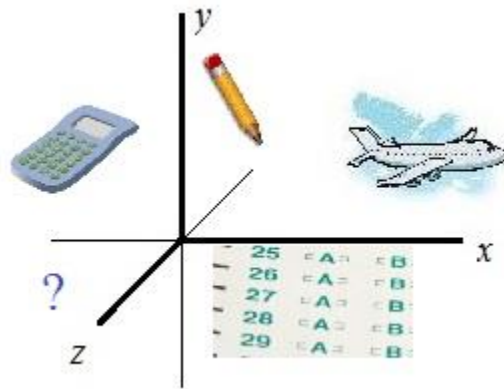


ACT Geometry Practice Questions

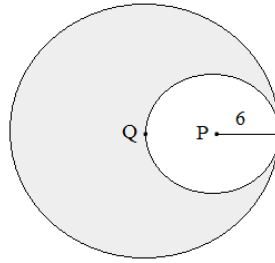
(And, detailed solutions)



Topics include coordinate geometry, area, perimeter, similarity, triangle properties, Pythagorean Theorem, circles, volume, parallel lines, and more!

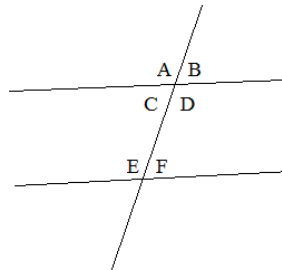
- 1) The diagram shows internally tangent circles, where the inside circle passes through the center of the large circle. What is the area of the shaded region?

- a) 12
- b) 12π
- c) 36π
- d) 108π
- e) 144π



- 2) Which MUST be true?

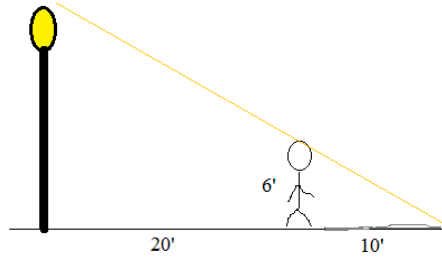
- a) I only
- b) I and II only
- c) I, II, and III
- d) II and III only
- e) None



- I. $\angle A \cong \angle D$
- II. $\angle A \cong \angle E$
- III. $\angle C \cong \angle F$

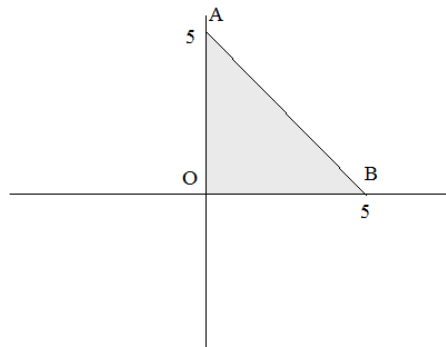
- 3) A 6 foot man stands 20 feet from a light post, leaving a 10 foot shadow. The height of the light post is...

- a) 12
- b) 15
- c) 18
- d) 21
- e) 24



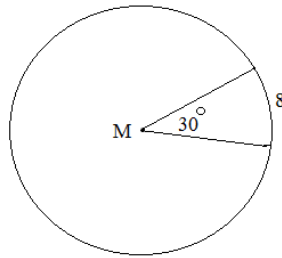
- 4) Triangle ABO is reflected over the y-axis. Then, the triangle in quadrant 2 is reflected over the x-axis. What is the perimeter of the 3 triangle area?

- a) $10 + 15\sqrt{2}$
- b) 15
- c) 25
- d) $30 + 15\sqrt{2}$
- e) 40



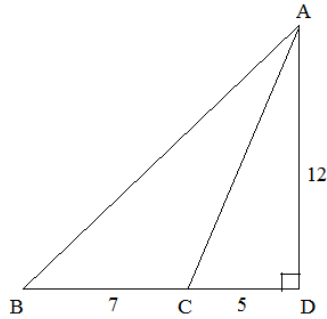
5) What is the radius of circle M?

- a) 15.28
- b) 30.56
- c) 48
- d) 75.39
- e) 96



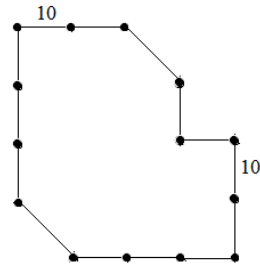
6) What is the area of $\triangle ABC$?

- a) 42
- b) 45.5
- c) 72
- d) 84
- e) 91



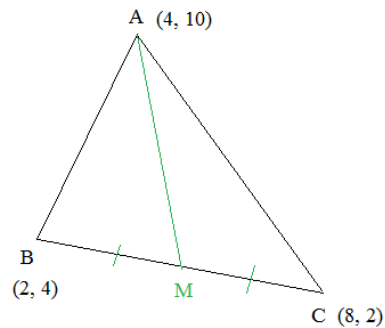
7) The diagram represents a fenced in grazing pasture. Each north/south and east/west post is set 10 feet apart. And, the diagonal posts are northwest by southeast.. What is the perimeter of the fence?

- a) 120
- b) $120 + 10\sqrt{2}$
- c) 140
- d) $120 + 20\sqrt{2}$
- e) 160



8) In triangle ABC, the length of the median \overline{AM} is

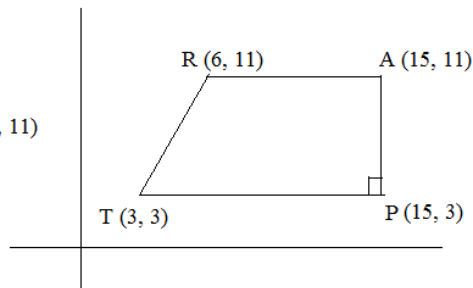
- a) 7
- b) $5\sqrt{2}$
- c) $2\sqrt{15}$
- d) 8
- e) $\sqrt{70}$



9) The slope of \overline{AP} is

- a) -8
- b) 0
- c) 4
- d) 8
- e) undefined

(Diagram for questions 9, 10, 11)



10) Which vertical line would cut the area of the trapezoid TRAP in half?

- a) $x = 6$
- b) $x = 8.8$
- c) $x = 9$
- d) $x = 9.75$
- e) $x = 10.5$

11) If \overline{TP} were rotated around the x-axis, it would create a right cylinder. The volume of the cylinder would be

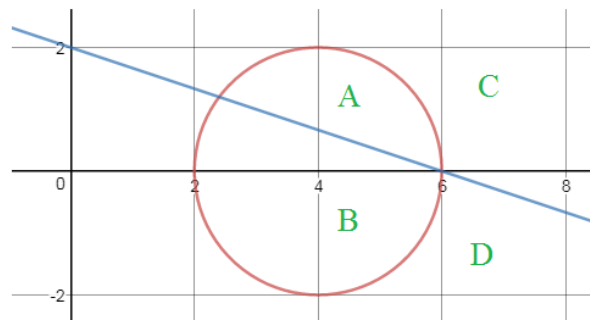
- a) 36π
- b) 72π
- c) 90π
- d) 108π
- e) 144π

12) If 2 sides of an isosceles triangle have lengths 6 and 14, then the third side must be

- a) 6
- b) 8
- c) 10
- d) 14
- e) 20

13) The region of the system $(x - 4)^2 + y^2 \leq 4$ includes:
 $x + 3y \leq 6$

- a) A
- b) B
- c) C
- d) D

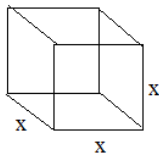


14) The supplement of an angle is 9 more than four times its complement.
What is the measure of the angle?

- a) 27
- b) 57
- c) 63
- d) 117
- e) 123

15) A cubical block weighs 5 pounds.
If the sides are all doubled, then the new cubical block will weigh:

- a) 10 pounds
- b) 15 pounds
- c) 25 pounds
- d) 40 pounds
- e) 125 pounds

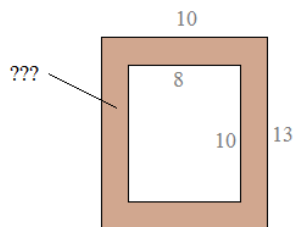


16) A 10 x 24 rectangle is inscribed in a circle.
What is the circumference of the circle?

- a) 13π
- b) 26π
- c) 34π
- d) 68π
- e) 169π

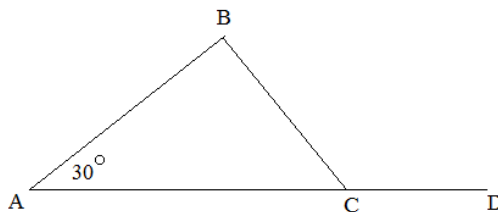
17) A 10" x 13" wooden picture frame can hold an 8" x 10" glossy photo.
What is the area of the wood portion of the frame?

- a) 6 sq inches
- b) 12 sq inches
- c) 24 sq inches
- d) 36 sq inches
- e) 50 sq inches



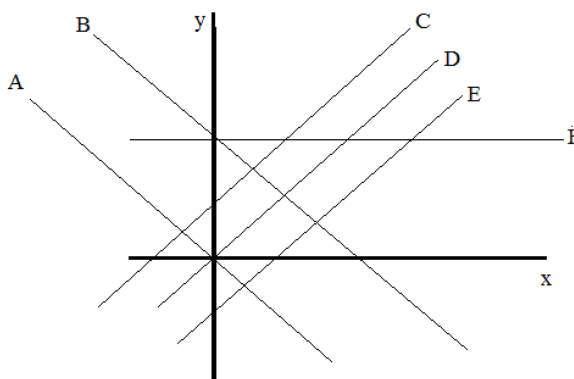
18) If $\angle BCD$ is an obtuse angle, then what is the measure of $\angle B$?

- a) $0 < B < 60$
- b) $0 < B < 90$
- c) $30 < B < 120$
- d) $60 < B < 150$
- e) $60 < B < 180$



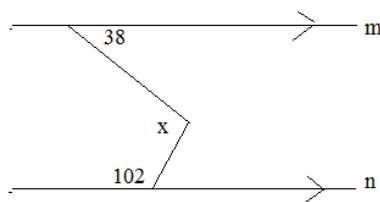
19) Which line could be $4x - 4y = 4$?

- a) A
- b) B
- c) C
- d) D
- e) E
- f) F



20) line m is parallel to line n
the measure of angle x is

- a) 64
- b) 78
- c) 116
- d) 140
- e) cannot be determined



(figure may not be drawn to scale)

21) the line $y + 6 = 2(x - 5)$ intersects the x-axis at the point

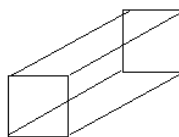
- a) (5, 0)
- b) (8, 0)
- c) (0, -16)
- d) (0, 4)
- e) (0, 0)

22) The measures of angles A, B, C in a triangle are in the ratio of 1:3:5.
The measure of the largest angle is

- a) 70°
- b) 80°
- c) 90°
- d) 100°
- e) 110°

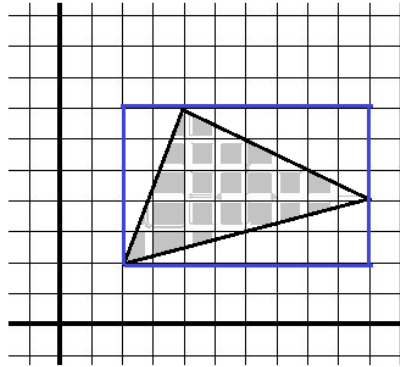
23) The surface area of a rectangular prism is 206 sq. meters.
If the dimensions of one base are 3 x 5 meters, then what is the height of the prism?

- a) 7.2
- b) 8
- c) 9.4
- d) 11
- e) 13.7



24) The area of the shaded triangle is

- a) 17
- b) 17.5
- c) 18
- d) 18.5
- e) 19



Vertices of shaded triangle:

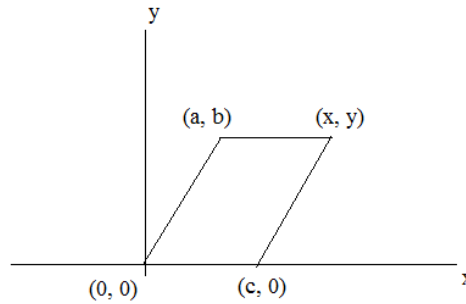
(2, 2)

(4, 7)

(10, 4)

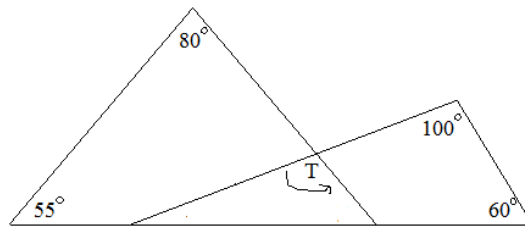
25) In the parallelogram, what is the coordinate (x, y) ?

- a) (c, b)
- b) $(c + a, b)$
- c) $(c - a, b)$
- d) $(2a, b)$
- e) $(2c, b)$



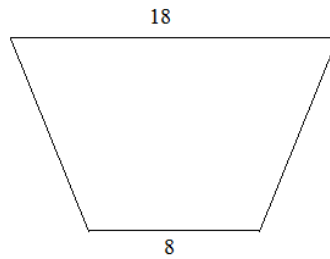
26) The measure of angle T is

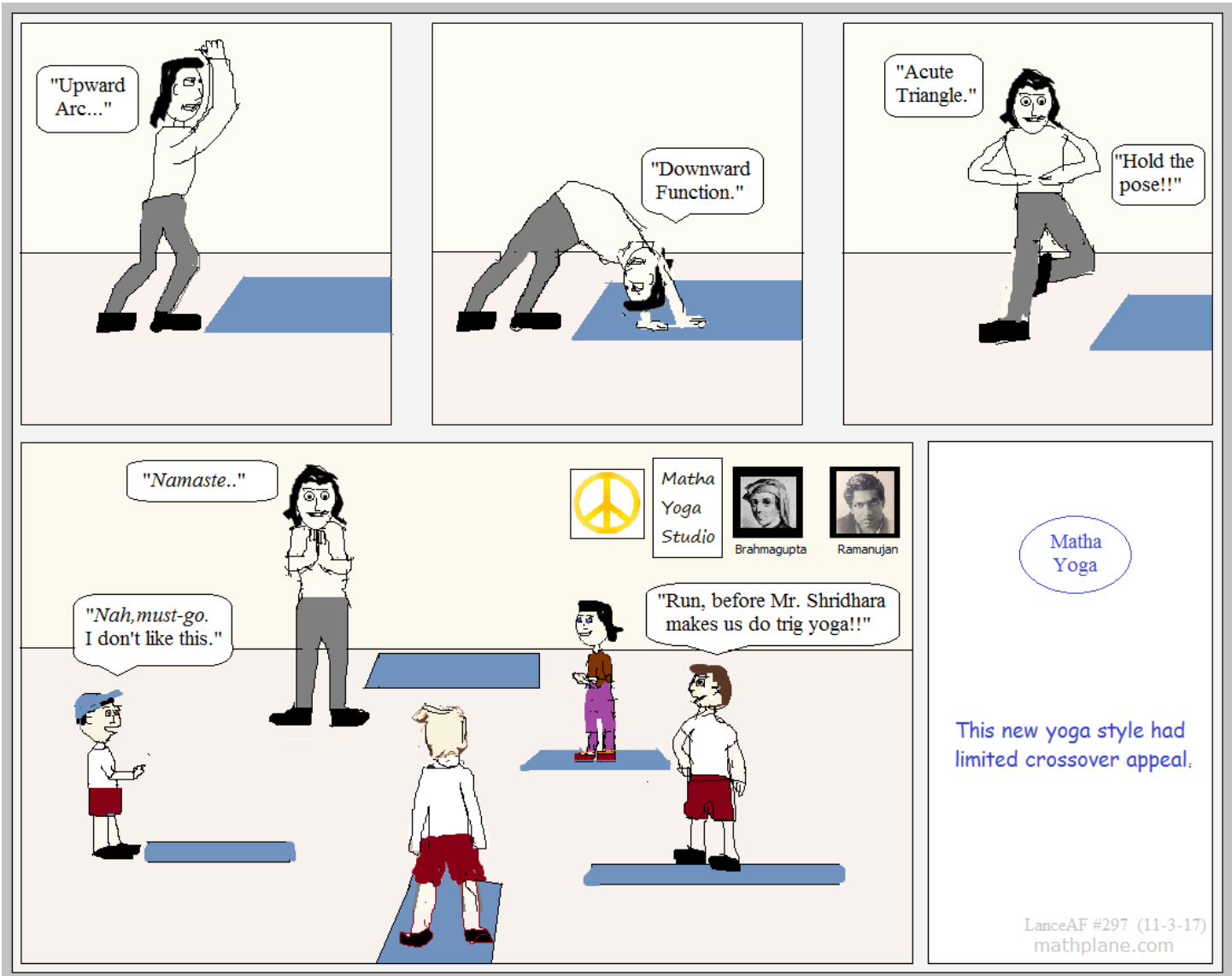
- a) 95
- b) 100
- c) 105
- d) 110
- e) 115



27) The perimeter of this isosceles trapezoid is 52.
What is the area of this trapezoid?

- a) 72
- b) 96
- c) 130
- d) 156
- e) 169

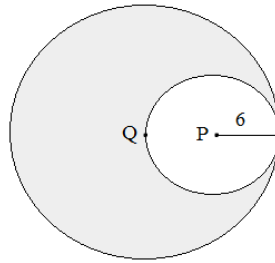




SOLUTIONS- →

- 1) The diagram shows internally tangent circles, where the inside circle passes through the center of the large circle. What is the area of the shaded region?

SOLUTIONS



$$\text{area of circle} = (\pi)(\text{radius})^2$$

$$\text{area of circle Q} = 144\pi$$

$$\text{area of circle P} = 36\pi$$

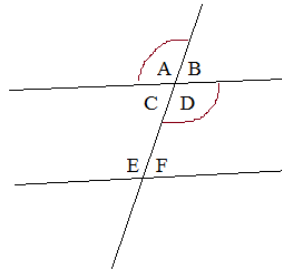
$$\begin{aligned} \text{shaded area} &= \text{circle Q} - \text{circle P} \\ &= 108\pi \end{aligned}$$

- a) 12
- b) 12π
- c) 36π
- d) 108π**
- e) 144π

- 2) Which MUST be true?

a) I only

- b) I and II only
- c) I, II, and III
- d) II and III only
- e) None



I. $\angle A \cong \angle D$

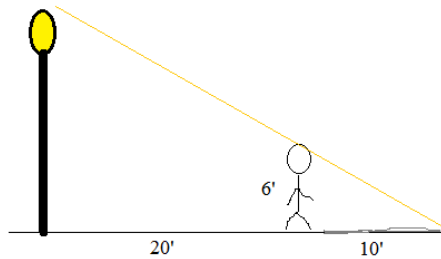
II. $\angle A \cong \angle E$

III. $\angle C \cong \angle F$

since the lines may or may NOT be parallel, the only angles that MUST be congruent are A and D (vertical angles)

- 3) A 6 foot man stands 20 feet from a light post, leaving a 10 foot shadow. The height of the light post is...

- a) 12
- b) 15
- c) 18**
- d) 21
- e) 24



Similar triangles....
Set up proportion

large triangle small triangle

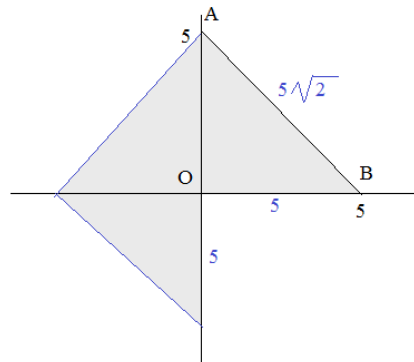
$$\frac{\text{(left)}}{\text{(bottom)}} = \frac{x}{(20 + 10)} = \frac{6}{10}$$

$$10x = 180$$

$$x = 18 \text{ feet}$$

- 4) Triangle ABO is reflected over the y-axis. Then, the triangle in quadrant 2 is reflected over the x-axis. What is the perimeter of the 3 triangle area?

- a) $10 + 15\sqrt{2}$**
- b) 15
- c) 25
- d) $30 + 15\sqrt{2}$
- e) 40

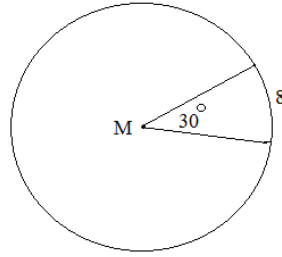


$$10 + 15\sqrt{2}$$

SOLUTIONS

5) What is the radius of circle M?

- a) 15.28
- b) 30.56
- c) 48
- d) 75.39
- e) 96



circumference of circle is $\frac{30}{360} = \frac{8}{C}$ $C = 96$

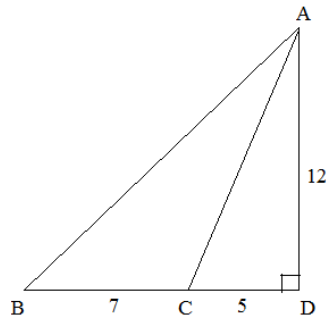
Circumference = $2\pi(\text{radius})$

$96 = 2\pi(\text{radius})$

radius = $\frac{48}{\pi} = 15.28$ (approx)

6) What is the area of $\triangle ABC$?

- a) 42
- b) 45.5
- c) 72
- d) 84
- e) 91



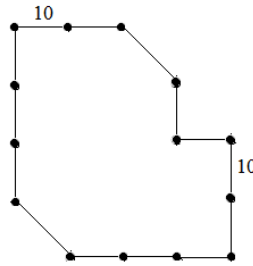
Area of large triangle ABD = 72

Area of small right triangle ACD = 30

Therefore, area of ABC = $72 - 30 = 42$

7) The diagram represents a fenced in grazing pasture. Each north/south and east/west post is set 10 feet apart. And, the diagonal posts are northwest by southeast.. What is the perimeter of the fence?

- a) 120
- b) $120 + 10\sqrt{2}$
- c) 140
- d) $120 + 20\sqrt{2}$
- e) 160



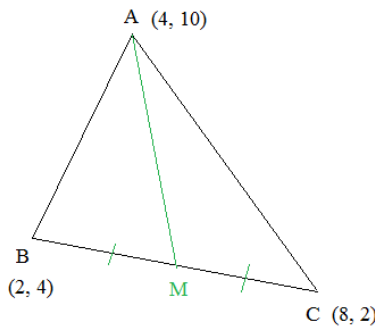
12 (horizontal/vertical) segments
2 (diagonal) segments

$12 \times 10 = 120$

$2 \times 10\sqrt{2} = 20\sqrt{2}$

8) In triangle ABC, the length of the median \overline{AM} is

- a) 7
- b) $5\sqrt{2}$
- c) $2\sqrt{15}$
- d) 8
- e) $\sqrt{70}$



First, find the coordinate of point M...

midpoint formula: $\left(\frac{2+8}{2}, \frac{4+2}{2}\right)$

(5, 3) is the midpoint M

Then, find the distance from A to M

distance formula: $\sqrt{(4-5)^2 + (10-3)^2}$

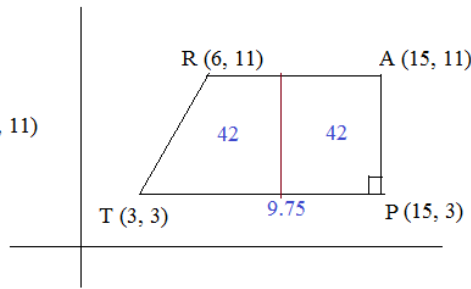
$\sqrt{50} = 5\sqrt{2}$

9) The slope of \overline{AP} is

- a) -8
- b) 0
- c) 4
- d) 8

e) undefined

(Diagram for questions 9, 10, 11)



slope of vertical line is undefined

SOLUTIONS

10) Which vertical line would cut the area of the trapezoid TRAP in half?

- a) $x = 6$
- b) $x = 8.8$
- c) $x = 9$
- d) $x = 9.75$
- e) $x = 10.5$

$$\text{area of TRAP} = \frac{1}{2} (12 + 9)(8) = 84$$

since $1/2(84) = 42$,
and, the height is 8,
the line must be 5.25 from 15..

$$x = 9.75$$

11) If \overline{TP} were rotated around the x-axis, it would create a right cylinder. The volume of the cylinder would be

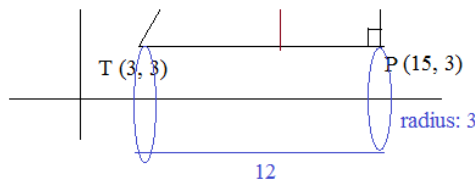
- a) 36π
- b) 72π
- c) 90π
- d) 108π
- e) 144π

$$\text{Volume of cylinder} = \pi (\text{radius})^2 (\text{height})$$

$$= \pi (3)^2 (12)$$

$$= 108\pi$$

(90π is the surface area)



12) If 2 sides of an isosceles triangle have lengths 6 and 14, then the third side must be

- a) 6
- b) 8
- c) 10
- d) 14
- e) 20

since triangle is isosceles, at least 2 sides are congruent...

So, third side could be 6 or 14...

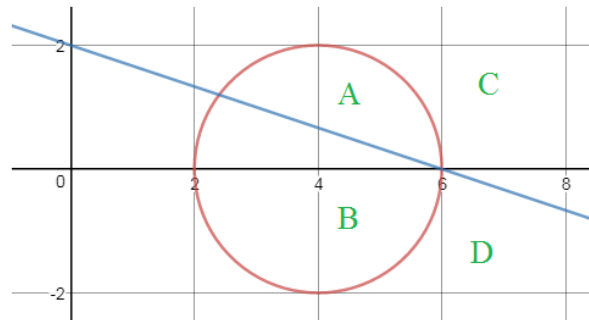
HOWEVER, it cannot be 6, because the third side must have a length between 8 and 20!

Therefore, the triangle has sides 6, 14, 14

13) The region of the system $(x - 4)^2 + y^2 \leq 4$ includes:
 $x + 3y \leq 6$

- a) A
- b) B
- c) C
- d) D

Note: (4, 0) satisfies BOTH equations, representing region B



SOLUTIONS

14) The supplement of an angle is 9 more than four times its complement.
What is the measure of the angle?

- a) 27
- b) 57
- c) 63**
- d) 117
- e) 123

x = "an angle"
 $(180 - x)$ = "the supplement"
 $(90 - x)$ = "its complement"

$$(180 - x) - 9 = 4 \cdot (90 - x)$$

"nine more" "4 times"

$$171 - x = 360 - 4x$$

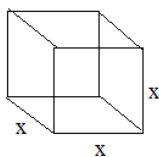
$$3x = 189$$

$$x = 63$$

angle: 63 degrees

15) A cubical block weighs 5 pounds.
If the sides are all doubled, then the new cubical block will weigh:

- a) 10 pounds
- b) 15 pounds
- c) 25 pounds
- d) 40 pounds**
- e) 125 pounds



Volume of cube = x^3

If sides are doubled: $(2x)^3 = 8x^3$

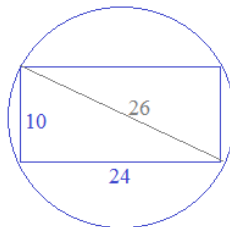
So, if original block is 5, then the new block is 40

$$x = \sqrt[3]{5} \Rightarrow \text{"doubled"} \ 2x = 2\sqrt[3]{5}$$

$$\text{volume} = \left(2\sqrt[3]{5}\right)^3 = 8 \cdot 5 = 40$$

16) A 10 x 24 rectangle is inscribed in a circle.
What is the circumference of the circle?

- a) 13π
- b) 26π**
- c) 34π
- d) 68π
- e) 169π (area of circle)

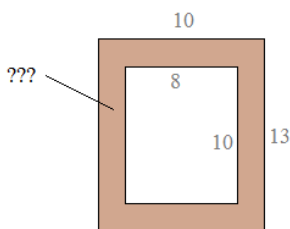


diagonal of rectangle is 26...
 (this is diameter of circle)
 radius of circle = 13

therefore, circumference is 26π

17) A 10" x 13" wooden picture frame can hold an 8" x 10" glossy photo.
What is the area of the wood portion of the frame?

- a) 6 sq inches
- b) 12 sq inches
- c) 24 sq inches
- d) 36 sq inches
- e) 50 sq inches**



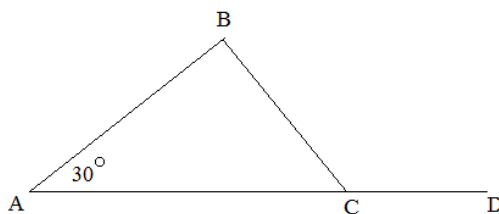
area of frame = $10 \times 13 = 130$

area of photo = $8 \times 10 = 80$

wood portion = $130 - 80 = 50$

18) If $\angle BCD$ is an obtuse angle, then what is the measure of $\angle B$?

- a) $0 < B < 60$
- b) $0 < B < 90$
- c) $30 < B < 120$
- d) $60 < B < 150$**
- e) $60 < B < 180$



Exterior angle theorem:

$$\angle BCD = \angle A + \angle B$$

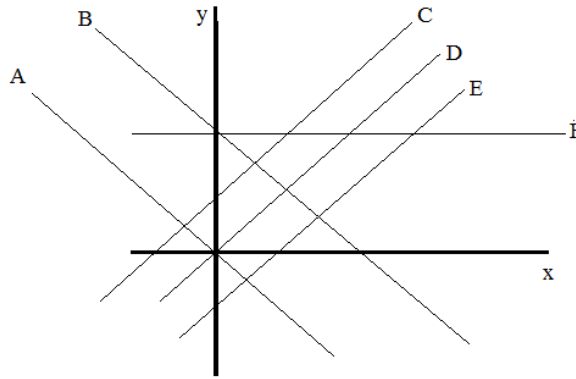
since BCD is obtuse, it is between 90 and 180 degrees...
 and, angle A is 30 degrees

therefore, angle B must be between 60 and 150

19) Which line could be $4x - 4y = 4$?

- a) A
- b) B
- c) C
- d) D
- e) E**
- f) F

SOLUTIONS



write in slope-intercept form..

$$x - y = 1$$

$$-y = -x + 1$$

$$y = x - 1$$

$$\text{slope} = 1$$

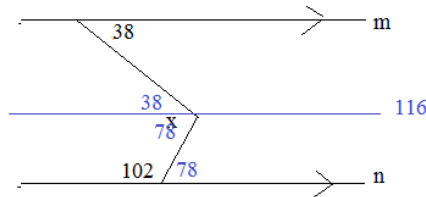
so, line is either C, D, or E

y-intercept is -1

so, line must be E

20) line m is parallel to line n
the measure of angle x is

- a) 64
- b) 78
- c) 116**
- d) 140
- e) cannot be determined



"crook problem"
insert a parallel line...

(figure may not be drawn to scale)

21) the line $y + 6 = 2(x - 5)$ intersects the x-axis at the point

- a) (5, 0)
- b) (8, 0)**
- c) (0, -16)
- d) (0, 4)
- e) (0, 0)

The x-intercept occurs at the point (x, 0)

$$0 + 6 = 2(x - 5)$$

$$6 = 2x - 10$$

$$x = 8$$

22) The measures of angles A, B, C in a triangle are in the ratio of 1:3:5.
The measure of the largest angle is

- a) 70°
- b) 80°
- c) 90°
- d) 100°**
- e) 110°

Triangle interior angles must add up to 180 degrees

$$x + 3x + 5x = 180 \text{ degrees}$$

$$9x = 180$$

$$x = 20 \quad \text{therefore, largest angle is } 100$$

23) The surface area of a rectangular prism is 206 sq. meters.
If the dimensions of one base are 3 x 5 meters, then what is the height of the prism?

- a) 7.2
- b) 8
- c) 9.4
- d) 11**
- e) 13.7

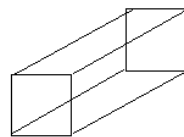
Since the area of one base is $3 \times 5 = 15$,
then the area of the top and bottom
is $15 + 15 = 30$

therefore, the lateral area is 150 sq meters

lateral area = (perimeter of base)(height)

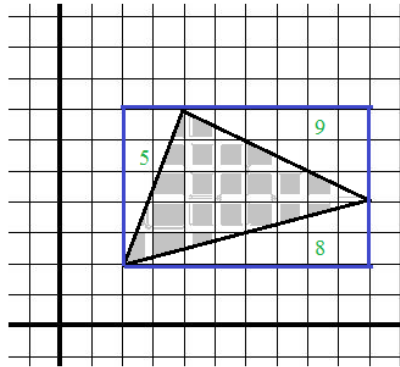
$$176 = 16 \times \text{height}$$

$$\text{height} = 11$$



24) The area of the shaded triangle is

- a) 17
- b) 17.5
- c) 18**
- d) 18.5
- e) 19



Vertices of shaded triangle:

(2, 2)

(4, 7)

(10, 4)

Using "encasement",
area of rectangle: $5 \times 8 = 40$

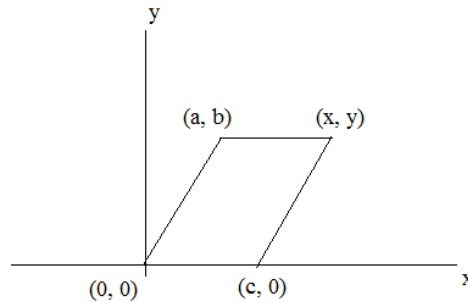
area of 3 right triangles:

$$5 + 9 + 8 = 22$$

Therefore, area of shaded triangle = 18

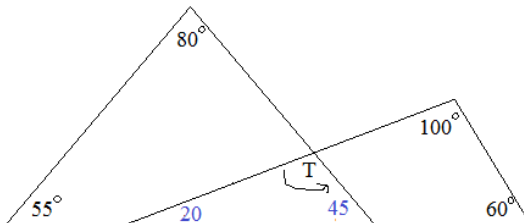
25) In the parallelogram, what is the coordinate (x, y) ?

- a) (c, b)
- b) (c + a, b)**
- c) (c - a, b)
- d) (2a, b)
- e) (2c, b)



26) The measure of angle T is

- a) 95
- b) 100
- c) 105
- d) 110
- e) 115**



sum of interior angles in triangle
must be 180

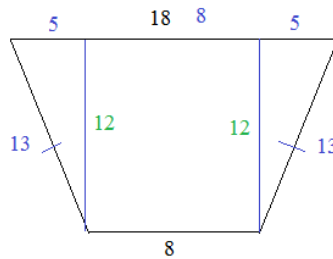
$$20 + 60 + 100 = 180$$

$$55 + 80 + 45 = 180$$

$$T + 20 + 45 = 180$$

27) The perimeter of this isosceles trapezoid is 52.
What is the area of this trapezoid?

- a) 72
- b) 96
- c) 130
- d) 156**
- e) 169



Since trapezoid is isosceles,
the sides must be congruent..

$$s + 18 + s + 8 = 52$$

the sides are 13

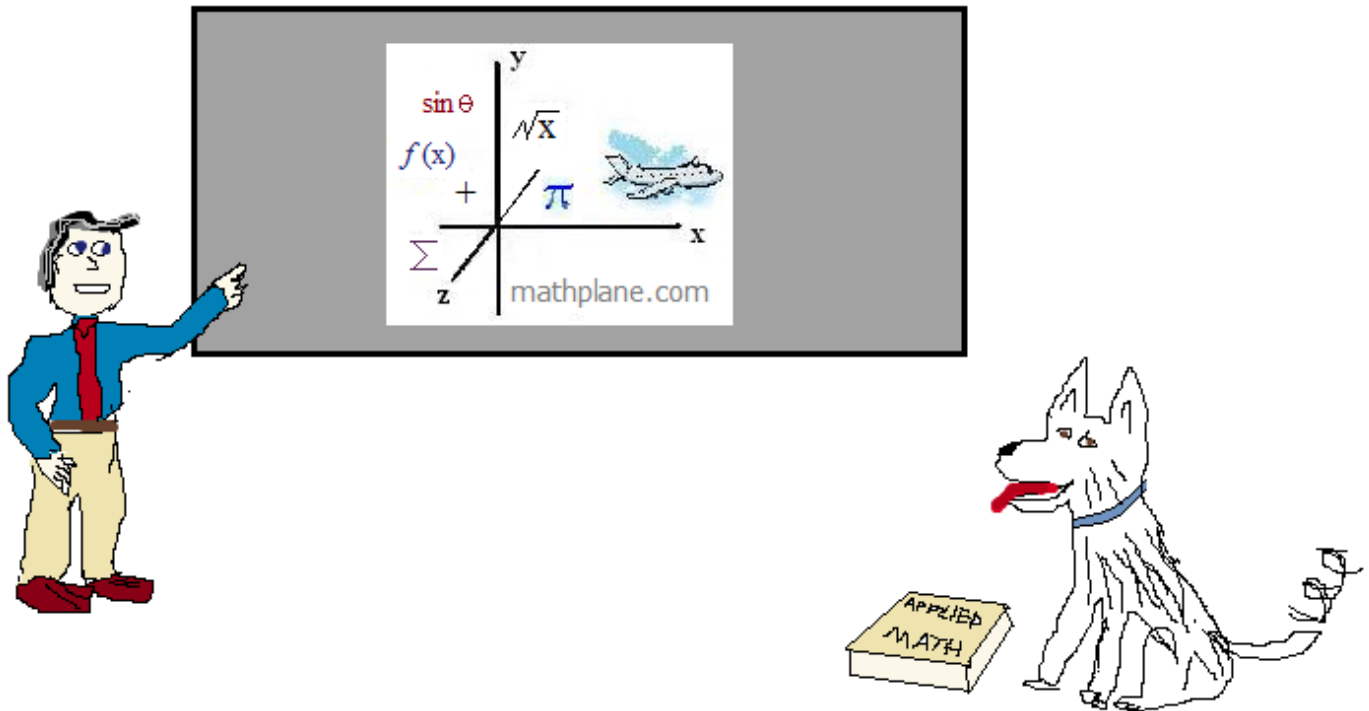
Then, to find area, need the
height... It's 12
(5-12-13)

$$\text{So, area is } \frac{1}{2} (18 + 8)(12) = 156$$

Thanks for visiting. (Hope it helped!)

If you have questions, suggestions, or requests, let us know.

Cheers.



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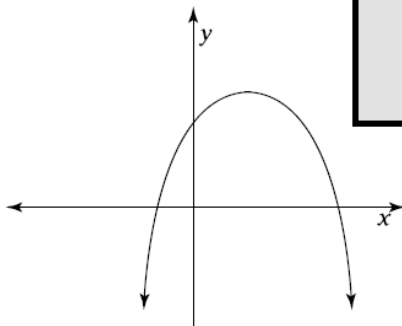
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6) Which of the following is equivalent to $\frac{\tan x \csc x}{\sin x \sec x}$?

- a) 1
- b) $\sin x$
- c) $\cos x$
- d) $\cot x$
- e) $\csc x$

7) The graph shows a parabola describing the function $y = ax^2 + bx + c$. Which of the following CANNOT be true?



- c) $b < c$
- d) $c < b$
- e) $a < c$

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