1) If 4x -7 = -9, what is the value of 6x + 5?

A 2

B 3

C 4

D 5

Sol: 4x -7 = -9 ; x = -1/2; 6x +5 = 6(-1/2) + 5 = 2

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2)

$$x + 2y = 0 ;$$
$$3x + y = -10$$

The above system of equation is satisfied by which of the following ordered pairs?

A (2,-4)

B (-4,2)

C (-2, 4)

D (4,-2)

Sol: x = -2y ; 3(-2y) + y = -10; -5y = -10; y = 2; and x = -4;

$$S = 3000 + 3dc$$

3) A service company estimates the salary of any employee in dollars, using the above expression, where d is the number of days an employee works in a month and c is the total number of complaints he resolved in a month. Which of the following is the best interpretation of the number 3 in the expression?

A the company charges 3$ per day for each of the complaint he resolves

B the minimum of3 complaints are resolved per day

C the employee is paid 3 $ everyday

D each day the employee works for 3 hours

Sol: dc is the total number of complaints resolved in d days. the company charges 3$ per day for each of the complaint he resolves.

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4) $9a^4 -30a^2b^3 +25b^6$

A $(5a^2 -3b^3)^2$

B $(3a^2 +5b^3)^2$

C $(3a^2 -5b^3)^2$

D $(3a -5b)^4$

Sol: compare with the formula $(x -y)^2 = x^2 -2xy + y^2$

$X = 3a^2$ and $y = 5b^3$

$(3a^2 -5b^3)^2 = 9a^4 -30a^2b^3 +25b^6$

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5) Sqrt($(x-1)^2 +7$) - k = 0

If x > 2 and k = 4 in the equation above, what is the value of x?

A 2

B 3

C 4

D 5

Sol: Sqrt($(x-1)^2 +7$) = 4 ;

$(x-1)^2 +7 = 16$; $(x-1)^2 = 9$; x-1 = 3 or -3; x = 4 or -2;

Since x >2 x = 4;

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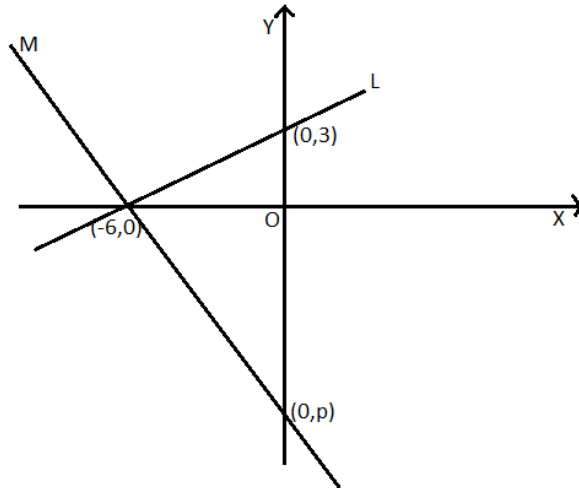
6) In the xy plane above, line l is perpendicular to line m and the two lines intersect on the x axis. What is the value of p?

A -4

B -6

C -8

D -12

Sol: (3/6)(-p/-6) = -1;

  3p/36 = -1; p = -12

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7) If $(x^{(a^2 +b^2)})/(x^{2ab}) = x^9$ and a<0 and b>0 , what is the value of a-b?

A -3

B 3

C 9

D -9

Sol: $x^{(a^2 +b^2-2ab)} = x^9$;

  $(a-b)^2 = 9$; a – b = 3 Or -3;

Since a<0 and b>0 a-b is negative. So a-b = -3

R = 3n

8) The revenue R of an apple vendor is given by the above equation.
n is the number of apples sold and R is the revenue. What should be the minimum number of an apples sold for the total revenue to be at least 100$?

A 32

B 33

C 34

D 35

Sol: total revenue = 3n ≥ 100 ;

$\qquad$ n ≥ 100/3; min p = 34

9) the line l in the xy plane has a slope 3 and passes through the point (1,2) and the line m in the xy plane passes through the points (2,3) and (-2,2). If the y intercept of line l is a and the y intercept of line m is b then what is the value of |a-b|?

A 5/2

B 7/2

C 9/2

D 11/2

Sol: y = 3x + c; (1,2) satisfies the equation;2 = 3+c; c = -1=a

$\qquad$ m = (3-2)/(2+2) = ¼; y = x/4 +c ; (2,3) satisfies the equation;

$\qquad$ 3 = 2/4 +c; c = 3-1/2 = 5/2=b

|a-b| = |-1-5/2| = 7/2

10) Which of the following equations has a graph in the xy plane for which y is always less or equal to 2?

A $\quad y = -x^2 +4$

B $\quad y = -|x| +3$

C $\quad y = -(x+5)^2 +1$

D $\quad y = x^3 +2$

Sol: $-(x+5)^2 <0$; so $-(x+5)^2 +1 <1$; $y = -(x+5)^2 +1$ always lies below 2.

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11) Which of the following complex numbers is equivalent to
(1/3+4i) +(1/4-3i) ?   (note : I = √-1)

A (7-2i)/25

B (7+i)/25

C (7-i)/25

D (7+2i)/25

Sol: (1/3+4i) +(1/4-3i) = (3-4i)/25 + (4+3i)/25;

(7-i)/25

$$a= (v_f -v_i) /(t_f -t_i)$$

12) Acceleration (a) in the above formula is a measure of how quickly the velocity of the object changes. v_f is the final velocity and v_i is the intial velocity. t_f is the final time and t_i is the initial time. Which of the following expresses v_i in terms of other variables?

A $v_i = a(t_f -t_i) - v_f$

B $v_i = v_f - a(t_f -t_i)$

C $v_i = a(t_i -t_f) - v_f$

D $v_i = v_f - a(t_i -t_f)$

Sol: $a= (v_f -v_i) /(t_f -t_i)$; $(v_f -v_i) = a(t_f -t_i)$;

$v_i = v_f - a(t_f -t_i)$

$$2x^2 - 16x + 24$$

13) If a and b are the solutions to the above equation, then what is the value of $1/a + 1/b$?

A 4/3

B 3/4

C 3/2

D 2/3

Sol: $1/a + 1/b = (a+b)/ab$;

$a+ b = 16/2 = 8$; $ab = 24/2 = 12$

$(a+b)/ab = 8/12 = 2/3$

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14) The amount of money in the saving account increases with an annual rate of 8 percent. If the initial amount in the savings account is 5000$, which of the following functions f models the amount of money in the savings account, n years later?

A $5000(1.08)^n$

B $5000(.92)^n$

C $1.08(5000)^n$

D $.92(5000)^n$

Sol: every year money increases by a factor of 1.08. so after n years the money in the account is $5000(1.08)^n$

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15) The expression $(3x^2 - 5x - 2)/(x-2)$ is equivalent to which of the following?

A 3x-1

B (3x + 1)/(x-2)

C 3x + 2

D 3x + 1

Sol: $(3x^2-5x-2)/(x-2) = (3x^2-6x+x-2)/(x-2) = (3x(x-2)+(x-2))/(x-2) = 3x+1;$

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16)   A total of 60 grams of gold coins are awarded to the best employees of the company. Only 5 grams and 15 grams gold coins are given to the best employees. If at least one 5 gram and one 15 gram gold coins are awarded, what is one possible value of the number of 5 gram gold coins?
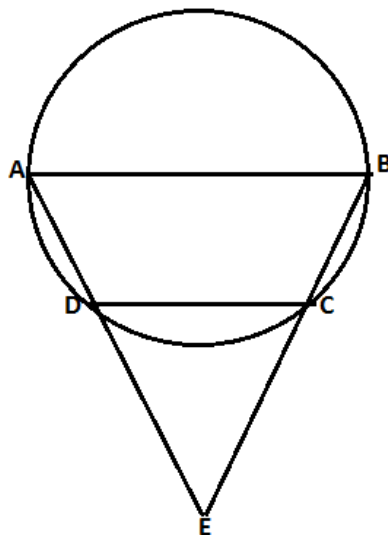
3,6,9

Sol: $5x + 15y = 60$;

$x + 3y = 12$; since x and y are intergers, the possible solutions are x = 3,6,9 and y = 3,2,1.

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17) $(x+5)(3x-1) = (a+b)x^2 + cx + (a-b)$

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

8

Sol: $3x^2 + 14x - 5 = (a+b)x^2 + cx + (a-b)$;
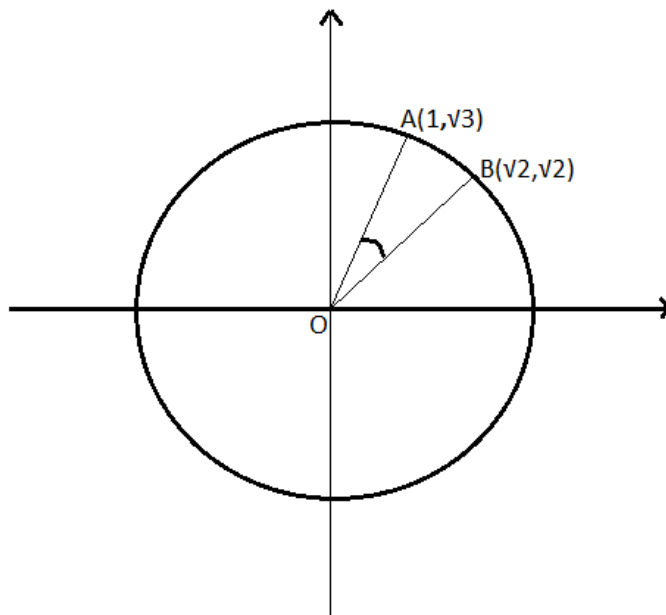
$a+b = 3$ and $a-b = -5$; => $b = 8$;

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18) In the figure above, AB is the diameter of the circle. C and D are the midpoints of BE and AE respectively. If the radius of the circle is 6 cm then what is the value of CD?

6

Sol: ABE and DCE are similar triangles by SAS property. So DC = 1/2AB.

DC = 12/2 = 6 cm.

19) In the xy plane above, O is the center of the circle, and the measure of angle AOB is π /a radians. What is the value of a?

12

Sol: OB makes an angle of 45 degrees with x axis. And OA makes an angle of 60 degrees with x axis. So, angle AOB = 60-45 = 15 .

Angle AOB = 15(π/180) = π/12. So, a = 12

$$6x + by + 8 = 0$$

$$2ax + 4y + 9 = 0$$

20)   a and b are constants in the system of equations above. If the system of equations have zero solutions then what is the value of ab?

12

Sol: Since the equations have zero solutions , slopes are equal.

-6/b = -2a/4; ab = 12