

## GEOMETRY TEST SOLUTIONS

1)  $\frac{x+4}{4} = \frac{x+14}{6}$        $4x + 56 = 6x + 24$        $2x = 32$        $x = 16$        $x + 4 = 20$

D

2) 30

E  $\frac{FE}{AE} = \frac{GE}{BE}$        $\frac{4}{6} = \frac{GE}{GE+3}$        $6x = 4(x+3)$        $GE = 6$   
 $2x = 12$

$\frac{HE}{CE} = \frac{FE}{AE}$        $\frac{5}{HC+5} = \frac{4}{6}$        $4(x+5) = 30$        $HC = 2.5$   
 $4x = 10$

$\frac{FG}{AB} = \frac{FE}{AE}$        $\frac{3}{AB} = \frac{4}{6}$        $4x = 18$        $AB = 4.5$

$Perimeter \Delta ABE = 4.5 + 9 + 6 = 19.5$

$GE + HC + perimeter \Delta ABE = 6 + 2.5 + 19.5 = 28$

3) PM & PQ are opposite rays

D

4)  $1:4\pi$

C Volume of the cylinder =  $\pi r^2 h = \pi (30)(30)(30) = 27,000\pi$

Volume of the prism =  $LWH = (60)(60)(30) = 108,000$

$\frac{108,000}{27,000\pi} = 4:\pi$

5) 1944

B Let  $x =$  angle, then  $180 - x$  is supplement and  $90 - x$  is complement.

$180 - x = 6(90 - x)$        $180 - x = 540 - 6x$        $5x = 360$

$x = 72$ ,  $90 - x = 18$ , and  $180 - x = 108$        $108 \times 18 = 1944$

6)  $1611 \text{ in}^2$

D Formula:  $2\pi rh + \pi r^2$  for each layer minus areas as needed.

bottom cake:  $r = 15 \text{ in.}$        $SA = 2\pi(15)(4) + (15)^2 \pi - (12)^2 \pi = 201\pi$

middle cake:  $r = 12 \text{ in.}$        $SA = 2\pi(12)(4) + (12)^2 \pi - (9)^2 \pi = 159\pi$

top cake:  $r = 9 \text{ in.}$        $SA = 2\pi(9)(4) + (9)^2 \pi = 153\pi$

$201\pi + 159\pi + 153\pi = 513\pi \approx 1610.82$

## GEOMETRY TEST SOLUTIONS (PAGE TWO)

7)  $24 = 2x - 3y$  has a slope of  $2/3$  not  $-2/3$

D

8) 40

C  $12/6 = 2$      $2 + (3240 \div 1080) = 2 + 3 = 5$      $5 \times 8 = 40$

9) Substitution Property

B

10)  $4/5$

D 8 out of the 10 integers results in a positive integer, 7 and 11 sides do not.

11) 74

A  $\frac{3}{5} = \frac{2}{x}$ ;  $x = \frac{10}{3}$  ;  $\frac{10 \cdot 10 \cdot 10 \pi}{3 \cdot 3} = \frac{1000 \pi}{9} = \frac{1000}{9.24} = 4,629 \approx 5$

12) 45

C  $2r - 4 = r + 9$

$r = 5$

$4b - 6r = r + 1$

$4b - 6(5) = 5 + 1$

$4b = 36$

$4b - 30 = 6$

$b = 9$

$b \times r = 5 \times 9 = 45$

13) 17 ft.

C Let  $x$  = slant height of roof. Then  $\cos 22 = \frac{16}{x}$   $x = \frac{16}{\cos 22}$

$x \approx 17.256...$

14) 75

B  $44 + 166 = 210$

$360 - 210 = 150 = \angle ACD$

$\angle ACD = \frac{1}{2}(150) = 75$

15) The sides of triangle HEP are 16-30-34 which is a Pythagorean Triple.

C Therefore, the area of triangle HEP =  $\frac{1}{2}(16)(30) = 240$

## GEOMETRY TEST SOLUTIONS (PAGE THREE)

16)  $A = 0.5h(b_1 + b_2)$

C  $A = kh(b_1 + b_2)$        $48 = k(8)(5 + 7)$        $48 = k(8)(12)$   
 $48 = 96k$                        $k = 0.5$

17)  $13\sqrt{2} + \sqrt{65} + \sqrt{197}$

C 1st side  $\sqrt{(4 + 4)^2 + (5 - 6)^2} = \sqrt{65}$       2nd side  $\sqrt{(4 - 6)^2 + (5 - 3)^2} = 2\sqrt{2}$   
 3rd side  $\sqrt{(6 + 5)^2 + (3 + 8)^2} = 11\sqrt{2}$       4th side  $\sqrt{(-4 + 5)^2 + (6 - 8)^2} = \sqrt{197}$

18)  $-11/2$

A  $x = (5 + 6)/2$     $y = (5 - 7)/2$        $(11/2)x - 1 = -11/2$

19)  $4x^2 + 6x + 2$

D  $b_1 = (2x^2 - 3x - 5)/(3x - 1)$        $b_2 = (12x^2 + 2x - 2)/(2x - 5)$

Since the area of rectangle ABCD is  $b_1b_2$ , factoring the above rational expressions gives  $((2x - 5)(x + 1))/(3x - 1)$  multiplied by  $[2(3x - 1)(2x + 1)]/(2x - 5)$ . After cancelling and multiplying you obtain the above answer.

20)  $30 \text{ in}^2$

C  $(x + 2)^2 + (x + 9)^2 = (x + 10)^2$   
 $x^2 + 4x + 4 + x^2 + 18x + 81 = x^2 + 20x + 100$   
 $2x^2 + 22x + 85 = x^2 + 20x + 100$   
 $x^2 + 2x - 15 = 0$      $(x + 5)(x - 3) = 0$      $x = -5$  or  $3$

But  $x \neq -5$ . Using the triangle area formula, substitute 3 for the values of the legs:

$$\frac{(3 + 2)(3 + 9)}{2} = \frac{(5)(12)}{2} = \frac{60}{2} = 30$$

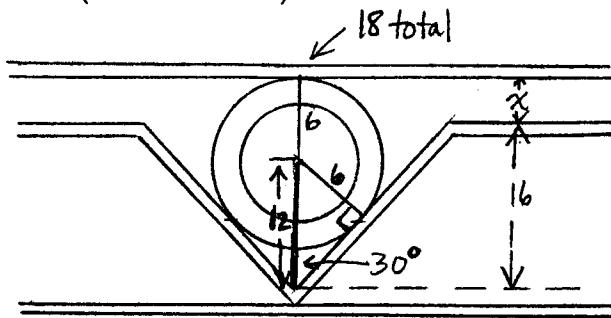
21) NOTA

E  $16(18) = 2x(x)$        $2x^2 = 288$        $x^2 = 144$        $x = 12$        $2x = 24$   
 $12 + 24 = 36$

22) 4

C  $(\overline{AB})^2 = 1(1+7) = 8$        $AB = \sqrt{8} = 2\sqrt{2}$        $AF = 2\sqrt{2}(\sqrt{2}) = 4$   
 $BF = 2\sqrt{2}$

# GEOMETRY TEST SOLUTIONS (PAGE FOUR)



23) 2 in.

B Follow picture to right.

$$16 + x = 18$$

Therefore,  $x = 2$

24)  $(7/2, -9/2)$

D Midpoint of PQ is  $M\left(\frac{-1 + 5}{2}, \frac{12 + (-10)}{2}\right) = (2, 1)$

$\frac{3}{4}$  of PQ = Midpoint of MQ which is  $\left(\frac{-1 + 5}{2}, \frac{12 + (-10)}{2}\right) = (7/2, -9/2)$

25)  $5\sqrt{2}$

C  $\text{Log}_3(2x - 1) + \text{Log}_3(x - 2) = 3$

$$\text{Log}_3(2x - 1)(x - 2) = 3$$

$$2x^2 - 5x + 2 = 27$$

$$2x^2 - 5x - 25 = 0$$

$$(2x + 5)(x - 5) = 0$$

$x = \frac{-5}{2}$  (not possible because it is negative) or  $x = 5$ .

In a 45-45-90 triangle with leg = 5, the hypotenuse =  $5\sqrt{2}$

26)  $30 + 30\sqrt{2}$

B distance VH =  $\sqrt{(5 + 3)^2 + (-2 - 4)^2} = \sqrt{64 + 36} = 10$

distance HI =  $\sqrt{(-3 + 2)^2 + (4 + 3)^2} = \sqrt{1 + 49} = 5\sqrt{2}$

distance VI =  $\sqrt{(5 + 2)^2 + (-2 + 3)^2} = \sqrt{49 + 1} = 5\sqrt{2}$

Perimeter of VHI =  $10 + 10\sqrt{2}$  and Perimeter of MTV is  $3(10 + 10\sqrt{2})$

27) 18

B  $\angle X = 2x$ ,  $\angle Y = x$ , &  $\angle Z = 4x + 12$ .  $7x + 12 = 180$ ,  $7x = 168$ ,  $x = 24$ .

Therefore,  $\angle X = 48$ ,  $\angle Y = 24$ , &  $\angle Z = 108$ . Product = 124,416 and

$1 + 2 + 4 + 4 + 1 + 6 = 18$ .

28)  $Q'(1, -4)$ ,  $U'(2, 1)$ ,  $A'(6, 3)$ , and  $D'(4, -3)$

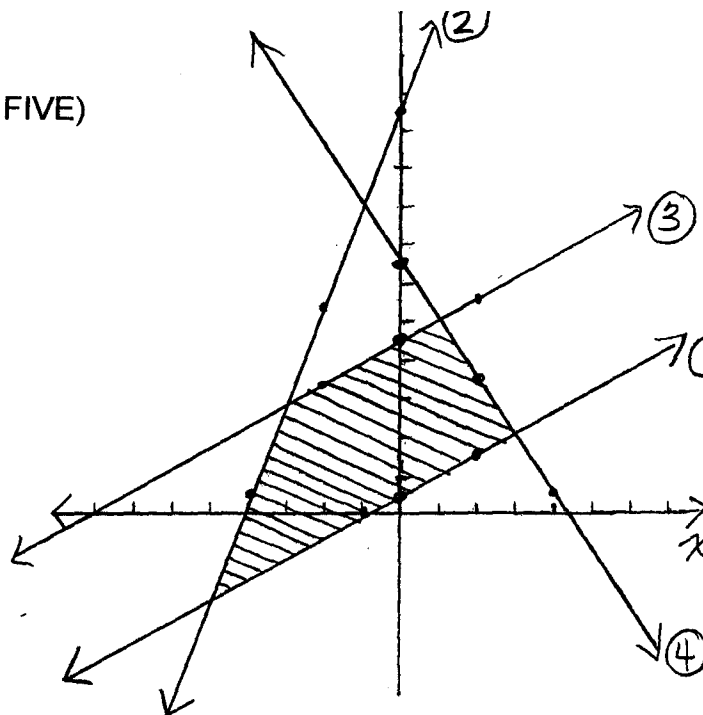
B add 3 to each x-value, and subtract 1 from each y-value

## GEOMETRY TEST SOLUTIONS (PAGE FIVE)

29) Trapezoid

D Graph:

- (1)  $x - 2y \leq -1$ ,  $-2y \leq -x - 1$ ,  
 $y \geq \frac{1}{2}x + \frac{1}{2}$
- (2)  $5x - 2y \geq -21$ ,  $-2y \geq -5x - 21$ ,  
 $y \leq \frac{5}{2}x + \frac{21}{2}$
- (3)  $x - 2y \geq -9$ ,  $-2y \geq -x - 9$ ,  
 $y \leq \frac{1}{2}x + \frac{9}{2}$
- (4)  $3x + 2y \leq 13$ ,  $2y \leq -3x + 13$ ,  
 $y \leq -\frac{3}{2}x + \frac{13}{2}$



30) NOTA. Answer should be  $-3$ .

E The vertex is created by the intersection of the two sides of the angle. Therefore, using the addition method of solving systems of equations, results give  $x = -3/2$  and  $y = 2$ . The product of these is  $-3$ .