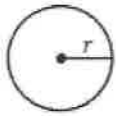
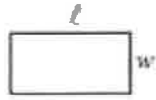


## SAT Math Formula Sheet

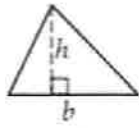


$$A = \pi r^2$$

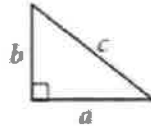
$$C = 2\pi r$$



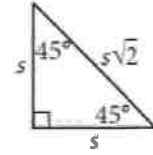
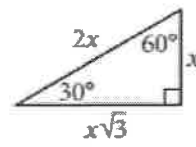
$$A = \ell w$$



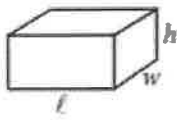
$$A = \frac{1}{2}bh$$



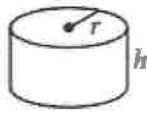
$$c^2 = a^2 + b^2$$



Special Right Triangles



$$V = \ell wh$$



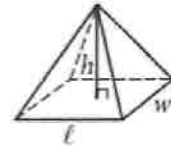
$$V = \pi r^2 h$$



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



$$V = \frac{1}{3}\pi r^2 h$$



$$V = \frac{1}{3}\ell wh$$

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is  $2\pi$ .

The sum of the measures in degrees of the angles of a triangle is 180.

NC Set #6 Part A

1. If  $5x + 6 = 10$ , what is the value of  $10x + 3$  ?

- A) 4
- B) 9
- C) 11
- D) 20

$$5x + 6 = 10$$

$$5x = 4$$

$$x = \frac{4}{5}$$

$$10\left(\frac{4}{5}\right) + 3$$

$$8 + 3$$

$$11$$

2. 
$$\begin{aligned} -3x + y &= 0 \\ 3x - 2y &= 10 \end{aligned}$$

Which of the following ordered pairs  $(x, y)$  satisfies the system of equations above?

- A) (3, -2)
- B) (2, -2)
- C) (-2, 2)
- D) (-2, -2)

$$-3x - 3y = 0$$

$$3x - 2y = 10$$

$$-5y = 10$$

$$y = -2$$

$$x - 2 = 0$$

$$x = 2$$

3. 
$$9a^4 + 12a^2b^2 + 4b^4$$
 PST

Which of the following is equivalent to the expression shown above?

- A)  $(3a^2 + 2b^2)^2$
- B)  $(3a + 2b)^4$
- C)  $(9a^2 + 4b^2)^2$
- D)  $(9a + 4b)^4$

$$(\quad)^2$$

$$\begin{array}{c} 3b \\ \wedge \\ + 6 + b \end{array}$$

$$\frac{9a^4}{6a^2b^2} \quad \frac{9a^4}{6a^2b^2}$$

$$(3a^2 + 2b^2)(3a^2 + 2b^2)$$

4.

$$2x(3x+5) + 3(3x+5) = ax^2 + bx + c$$

In the equation above,  $a$ ,  $b$ , and  $c$  are constants. If the equation is true for all values of  $x$ , what is the value of  $b$ ?

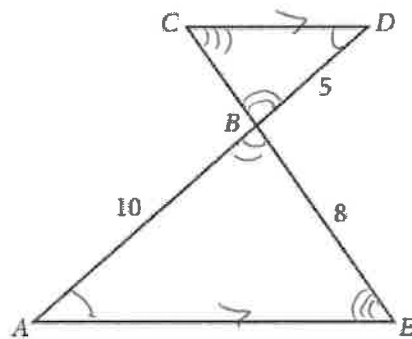
$$6x^2 + 10x + 9x + 15$$

$$6x^2 + 19x + 15$$

$b$

$$b = 19$$

5.



In the figure above,  $\overline{AE} \parallel \overline{CD}$  and segment  $AD$  intersects segment  $CE$  at  $B$ . What is the length of segment  $CE$ ?

$$\frac{10}{5} = \frac{8}{x}$$

$$10x = 40$$

$$x = 4$$

$$4 + 8 = 12$$

NC Set #6 Part A Key

1. C

2. B

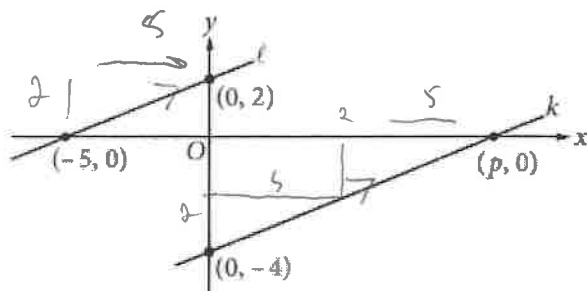
3. A

4. 19

5. 12

NC Set #6 Part B

1.



In the  $xy$ -plane above, line  $\ell$  is parallel to line  $k$ .  
What is the value of  $p$ ?

- A) 4
- B) 5
- C) 8
- D) 10

2.

Which of the following complex numbers is

equivalent to  $\frac{3-5i}{8+2i}$ ? (Note:  $i = \sqrt{-1}$ )

A)  $\frac{3}{8} - \frac{5i}{2}$

B)  $\frac{3}{8} + \frac{5i}{2}$

C)  $\frac{7}{34} - \frac{23i}{34}$

D)  $\frac{7}{34} + \frac{23i}{34}$

$$\frac{(3-5i)(8-2i)}{(8+2i)(8-2i)} = \frac{24-46i+10i^2}{64-4i^2}$$

$$\frac{14-46i}{68}$$

$$\frac{7-23i}{34}$$

3.

What is the sum of all values of  $m$  that satisfy

$$2m^2 - 16m + 8 = 0?$$

A) -8

B)  $-4\sqrt{3}$

C)  $4\sqrt{3}$

D) 8

$$2(m^2 - 8m + 4) = 0$$

$$\frac{8 \pm \sqrt{64 - 4(1)(4)}}{2} = \frac{8 \pm \sqrt{48}}{2} = \frac{8 \pm 4\sqrt{3}}{2}$$

$$(4 + 2\sqrt{3}) + (4 - 2\sqrt{3})$$

$$= 4 \pm 2\sqrt{3}$$

4.

$$R = \frac{F}{N+F}$$

A website uses the formula above to calculate a seller's rating,  $R$ , based on the number of favorable reviews,  $F$ , and unfavorable reviews,  $N$ . Which of the following expresses the number of favorable reviews in terms of the other variables?

A)  $F = \frac{RN}{R-1}$

B)  $F = \frac{RN}{1-R}$

C)  $F = \frac{N}{1-R}$

D)  $F = \frac{N}{R-1}$

$$\frac{R}{1} = \frac{F}{N+F}$$

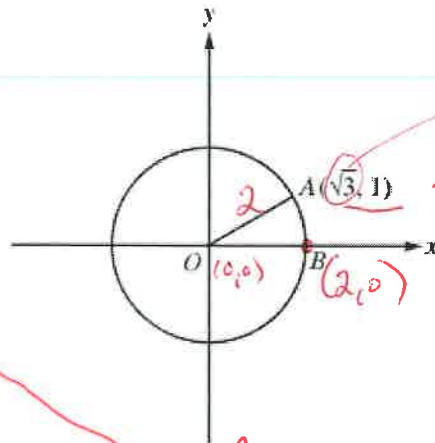
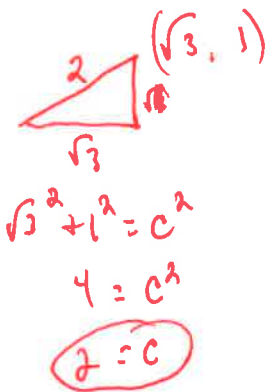
$$F = RN + RF$$

$$F - RF = RN$$

$$F(1-R) = RN$$

$$F = \frac{RN}{1-R}$$

5.



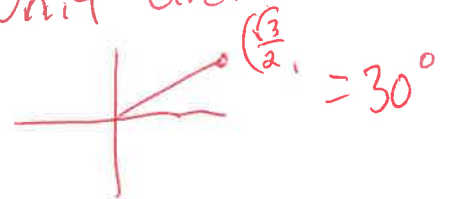
can be written  $(2 \cos \theta, 2 \sin \theta)$

$$\begin{aligned} \text{radius} &= \sqrt{(\sqrt{3}-0)^2 + (1-0)^2} \\ &= \sqrt{4} \\ &= 2 \end{aligned}$$

$$\sqrt{3} = 2 \cos \theta$$

$$\frac{\sqrt{3}}{2} = \cos \theta$$

Unit Circle



2 is Twice unit circle so divide by 2.

$$\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$$

$$30^\circ, \frac{180}{a} = 30$$

$$a = 6$$

$$\frac{\pi}{a} = 30^\circ$$

$$\frac{180}{a} = 30^\circ$$

$$a = 6$$

In the  $xy$ -plane above,  $O$  is the center of the circle, and the measure of  $\angle AOB$  is  $\frac{\pi}{a}$  radians. What is the value of  $a$ ?

NC Set #6 Part B Key

1. D

2. C

3. D

4. B

5. 6

NC Set #6 Part C

1. A landscaping company estimates the price of a job, in dollars, using the expression  $60 + 12nh$ , where  $n$  is the number of landscapers who will be working and  $h$  is the total number of hours the job will take using  $n$  landscapers. Which of the following is the best interpretation of the number 12 in the expression?

- A) The company charges \$12 per hour for each landscaper.
- B) A minimum of 12 landscapers will work on each job.
- C) The price of every job increases by \$12 every hour.
- D) Each landscaper works 12 hours a day.

- 2.

$$\sqrt{2k^2 + 17} - x = 0$$

If  $k > 0$  and  $x = 7$  in the equation above, what is the value of  $k$ ?

- A) 2
- B) 3
- C) 4
- D) 5

$$\begin{aligned} \sqrt{2k^2 + 17} &= 7 \\ 2k^2 + 17 &= 49 \\ 2k^2 &= 32 \\ k^2 &= 16 \\ k &= \pm 4 \\ k &= 4 \end{aligned}$$

- 3.

$$nA = 360$$

The measure  $A$ , in degrees, of an exterior angle of a regular polygon is related to the number of sides,  $n$ , of the polygon by the formula above. If the measure of an exterior angle of a regular polygon is greater than  $50^\circ$ , what is the greatest number of sides it can have?

- A) 5
- B) 6
- C) 7
- D) 8

$$\begin{aligned} n(50) &= 360 \\ 50n &= 360 \\ n &= 7.2 \end{aligned}$$



4.

If  $\frac{x^{a^2}}{x^{b^2}} = x^{16}$ ,  $x > 1$ , and  $a + b = 2$ , what is the value

of  $a - b$ ?

- (A) 8
- B) 14
- C) 16
- D) 18

$$a = -b + 2$$

$$\frac{x^{a^2}}{x^{b^2}} = x^{16}$$

$$a^2 - b^2 = 16$$

$$(-b+2)^2 - b^2 = 16$$

$$-4b = 12$$

$$b = -3, \text{ so } a = 5$$

$$a - b = 5 - (-3) = 8$$

$$(a+b)(a-b) = 16$$

$$2(a-b) = 16$$

$$a - b = 8$$

5.

The sales manager of a company awarded a total of \$3000 in bonuses to the most productive salespeople. The bonuses were awarded in amounts of \$250 or \$750. If at least one \$250 bonus and at least one \$750 bonus were awarded, what is one possible number of \$250 bonuses awarded?

~~$$3000 - 250 = 2750$$~~

$$3000 - 750 = 2250$$

$$\frac{2250}{250} = 9$$

$$3000 - 2(750) = 1500$$

$$\frac{1500}{250} = 6$$

$$3000 - 3(750) = 750$$

$$\frac{750}{250} = 3$$

3, 6, or 9

NC Set #6 Part C Key

1. A

2. C

3. C

4. A

5. 3, 6, or 9

NC Set #6 Part D

1.

The graph of a line in the  $xy$ -plane has slope 2 and contains the point  $(1, 8)$ . The graph of a second line passes through the points  $(1, 2)$  and  $(2, 1)$ . If the two lines intersect at the point  $(a, b)$ , what is the value of  $a + b$  ?

A) 4  
 B) 3  
 C) -1  
 D) -4

$y - 8 = 2(x - 1)$   
 $y = 2x + 6$   
 $2x + 6 = -x + 3$   
 $x = -1$   
 $y = 4$

$(1, 2)(2, 1) \quad \frac{2-1}{1-2} = -1$   
 $y - 2 = -1(x - 1)$   
 $y = -x + 3$

$a + b = -1 + 4 = 3$

2.

Which of the following equations has a graph in the  $xy$ -plane for which  $y$  is always greater than or equal to  $-1$  ?

A)  $y = |x| - 2$  → No

B)  $y = x^2 - 2$  → No

C)  $y = (x - 2)^2$  → Yes

D)  $y = x^3 - 2$  → No

3.

A radioactive substance decays at an annual rate of 13 percent. If the initial amount of the substance is 325 grams, which of the following functions  $f$  models the remaining amount of the substance, in grams,  $t$  years later?

A)  $f(t) = 325(0.87)^t$   
 B)  $f(t) = 325(0.13)^t$   
 C)  $f(t) = 0.87(325)^t$   
 D)  $f(t) = 0.13(325)^t$

decay =  $1 - 13\% = 87\%$

4.

The expression  $\frac{5x-2}{x+3}$  is equivalent to which of the following?

A)  $\frac{5-2}{3}$

B)  $5 - \frac{2}{3}$

C)  $5 - \frac{2}{x+3}$

D)  $5 - \frac{17}{x+3}$

$$\begin{array}{r} \frac{5x-2}{x+3} \\ \underline{5 - \frac{17}{x+3}} \\ x+3 \overline{) 5x-2} \\ \underline{-5x+15} \\ -17 \end{array}$$

Plug in 2

$$\frac{5(2)-2}{2+3} = \frac{8}{5}$$

D.  $5 - \frac{17}{2+3} = \frac{25}{5} - \frac{17}{5} = \frac{8}{5}$  *yes*

5.

$$ax + by = 12$$

$$2x + 8y = 60$$

In the system of equations above,  $a$  and  $b$  are constants. If the system has infinitely many solutions, what is the value of  $\frac{a}{b}$ ?

$$ax + by = 12$$

$$2x + 8y = 60$$

must be the same

2nd eq.  $\div 5$  to get first

$$\text{So, } \frac{2}{5} \text{ is } a \quad \frac{8}{5} = b$$

$$\frac{\frac{2}{5}}{\frac{8}{5}} = \frac{2}{8} = \frac{1}{4}$$