

# SOLUTIONS: Stage I Question Set 11

## Solution to Question #1:

$$y = 3.2 + 0.32 + .032 = 3.552$$

The correct answer is (c) .

## Solution to Question #2:

$$(1/4)(24.2) = 6.05 = 6 \frac{5}{100} = 6 \frac{1}{20}$$

The correct answer is (a) .

## Solution to Question #3:

$$3,000,000(0.30) = 900,000$$

The correct answer is (c) .

## Solution to Question #4:

$$2/x = 4, \text{ so } x = 2/4 = 1/2.$$

The correct answer is (b) .

## Solution to Question #5:

$$2.2 + 2 + 1.1 + 4 = 3.3 + 6 = 9.3$$

The correct answer is (a) .

## Solution to Question #6:

ABCD has an area of  $5(5) = 25\text{m}^2$ . The triangle ABE has an area of  $(\frac{1}{2})(\text{base})(\text{height}) = \frac{1}{2}(5)(2) = 5\text{m}^2$ .

The area of the quadrilateral AECD equals the area of the square minus the area of the triangle.

area AECD =  $25 - 5 = 20 \text{ m}^2$  The correct answer is (b) .

## Solution to Question #7:

$$S = 4\pi (6)(6) = 144\pi \text{ cm}^2.$$

The correct answer is (a) .

## Solution to Question #8:

Stella will have bladed  $(5 \times 10 \times 4) = 200 \text{ km}$  in 4 months.

The correct answer is (d) .

## Solution to Question #9:

$$A = 45 = (\frac{1}{2})(10)(\text{height}) = 5(\text{height}); \text{ height} = 45/5 = 9\text{m}$$

The correct answer is (e) .

## Solution to Question #10:

a) Joel would take  $12/20 = 3/5$  of an hour to get to where he was going. Kathy would take  $10/15 = 2/3$  of an hour to get to where she was going. Joel would arrive at his destination first, so this statement is false.

b) True (see (a) ) .

c) Kathy took  $2/3$  of an hour, and  $(2/3)(60) = 40$  minutes, so this statement is true.

d) False, since a) is false. e) True. The correct answer is (e) .

## Solution to Question #11:

a) If K is an odd number,  $n$  must be also, since  $K = n(n)$  is odd, and the only way to get an odd product is to have odd factors. This statement is true.

b) Any natural number multiplied by 2 is even, so this statement is true.

c) Since K is an odd number,  $K(K)$  is an odd number, since the product of two odd numbers is odd.

d) True, since a), b), and c) are true. e) False. The correct answer is (d) .

## Solution to Question #12:

The total area equals the area of the semicircle plus the area of the square.

$$A = \frac{1}{2}\pi (2)(2) + (4)(4) = (\frac{1}{2})\pi (2)(2) + 16 = 2\pi + 16$$

The area of the shaded rectangle =  $(1 \times 4) = 4 \text{ m}^2$ .

The ratio of the shaded rectangle to the total area is  $(4)/(2\pi + 16) = 0.1795\dots \sim 18\%$ .

The correct answer is **(a)**.

**Solution to Question #13:**

The diagonal of the square equals the diameter of the circle, which is 20 cm.

The side of the square is  $20 \div \sqrt{2} = 10\sqrt{2}$

The area of the square is  $(10\sqrt{2})^2 = (100)(2) = 200 \text{ cm}^2$ .

The correct answer is **(d)**.

**Solution to Question #14:**

The telephone numbers begin with 927-0000 and proceed up to 927-9999.

There are 10,000 telephone numbers from 927-0000 to 927-9999.

The correct answer is **(a)**.

**Solution to Question #15:**

$$r^2 = 125/5\pi = 25$$

$r = 5 \text{ cm}$ , so diameter =  $10 \text{ cm} = 0.1 \text{ meters}$ .

The correct answer is **(d)**.

**Solution to Question #16:**

In order to win 80% of its games, the team must win  $(0.8)(50) = 40$  games.

If they have won 15 games so far, they must win 25 of the remaining 30.

The correct answer is **(a)**.

**Solution to Question #17:**

The resulting solid is  $6 \times 3 \times 3$ , and will have 18 unit squares on the surface which are red (since each original cube has 9 red unit squares on the surface, and none are obscured by gluing them together).

The surface area is  $(4 \times 6 \times 3) + (2 \times 3 \times 3) = 90 \text{ units}^2$ .

$18/90 = 1/5$ , so 20% of the surface area of the resulting solid is red.

The correct answer is **(b)**.

**Solution to Question #18:**

Let  $x = AD$ .  $x + x + x + x/2 = AC = 20$ , so  $3.5x = 20$ .  $x = 20/3.5 = 40/7$ .

The base of triangle ABF is  $(AD + DE + EF) = (40/7 + 20/7 + 40/7) = 100/7$ , and the height DB is 8.

The area of the triangle ABF =  $(\frac{1}{2})(8)(100/7) = 400/7 \text{ m}^2$ .

The correct answer is **(c)**.

**Solution to Question #19:**

$$a + 8 > (-8a); \quad a > -8a - 8; \quad a > -8(a + 1); \quad 9a > -8; \quad a > -8/9$$

The correct answer is **(a)**.

**Solution to Question #20:**

There is no 0 A.D. The calendar goes from 21 B.C. to 1 B.C., and then goes from 1 A.D. and up.

On the first day of 1 A.D., Tiberius was 21 years old. Thirty-eight years later, he dies on the second day of 39 A.D., which makes him 59 years old.

(As an historical note, the B.C./A.D. system of numbering calendar years was not introduced until several hundred years after the birth of Christ, and the incorrect year was chosen for 1 A.D.)

The correct answer is **(b)**.