

2010-2011

key

Semester 2 Geometry Final Exam Review Short Answer-STU

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7 last  
page.

1 Find the fourth vertex of a rectangle with vertices A(3,2), B(5,1) and D(7,10).

(9,9)

2 A rectangle centered at the origin has coordinates of (2a, 2b), (2a, -2b) and (-2a, -2b). What would be the coordinates of the fourth vertex?

(-2a, 2b)

3 Prove that the shape with corners A(3,2), B(5,1), C(9,9) and D(7,10) is a rectangle.

AD slope:  $\frac{y_2 - y_1}{x_2 - x_1} = \frac{9 - 2}{7 - 3} = \frac{7}{4}$  Right  $\frac{7}{4}$   
DC slope:  $\frac{9 - 1}{7 - 5} = \frac{8}{2} = 4$  DC slope down right  $\frac{1}{2}$

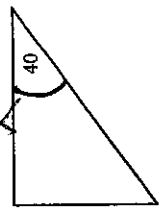
4 Macomb Community College wants to build an indoor soccer field. The playing field will be 5 times as long as it is wide. Artificial turf cost \$7 per square foot. The college has \$70,000 to spend on artificial turf. What will be the approximate width and length of the field?

$5x \cdot x = 10,000$   
 $5x^2 = 10,000$   
 $x^2 = 2000$   
 $x = 44.7$

5 Given  $\triangle ABC \sim \triangle DEF$  and  $\sin D = \frac{5}{13}$ , find  $\sin A$ .

$\frac{5}{13}$

6 Pools 'R' Us has an order to dig a custom pool that, viewed from the side, is a right triangle. They have been instructed to dig it 45 feet at its deep end with a 40 angle. How long will the pool be across the top?



45

$$\tan 40 = \frac{45}{x}$$

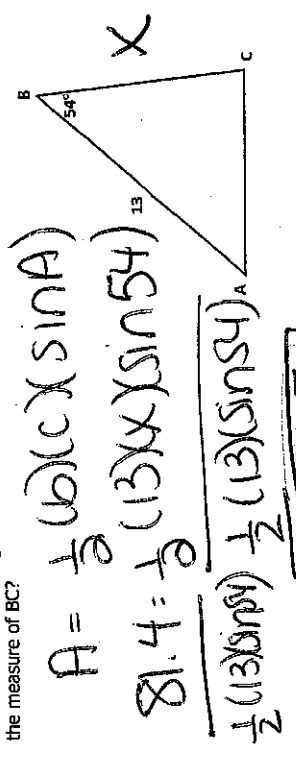
$$\frac{45}{\tan 40} = x \cdot \frac{\tan 40}{\tan 40}$$

$$53.6 = x$$

7 The sine of a 50 degree angle is equal to the cosine of what angle and why?

$$90^\circ - 50^\circ = 40^\circ$$

8 If the area of the triangle below is 81.4 ft<sup>2</sup>, what is the measure of BC?



$$A = \frac{1}{2} (b)(c)(\sin A)$$

$$81.4 = \frac{1}{2} (13)(x)(\sin 54)$$

$$\frac{1}{2} (13)(x) = \frac{81.4}{\sin 54}$$

$$x = 15.5$$

9 Find the area of a triangle with sides, 22 and 30 with the included angle measure of 62°.

$$A = \frac{1}{2} (22)(30)(\sin 62)$$

$$291.4$$

10 Find the area of triangle AMNO that has adjacent sides with lengths 12cm and 17cm and an included angle of 41°, to the nearest whole square unit.

$$A = \frac{1}{2} \cdot b \cdot c \cdot \sin A$$

$$\frac{1}{2} \cdot 12 \cdot 17 \cdot \sin 41$$

$$= 66.9 \text{ cm}^2$$

11  $\triangle ABC$  has sides  $a = 17$ ,  $b = 24$ , and  $c = 27$ . Find the measure of angle A using Law of Cosines.

$$\cos A = \frac{24^2 + 27^2 - 17^2}{2(24)(27)} = \frac{1016}{1296}$$

$$1016 \div 1296$$

$$\cos^{-1}$$

$$38.37^\circ$$

38

# Law of Sines

12 The largest of the three angles of a triangle is 80 degrees. The largest side, which is opposite the 80 degree angle is 13 inches. The smallest side is 8 inches. What is the angle opposite the smallest side?

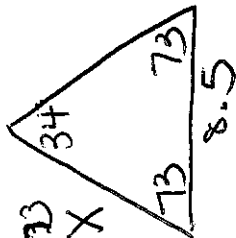
$$\frac{13}{\sin 80} = \frac{8}{\sin x}$$

$$13 \cdot \sin x = 8 \cdot \sin 80$$

$$\sin x = \frac{8 \cdot \sin 80}{13}$$

$$\sin x = .6016003$$

$$\sin^{-1} \boxed{.6016003} = \boxed{37.3^\circ}$$



$$x \cdot \sin 34 = \frac{8.5 \cdot \sin 73}{\sin 34}$$

$$x = \frac{8.5 \cdot \sin 73}{\sin 34} = 14.5$$

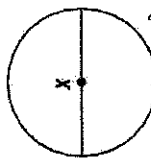
$$180 - 34 = 146$$

$$146 \div 2 = 73$$

14 In your own words, write the definition of a circle.

All points on a plane that are distance r from a central point

15 a. If the ratio of the diameter to the radius of Circle X is 2. What is the ratio of the diameter to the radius of Circle Y?



Diameter to radius is always 2:1

b. The diameter of Circle X is 6m. The diameter of Circle Y is 3. What is the area ratio of Circle X to Circle Y?

$$\frac{6}{3} = \frac{2^2}{1^2} = \frac{4}{1}$$

16 A circle of radius 1 divided into 12 pieces, cut, and rearranged into figure B.

Figure A

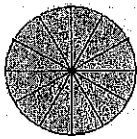
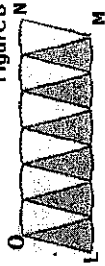


Figure B



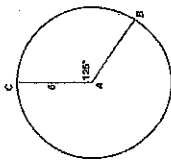
a) What does LO represent in relation to the circle? Radius

b) What does LM represent in relation to the circle?  $\frac{1}{2}$  circumference

c) How do we use this information to derive the formula for area of a circle?

$$\frac{1}{2}(r)(2\pi r) = \pi r^2$$

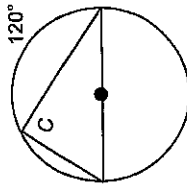
What is the area of the sector formed by  $\angle BAC$  in circle AP?



$$\frac{105}{360} \cdot \pi \cdot 6^2$$

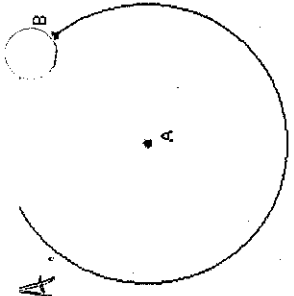
$$10.5\pi = 39.3$$

18 What is the measure of angle C in the figure at the right?

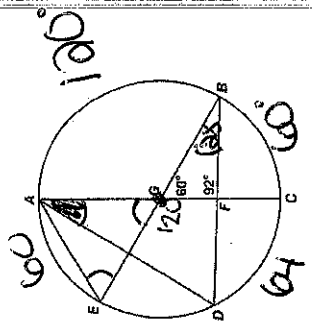


$$\frac{120^\circ}{2} = 90^\circ$$

tangent to circle A.  
 better circle of last page!  
 mathopenref.com



22. The diagram shows Circle G, with diameters  $\overline{BE}$  and  $\overline{AC}$  and chords  $\overline{AE}$  and  $\overline{AD}$ .



If  $\angle BFA$  measures  $92^\circ$  and  $\angle BGC$  measures  $60^\circ$ , how many degrees larger is  $\angle AEB$  than  $\angle DAC$ ?

$\angle AEB = \frac{120}{0} = 60$   
 $\angle DAC = \frac{64}{2} = 32$   
 $60 - 32 = 28$

23. Find the distance travelled by the tip of the minute hand of a clock in 5 minutes if the hand is 6 cm long.

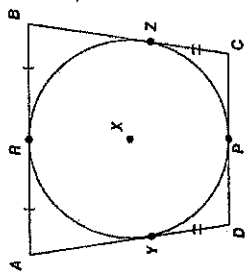
$\frac{360^\circ}{60} = 6^\circ \text{ per min} \cdot 5 = 30^\circ$   
 $\frac{30^\circ}{360} \cdot 2 \cdot \pi \cdot 6$

1- $\pi$ -or-3.14

24. Given the circle with equation  $(x + 4)^2 + (y - 58)^2 = 100$ , is the point  $(-14, 60)$  in the exterior of the circle, in the interior of the circle, or on the circle? Explain your reasoning.

$(-14+4)^2 + (60-58)^2 = 100$   
 $100 + 4 = 104$

outside / exterior



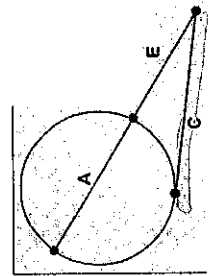
19. Quadrilateral  $ABCD$  is circumscribed about Circle  $X$ . The radius of Circle  $X$  is 15 cm.  $\overline{RP}$  is a diameter.

skip

- If  $BZ = 20$  cm and  $CZ = 24$  cm, what is the perimeter of  $ABCD$ ?
- What is the area of  $ABCD$ ?

Use words, numbers, and/or pictures to show your work. Write your answer(s) on the paper provided.

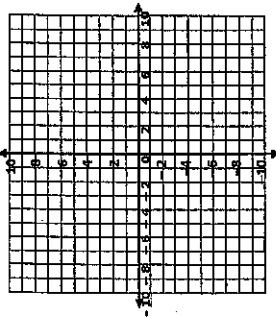
21. Which one of these lines represent a line tangent to a circle?



25 Graph the equation  $(x - 3)^2 + (y + 2)^2 = 9$ .

Center  
 $(3, -2)$

$$r = \sqrt{9} = 3$$



26 There are two cylinders, both with the same radius. One has a height of 6 cm and the other has a height of 12 cm. Compare the volumes of these two cylinders.

$\frac{12}{6} = 2$  times as large.

27 If the volume of a cylinder is  $90 \text{ in}^3$ , what is the volume of a cone with the same base area and height? ~~30~~ Explain how you determined your answer.  $90 \div 3$

If the volume of a cone is  $9 \text{ cm}^3$ , what is the volume of a cylinder with the same base area and height? ~~27~~ Explain how you determined your answer.  $9 \cdot 3$

28 Fill a cone with rice and pour it into a cylinder. Repeat until the cylinder is filled to the top. What is the relationship between the volume of a cone and the volume of a cylinder with the same base area and height?

3 cones = 1 cylinder

29 Jake found an old toy pyramid while he was cleaning out his closet. To help him finish cleaning out his closet, he placed all his old toys in the pyramid. If the pyramid had a height of 12 inches, and a side base of 10 inches, how much could the pyramid hold?

$$\frac{1}{3} B \cdot h$$

$$\frac{1}{3} (10 \cdot 10) \cdot 12$$

400  $\text{in}^3$

30 The diameter of a soup can is 8 cm. The height is 12 cm. How much soup will fit in the can?

$$r = 4$$

$$\pi \cdot r^2 \cdot h$$

$$\pi \cdot 4^2 \cdot 12 = 192\pi = 603.2$$

31 A softball has a radius of about 2.14 in. To the nearest whole number, what is the volume of the softball?

$$\frac{4}{3} \pi r^3$$

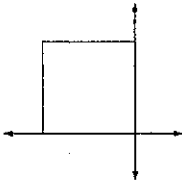
$$\frac{4}{3} \pi (2.14)^3 = 41$$

32 A sculptor is making a statue of the founder of the city where he lives. What is the BEST description of the shape of the arms and legs of the statue?

cylinders

33 Which solid is formed when a square is rotated  $360^\circ$  around the vertical axis?

cylinder



34 Describe the shape resulting from a vertical and horizontal cross section of a cylinder and cone.

vertical  $\updownarrow$  rectangle  $\rightarrow$  triangle  
 horizontal  $\leftrightarrow$  circle  $\rightarrow$  circle

35 Caleb's Cereal Company wants to change the front of one of their cereal boxes (rectangle). The old dimensions were 8 inches by 11 inches. The new dimensions are 7 inches by 12 inches.

a) What is the change in area of the front of the cereal box?

b) If each square inch costs \$.30, then how much money are they saving or losing per box?

a)  $8(11) = 88$      $7(12) = 84$   
 $88 - 84 = 4 \text{ in}^2$

b)  $4(.30) = \$1.20$  saved

36 Find the area of a regular pentagon with side length of 14 and an apothem of 12cm.

$\frac{1}{2}(a \cdot p) = \frac{1}{2}(14)(12) = 84$   
 $84 \cdot 5 = 420$   
 $420 \text{ cm}^2$

37 Find the area of a regular hexagon whose radius is 24.

AD:  $4^2 + 8^2 = x^2$

$80 = x^2$   
 $\sqrt{80} = x$

BC:  $4^2 + 8^2 = x^2$

$\sqrt{80} = x$

DC:  $1^2 + 2^2 = x^2$

$5 = x^2$

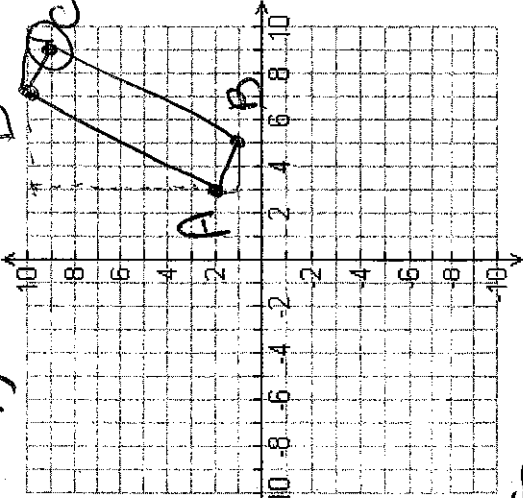
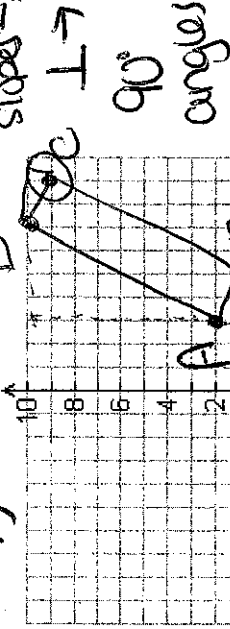
$\sqrt{5} = x$

AB:  $1^2 + 2^2 = x^2$

$5 = x^2$      $x = \sqrt{5}$

opposite sides  $\parallel$  &  $\cong$

1) adjacent sides opposite reciprocal 3) slopes  $\rightarrow$

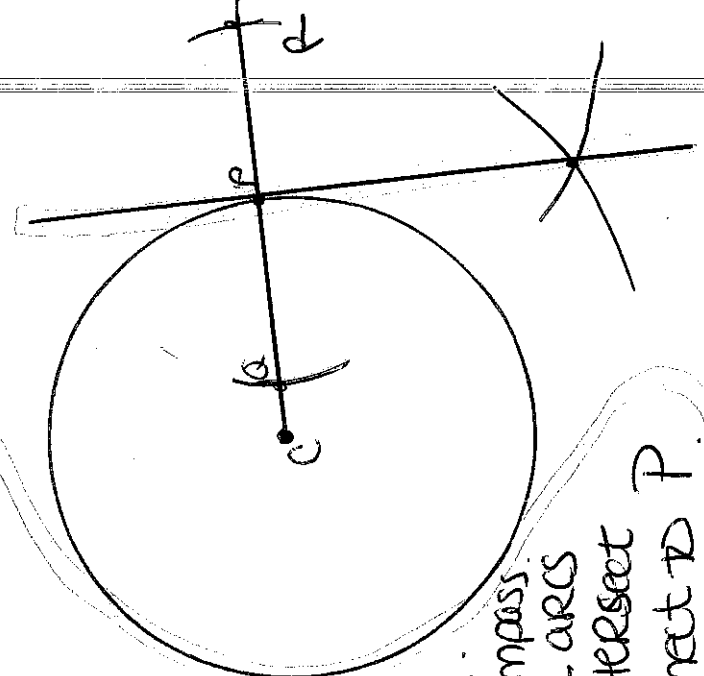


1) draw Radius, extend beyond circle. 20)

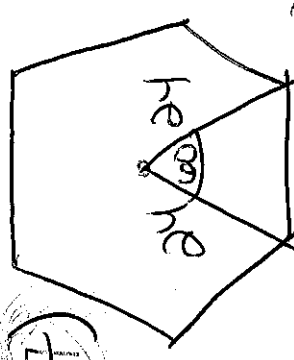
2) compass on P, make arc on left + right of P, smaller than radius.

3) compass on O, R. widen compass. make 2 arcs that intersect

4) connect to P.



37)



$\frac{1}{2}(24)(24)(\sin 60)(6)$   
 $1496.5$

