above

19) A pack of rats abandoned a sinking ship and colonized a deserted island. In the first year their population tripled. In the second year it fell 6 short of doubling. In the third year it increased by 24. In each of the next two years it was cut in half, so that after 5 years, the population stood at 15. How many rats were in the original colony?

  a) 4   b) 7   c) 8   d) 27   e) None of the above

20) A legally caught fish needs to be both in season and of size no less than the legal size limit. If two-fifths of the fish in the lake are out of season, and three-fourths of the fish that are in season are under the legal size limit, what fraction of the fish in the lake are legal to catch?
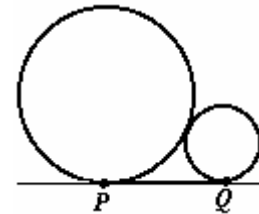
  a) 9/20   b) 3/10   c) 1/5   d) 3/20   e) None of the above

21) Simplify $\dfrac{x-y}{x^{-2}-y^{-2}}$

a) $\dfrac{1}{x+y}$

b) $\dfrac{xy}{x+y}$

c) $x+y$

d) x^3-y^3

e) None of the above

22) Circles of radius 4 and 9 are tangent to each other and to a horizontal line. Find the distance $d(P,Q)$ between the two points of tangency with the line

a) 6

b) $\sqrt{56}$

c) 12

d) $9\sqrt{2}$

e) 13

23) The sum of the distinct solutions of the equation $(x-\dfrac{2}{x})^2 - 2x + \dfrac{4}{x} = -1$ is

a) 1   b) -1   c) -3   d) 3   e) None of the above

24) The size of a TV screen is described by the length of its diagonal. The ratio of the height to width is the same for all televisions. How much larger is the area of a 30" screen than the area of 20" screen?

a) The areas are the same

b) The ratio of the areas is 3:2

c) The ratio of the areas is 2:1

d) The ratio of the areas is 4:1

e) The ratio of the areas is 9:4

25) Which of the following numbers are prime?

a) 417   b) 847   c) 419   d) 143   e) 847 and 419 are both prime