1. (B) Now, $a - b^2 \geq \frac{1}{4}$
   $\Rightarrow a \geq b^2 + \frac{1}{4}$

Similarly, $b \geq c^2 + \frac{1}{4}$
   $\Rightarrow a \geq (c^2 + \frac{1}{4})^2 + \frac{1}{4}$

Again $c \geq d^2 + \frac{1}{4}$
   $\Rightarrow a \geq \{(d^2 + \frac{1}{4})^2 + \frac{1}{4}\}^2 + \frac{1}{4}$

Again $d \geq a^2 + \frac{1}{4}$
   $\Rightarrow a \geq \{(a^2 + \frac{1}{4})^2 + \frac{1}{4}\}^2 + \frac{1}{4}$

Now, $(a^2 + \frac{1}{4})/2 \geq \sqrt{a^2*(1/4)} = a/2$
   $\Rightarrow a^2 + \frac{1}{4} \geq a$
   $\Rightarrow (a^2 + \frac{1}{4})^2 \geq a^2 \text{ ....... (A)}$
   $\Rightarrow (a^2 + \frac{1}{4})^2 + \frac{1}{4} \geq a^2 + \frac{1}{4}$
   $\Rightarrow \{(a^2 + \frac{1}{4})^2 + \frac{1}{4}\}^2 \geq (a^2 + \frac{1}{4})^2 \geq a^2 \text{ (using (A))}$

So going forward in this way we will get,

$a \geq \{(a^2 + \frac{1}{4})^2 + \frac{1}{4}\}^2 + \frac{1}{4} \geq a^2 + \frac{1}{4} \text{ (Using (A) again and again)}$
   $\Rightarrow a^2 - a + \frac{1}{4} \leq 0$
   $\Rightarrow (a - \frac{1}{2})^2 \leq 0$
   $\Rightarrow a - \frac{1}{2} = 0$
   $\Rightarrow a = \frac{1}{2}$

Similarly, $b = \frac{1}{2}$, $c = \frac{1}{2}$ and $d = \frac{1}{2}$

Putting the values backward, we get, $a - b^2 = \frac{1}{4}$, $b - c^2 = \frac{1}{4}$, $c - d^2 = \frac{1}{4}$ and $d - a^2 = \frac{1}{4}$

$\Rightarrow \text{Only one solution.}$

2. (A) Now, $\log_{12}18 = a$
   $\log_{18}/\log_{12} = a$
   $\log_{2\times3^2}/\log_{3^2} = a$
   $(\log_{2} + 2\log_{3})/(2\log_{2} + \log_{3}) = a$
   $\log_{2} + 2\log_{3} = 2\log_{2} + a\log_{3}$
   $(2a - 1)\log_{2} = (2 - a)\log_{3}$
   $\log_{3}/\log_{2} = (2a - 1)/(2 - a)$
Now, \( \log_{24}16 = \log_{16}/\log_{24} \)
\[ = \log_{2}^{4}/\log_{2}^{3} \times 3 \]
\[ = 4\log_{2}/(3\log_{2} + \log_{3}) \]
\[ = 4/(3 + \log_{3}/\log_{2}) \]
\[ = 4\{3 + (2a - 1)/(2 - a)}\]  
\[ = 4(2 - a)/(6 - 3a + 2a - 1) \]
\[ = (8 - 4a)/(5 - a) \]

3. (C) Now, \( \sec^{2}x - \tan^{2}x = 1 \)
\[ (\sec x - \tan x)(\sec x + \tan x) = 1 \]
\[ (\sec x - \tan x) = 1/(\sec x + \tan x) \]
\[ (sec x - tan x) = 1/2\cos x \]
\[ (sec x - tan x) = sec x/2 \]
\[ sec x/2 = tan x \]
\[ \sin x = \frac{1}{2} \]
\[ x = n/6, 5n/6 \]

4. (C) Now, last digit must be 2.
3 and 9 both are divisible by 3. We need to consider 3 2’s or 6 2’s to get the number divided by 3 and hence 6.

We put 3 2’s and the rest 3 numbers can be two 3 one 9 or two 9 one 3 or three 3 or three 9.
In first case number of numbers = \( 5!/(2!\times2!) = 30 \) (note that last digit 2 is fixed, it cannot permutate)
In second case number of numbers = \( 5!/(2!\times2!) = 30 \)
In third case number of numbers = \( 5!/(3!\times2!) = 10 \)
In fourth case number of numbers = \( 5!/(3!\times2!) = 10 \)
And 1 number for 6 2’s.

So, total number of six digit numbers with the given criteria = \( 30 + 30 + 10 + 10 + 1 = 81 \)
5. (B) Let, \( I = \int \left( \frac{\tan^{-1}x}{x} \right) \, dx \) (integration running from 1/2014 to 2014)

\[ I = \int \left( \frac{\cot^{-1}(1/x)}{x} \right) \, dx \] (integration running from 1/2014 to 2014)

\[ I = \int \left( \frac{n/2 - \tan^{-1}(1/x)}{x} \right) \, dx \] (integration running from 1/2014 to 2014)

\[ I = \left( \frac{n}{2} \right) \left[ \log(x) \right]_{1/2014}^{2014} - \int \left( \frac{\tan^{-1}(1/x)}{x} \right) \, dx \] (integration running from 1/2014 to 2014)

Now, let \( x = 1/z \)

\[ dx = -\frac{dz}{z^2} \]

\[ I = \left( \frac{n}{2} \right) \left[ \log(z) \right]_{1/2014}^{2014} - \int \left( \frac{z\tan^{-1}z}{z^2} \right) \, dz \] (integration running from 2014 to 1/2014)

\[ I = \left( \frac{n}{2} \right) \left[ \log(2014) - \log(1/2014) \right] - \int \left( \frac{\tan^{-1}z}{z} \right) \, dz \] (integration running from 1/2014 to 2014)

(Note that the sign came up due to upper limit and lower limit change)

\[ I = \left( \frac{n}{2} \right) 2\log(2014) - I \]

\[ 2I = n\log(2014) \]

\[ I = \left( \frac{n}{2} \right) \log(2014) \]
6. (A)

\[
\tan C = \tan^{-1}(1/2)
\]

\[
\tan C = \frac{1}{2}
\]

\[
\frac{(m - \frac{1}{2})}{(1 + m/2)} = \frac{1}{2} \quad (m \text{ is slope of the reflected ray line and } \frac{1}{2} \text{ is slope of } x = 2y)
\]

\[
m - \frac{1}{2} = \frac{1}{2} + m/4
\]

\[
3m/4 = 1
\]

\[
m = 4/3
\]

The equation of reflected ray line is,\]

\[
y - 1 = (4/3)(x - 2)
\]

\[
4x - 3y = 5
\]

7. (D) If \(x > 0\), then \(2x - [x] = 4\)

\[
2x = 4 + [x]
\]

RHS is an integer as \([x]\) is an integer.

Either \(x\) is (an odd number)/2 or an integer. First case (\(x\) is an odd number/2)

Let \(x = p/2\) where \(p\) is odd. Then \([x] = (p - 1)/2\) Putting the values we get, \(p = 4 + (p - 1)/2\)
p = 7
x = 3.5

Second case (x is an integer) $2x = 4 + x$

$\Rightarrow x = 4$

If $x < 0$ then $[x] - 2x = 4$

Similarly 2 cases, x is an odd integer/2 or x is an integer. Third case (x is an odd integer/2)

Let $x = \frac{p}{2}$ where p is odd integer

$\Rightarrow [x] = \frac{p - 1}{2}$ Putting the values we get,

$\frac{p - 1}{2} - p = 4$

$\Rightarrow p = -9$

$x = -4.5$

Fourth case (x is integer)

So, $x - 2x = 4$

$\Rightarrow x = -4$

Four solutions viz. 3.5, 4, -4.5, -4
Angle $A = (5 - 2) \times 180^\circ / 5 = 108^\circ$

$\Rightarrow$ Angle $OAB = 108^\circ / 2 = 54^\circ$

From triangle $OAC$,

$\Rightarrow \cos 54^\circ = \frac{AC}{OA}$

$\Rightarrow AC = r \cos 54^\circ$

$\Rightarrow AB = 2r \cos 54^\circ$

Now, $\sin 54^\circ = \frac{OC}{OA}$

$\Rightarrow OC = r \sin 54^\circ$

Area of triangle $OAB = (1/2) \times OC \times AB$

$= (1/2)(r \sin 54^\circ)(2r \cos 54^\circ) = (r^2/2) \sin 108^\circ$

$\Rightarrow$ Area of the inscribed pentagon $= 5 \times (r^2/2) \sin 108^\circ$
Angle $X = (5 - 2) \times 180°/5 = 108°$

$\Rightarrow$ Angle $RXZ = 108°/2 = 54°$

Now, $RX/RZ = \cot 54°$

$\Rightarrow$ $RX = r\cot 54°$

$XY = 2r\cot 54°$

Now, area of triangle $XYZ = (1/2) \times XY \times RZ = (1/2) \times (2r\cot 54°) \times r$

$= r^2\cot 54°$

$\Rightarrow$ Area of circumscribed pentagon $= 5r^2\cot 54°$

Now, ratio of area of inscribed and circumscribed pentagons is

$\{5 \times (r^2/2) \sin 108°\}/(5r^2\cot 54°)$

$= (2\sin 54°\cos 54°)(\sin 54°)/2\cos 54°$

$= \sin^2 54°$

$= \cos^2 36°$
Let, \( z_1 = iy_1 \) and \( z_2 = x_2 + iy_2 \)

Now, mid-point of \( z_1, z_2 \)
\[
= \frac{x_2}{2} + i\left(\frac{y_1 + y_2}{2}\right)
\]

Slope of \( z_1, z_2 = \frac{y_2 - y_1}{x_2} \)

Slope of perpendicular bisector of \( z_1, z_2 = -\frac{x_2}{y_2 - y_1} \)

Equation of perpendicular bisector of \( z_1, z_2 \) is,
\[
y - \left(\frac{y_1 + y_2}{2}\right) = -\frac{x_2}{(y_2 - y_1)}(x - \frac{x_2}{2})
\]

Equation of perpendicular bisector of \( z_1 \) is, \( y = \frac{y_1}{2} \)

Solving the two equations we get the circumcentre of triangle \( z_1, z_2, 0 \) as the intersection of these two lines is circumcentre.

Now, \( \frac{y_1}{2} - \left(\frac{y_1 + y_2}{2}\right) = -\left(\frac{x_2}{(y_2 - y_1)}\right)(x - \frac{x_2}{2}) \)

\[\Rightarrow\]
\[
y_2(y_2 - y_1)/2x_2 = x - \frac{x_2}{2}
\]

\[\Rightarrow\]
\[
x = y_2(y_2 - y_1)/2x_2 + \frac{x_2}{2}
\]

Now, we have,
10. (A) Everyone gets at least one chocolate and exactly 2 students get at least 2 chocolate. Now, the rest $8 - 2 = 6$ students get exactly one chocolate because if they get more than one chocolate then there will be more than 2 students who will get at least 2 chocolates and hence contradicting the statement that exactly 2 students get at least 2 chocolates.

Now, we can choose any 2 students out of 8 students in $^8C_2$ ways. Now, we give one chocolate to 8 students each.

Remaining chocolates $= 20 - 8 = 12$

Now, the chosen two students will get at least one chocolate among 12 chocolates and we need to distribute rest 12 chocolates among those 2 students only.

Number of ways $= ^{12 - 1}C_2 - 1 = ^{11}C_1$

Total number of ways $= ^8C_2*^{11}C_1 = (8*7/2)*11 = 308$

11. (D)
Now, from triangle OAC we get, \( OA = \sqrt{(r^2 - a^2/4)} \)
Now, \( AO + OB = a \)
\[ \Rightarrow \sqrt{(r^2 - a^2/4)} + r = a \]
\[ \Rightarrow \sqrt{(r^2 - a^2/4)} = a - r \]
\[ \Rightarrow r^2 - a^2/4 = a^2 - 2ar + r^2 \]
\[ \Rightarrow 5a^2/4 = 2ar \]
\[ \Rightarrow a = 8r/5 \]

12. (C) The element of P which gets divided by \( 2^n \) where \( n \) is largest is \( 2^6 \times 2^5 \times (3 \times 2^5) \times 2^4 \times (3 \times 2^4) = 9 \times 2^{24} \)
\[ \Rightarrow n = 24 \]

13. (B) So, \( g(x) = 3ax^2 + 2bx + c - 6ax - 2b + 6a \)
Let us put \( x = -r \) where \( r \) is real and positive.
\[ g(-r) = 3ar^2 - 2b(r + 1) + c + 6ar + 6a \]
Now, \( f'(x) = 3ax^2 + 2bx + c \)
\[ f'(-r + 1)) > 0 \quad (\text{As } f(x) \text{ is increasing}) \]
\[ 3a(r + 1)^2 - 2b(r + 1) + c > 0 \quad \text{(A)} \]
Now, \( g(-r) = 3a(r^2 + 2r + 1) - 2b(r + 1) + c + 3a \]
\[ = 3a(r + 1)^2 - 2b(r + 1) + c + 3a > 0 \quad (\text{As } a > 0 \text{ and from (A))} \]
Now, let \( r > 0 \)
\[ g(r) = 3ar^2 - 6ar + 3a + 2b(r - 1) + c + 6a \]
\[ 3a = 3a(r - 1)^2 + 2b(r - 1) + c + 6a \]
Now, \( f'(r - 1) = 3a(r - 1)^2 + 2b(r - 1) + c \quad \text{(B)} \)
\[ \Rightarrow g(r) > 0 \quad (\text{As } a > 0 \text{ and from (B))} \]
Now, \( g(0) = 6a - 2b + c \)
Now, \( f'(-1) = 3a - 2b + c > 0 \quad \text{(C)} \)
\[ \Rightarrow g(0) = 3a - 2b + c + 3a > 0 \quad (\text{As } a > 0 \text{ and from (C))} \]
\( g(x) \) is always positive.
14. (D) We have, \( \frac{1}{2} \{ h(6 - 2) + 5(2 - k) + 3(k - 6) \} = 12 \)
\[ 4h - 2k = 32 \]
\[ k = 2h - 16 \]

Now, distance of a point in A from (0, 0) is \( B = \sqrt{h^2 + k^2} \)

Now, \( B \) will be minimum when \( C \) is minimum.

Now, \( C = h^2 + (2h - 16)^2 \) (Putting value of \( k \) from above)
\[ C = 5h^2 - 64h + 256 \]
\[ \frac{dC}{dh} = 10h - 64 = 0 \]
\[ h = \frac{32}{5} \]

Now, \( \frac{d^2C}{dh^2} = 10 > 0 \)
- \( C \) is minimum when \( h = \frac{32}{5} \)
- \( C \) is minimum when \( k = 2 \times \left( \frac{32}{5} \right) - 16 = -\frac{16}{5} \)
- \( C_{\text{min}} = \left( \frac{32}{5} \right)^2 + \left( -\frac{16}{5} \right)^2 = \left( \frac{16}{5} \right)^2(4 + 1) = \frac{16^2}{5} \)
- \( B_{\text{min}} = \sqrt{C_{\text{min}}} = \frac{16}{\sqrt{5}} \)

15. (D) Now, \( a^2 + b^2 = c^2 \)
Let 3 doesn’t divide \( a \) or \( b \).

Dividing the equation by 4 we get, \( (\pm 1)^2 + (\pm 1)^2 \equiv 0 \pmod{3} \)
\[ \Rightarrow 1 + 1 \equiv 0 \pmod{3} \]
Which is impossible.

Now, Let \( c \) divides one of \( a, b \).

Dividing the equation by 3 again we get, \( (\pm 1)^2 + 0 \equiv 0 \pmod{3} \)
\[ \Rightarrow 1 \equiv 0 \pmod{3} \]
Which is impossible.
\[ \Rightarrow 3 \text{ divides both } a \text{ and } b. \]

Now, we have, \( (3a_1)^2 + (3b_1)^2 = (3c_1)^2 \) where \( a = 3a_1, b = 3b_1 \) and \( c = 3c_1 \)
\[ a_1^2 + b_1^2 = c_1^2 \]

Let, 3 doesn’t divide any of \( a_1, b_1, c_1 \)

Dividing the equation by 3 we get,
\[ 1 + 1 \equiv 1 \pmod{3} \]
Which is impossible

Let, 3 divides both of \( a_1, b_1 \)

Dividing the equation by 3 we get,
\[ 0 + 0 \equiv 1 \pmod{3} \]
Which is impossible.

\[ 3 \text{ divides exactly one of } a_1, b_1. \text{ Let } 3 \text{ divides } b_1 \text{ (Without loss of generality)} \]

In that case dividing the equation by 3 we get,
\[ 1 + 0 \equiv 1 \pmod{3} \]
Which is consistent.

\[ 3 \text{ divides } b_1 \]
\[ 3 \text{ divides } a, 3^2 \text{ divides } b \text{ and } 3 \text{ divides } c \]
\[ 3^4 \text{ divides } abc \]

16. \( (D) \)

17. \( (A) \) Now, \( f(x) = 1/(x - 2) \)
\[ x - 2 = 1/f \]
\[ x = 1/f + 2 \]
\[ f^{-1} = 1/x + 2 = (2x + 1)/x \]
Now, \( 1/(x - 2) = (2x + 1)/x \)
\[ x = 2x^2 + x - 4x - 2 \]
\[ x^2 - 2x - 1 = 0 \]
\[ x = \{2 \pm \sqrt{(4 + 4*1*1)})}/2 \]
\[ x = 1 \pm \sqrt{2} \]
When \( x = 1 + \sqrt{2} \), \( f = \frac{1}{(1 + \sqrt{2} - 2)} = \frac{1}{(\sqrt{2} - 1)} = \frac{(\sqrt{2} + 1)}{(\sqrt{2} - 1)(\sqrt{2} + 1)} = 1 + \sqrt{2} \\

When \( x = 1 - \sqrt{2} \), \( f = \frac{1}{(1 - \sqrt{2} - 2)} = \frac{1}{(-1 - \sqrt{2})} = \frac{(-1 + \sqrt{2})}{(-1 - \sqrt{2})(-1 + \sqrt{2})} = 1 - \sqrt{2} \\

So the intersection points are \((1 + \sqrt{2}, 1 + \sqrt{2})\) and \((1 - \sqrt{2}, 1 - \sqrt{2})\)

18. (C) \(374 = 2 \times 11 \times 17\)

Now, if we take, 119, 120 and 121 then no one is coprime to 374.

If we take 118, 119, 120, 121, 122 then also no one is coprime to 374. Because there are 2 odd prime factors of 374 and consecutive odd numbers are divisible by 11 and 17.

So, if we take 3 odd numbers then one must be coprime to 373.

So, if we take, 117, 118, 119, 120, 121, 122 then 117 is coprime to 374. Also if we take 118, 119, 120, 121, 122, 123 then 123 is coprime to 371.

\[ \Rightarrow N = 6 \]

19. (C)

20. (A) Clearly the limit holds for \(\alpha \geq 1\)

In that case \(\lim_{x \to 0} \frac{(\sin^\alpha x)}{x} = \lim_{x \to 0} \left(\frac{(\sin x)}{x}\right) \times \sin^{\alpha-1}x \) as \(x \to 0 = 1 \times 0 = 0\)

If \(\alpha - 1\) is negative then it makes a 0 in numerator.
21. (B)

\[ x + y = 0 \]
\[ x^2 + y^2 = 100 \]

Now, \( \sin(x + y) > 0 \)

\[ \Rightarrow \sin(x + y) > \sin 0 \]
\[ x + y > 0 \]

Clearly the area represented by \( R \) is the semicircular area \( AOBCA \)

Now, radius of the circle = 10

\[ \Rightarrow \text{Area of the semicircular region } AOBCA = \left( \pi \times 10^2 \right)/2 = 50\pi \]

22. (A)

The circumcentre lie on \( AD \).

\[ \Rightarrow O, \text{ the circumcentre must divide } AD \text{ in equal halves.} \]
\[ BC = CD \]

Now, from triangle \( OBC \), let \( \text{Angle } BOC = \theta \)

\[ \Rightarrow \cos \theta = \frac{(r^2 + r^2 - r^2/4)/2 \times r \times r}{2} \]}
\[ \cos \theta = \frac{7}{8} \]
\[ \text{Angle DOC} = \frac{180^\circ - \theta}{2} \]
\[ \cos(\text{DOC}) = \cos(90^\circ - \frac{\theta}{2}) = \sin(\frac{\theta}{2}) \]
\[ \sin(\frac{\theta}{2}) = \frac{r^2 + r^2 - a^2}{2r^2} \]
\[ \sin^2(\frac{\theta}{2}) = \left(1 - \frac{a^2}{2r^2}\right)^2 \]
\[ \frac{1 - \cos \theta}{2} = \left(1 - \frac{a^2}{2r^2}\right)^2 \]
\[ 
\begin{align*}
\frac{1}{16} &= \left(1 - \frac{a^2}{2r^2}\right)^2 \\
1 - \frac{a^2}{2r^2} &= \frac{1}{4} \\
a^2/2r^2 &= \frac{3}{4} \\
a^2/r^2 &= \frac{3}{2} \\
a/r &= \sqrt{3} : \sqrt{2} \\
2a/2r &= \sqrt{3} : \sqrt{2} 
\end{align*}
\]

23. (B)

24. (B)

The combinations are when none of \(a, b, c\) is 1.

\[ (2, 2, 2 \times 5^3) = 3!/2! = 3 \] \[ (2, 2^2, 5^3) = 3! \]
\[ = 6 (5, 5, 5 \times 2^3) = 3!/2! = 3 (5, 5^2, 2^3) = 3! = 6 \]
\[ (2, 2 \times 5, 2 \times 5^2) = 3! \]
\[ = 6 (2, 2^2 \times 5, 5^2) = 3! \]
\[ = 6 (2, 2^2 \times 5^2, 5) = 3! = 6 \]
\[ (2^2, 2 \times 5, 5^2) = 3! \]
\[ = 6 (2^2 \times 5, 2 \times 5, 5) = 3! = 6 \]
\[ (5, 2 \times 5^2, 2^2) = 3! \]
\[ = 6 (2 \times 5, 2 \times 5, 2 \times 5) = 1 \]

Number of cases = 3 + 6 + 3 + 6 + 6 + 6 + 6 + 6 + 6 + 1 = 55

Now, when one of \(a, b, c\) is 1.

\[ (1, 2, 2^2 \times 5^2) = 3! \]
\[ = 6 (1, 2^2, 2 \times 5^3) = 3! = 6 \]
\[(1, 2^3, 5^3) = 3!\]
\[= 6 (1, 2 \times 5, 2^2 \times 5^2) = 3! = 6\]
\[(1, 2 \times 5^2, 2^2 \times 5) = 3!\]
\[= 6 (1, 2^3 \times 5, 5^2) = 3!\]
\[= 6 (1, 2^3 \times 5^2, 5) = 3! = 6\]

Number of cases = \[6 + 6 + 6 + 6 + 6 + 6 + 6 = 42\]

Now, when 2 of a, b, c are 1.
\[(1, 1, 1000) = 3!/2! = 3\]

Therefore, total number of cases = \[55 + 42 + 3 = 100\]

25. (B) Let \(z = 1/x\), then \(z \to 0\) as \(x \to \infty\)

The limit is \(\lim \{f(3 + z)/f(3)\}^{1/z}\)

as \(z \to 0\)
\[= \lim [1 + \{f(3 + z) - f(3)\}/f(3)]^{1/z}\]

Now, \(\{f(z + 3) - f(3)\} /f(3) \to 0\) as \(z \to 0\)

So, the limit is \(= e\)

26. (D)

Let \(z = re^{i\theta}\)

Now, \(z - 1/z = re^{i\theta} + 1/re^{i\theta} = (r\cos\theta + \cos\theta/r) + i(r\sin\theta - \sin\theta/r)\)

\[|z - 1/z| = \sqrt{r^2 \cos^2 \theta + \cos^2 \theta/r^2 - 2\cos^2 \theta + r^2 \sin^2 \theta + \sin^2 \theta/r^2 - 2\sin^2 \theta}\]

\[2 = \sqrt{r^2 + 1/r^2 - 2}\]
\[r^2 + 1/r^2 = 6\]
\[r^2 + 2 + 1/r^2 = 8\]
\[(r + 1/r)^2 = 8\]
\[r + 1/r = 2\sqrt{2}\]
\[r^2 - r2\sqrt{2} + 1 = 0\]
\[r = (2\sqrt{2} + \sqrt{8 - 4})/2\]
\[r = (1 + \sqrt{2})\]
27. (B)

28. (D)

\((f^{-1}(A_1))^c \cup (f^{-1}(A_2))^c\) includes the whole area except \(A_1 \cap A_2\)
So, this may not be always true.

Second statement holds if the function is one-one and onto. So, option (d) is correct.
29. (A)

Clearly when c is shifted from \((a + b)/2\) then the red area > green area and so \(A(c)\) is minimum when \(c = (a + b)/2\).

30. (C)