1. **A**	11. **C**	21. **D**
2. **C**	12. **D**	22. **C**
3. **D**	13. **A**	23. **A**
4. **E**	14. **E**	24. **B**
5. **C**	15. **B**	25. **D**
6. **A**	16. **C**	26. **C**
7. **C**	17. **A**	27. **C**
8. **B**	18. **D**	28. **A**
9. **C**	19. **C**	29. **A**
10. **D**	20. **B**	30. **A**

1. **A** Using the linear combination method to solve: (2x + 3y = 8)•2 gives us 4x + 6y = 16. (5x + 2y = -2)•(-3) gives us -15x – 6y = 6. These two equations combine to give us x = -2, therefore y = 4. The product is **-8.**
2. **C** A line with an undefined slope is a vertical line of the form x = c, where c is the abscissa of every point on the line. Therefore, the equation must be $\boldsymbol{x = 20}$.
3. **D** Multiply both sides of the equation by $(x + 1)(x – 3)$. This gives us $A(x + 1) + B(x – 3) = 1$. Distributing and regrouping we have $Ax + Bx + A – 3B = 1$; $x(A + B) + (A – 3B) = 0x + 1$, so A + B = 0 and A – 3B = 1. Solving we get B = - ¼ and A = ¼ , so the product is **-1/16.**
4. **E** The only possible values of x and y are -1, 0, and 1. The combinations of coordinates are (0,0), (0, ±1), (±1, 0), and (±1, ±1), which is a total of **9** points.
5. **C** $2^x \cdot 2^2 - 2^1 \cdot 2^x - 1 \cdot 2^x = 2^x(4-2-1) = \mathbf{2^x}$
6. **A** Squaring both sides of the equation gives us $9+4\sqrt{5} = x+2\sqrt{xy}+y$; so 9 = x + y and $4\sqrt{5} = 2\sqrt{xy}$, which means 80 = 4xy and 20 = xy. At this point we can solve by inspection and conclude that x = 4 and y = 5, so the value $3x – y$ is **7.**
7. **C** Transform the equation by completing the square in order to identify the relevant values: $4(x^2+6x+9)+9(y^2-8y+16) = -144+4(9)+9(16) = 36$. So $\frac{(x+3)^2}{9}+\frac{(y-4)^2}{4} = 1$, which tells us a = 3 and b = 2. Therefore $c = \sqrt{5}$ and the distance between the foci is $\mathbf{2\sqrt{5}}$.
8. **B** The slope of the segment is 1/3, so the slope of the perpendicular bisector is -3. The midpoint of the segment is (-1, -4). The equation of the line with slope of -3 and passing through the point (-1, -4) is found by substituting into slope intercept form: -4 = -3(-1) + b, so we get b = -7 and the line is y = -3x -7. Solving for the x-intercept by replacing y with 0, we find that the x-intercept is .
9. **C** First, we know that $x^3 + y^3 = (x + y)(x^2 – xy + y^2)$. Since $(x + y) = 11$, then $x^2 + 2xy + y^2 = 121$. If from this we subtract $x^2 + y^2 = 325$, the result is $2xy = -204$, so $xy = -102$. We can now substitute numerical values into the expression $(x + y)(x^2 – xy + y^2)$: (11)(325 – (-102)) = 11(427) = **4,697.**
10. **D** Distributing we have $-3x + 6 – x^2 + 3x < – x^2 – 2x – 8$. Combining terms and simplifying gives us $2x < -14$, so $x < -7$. The greatest integer in this solution is **-8.**
11. **C** By the complex conjugate theorem and remainder theorem, the roots are (2 + i), (2 – i), i, -i, and (2x + 3). Using the rules for sum and product of the roots of a quadratic equation we can construct the quadratic polynomial factors of our desired equation. The roots (2 + i) and (2 – i) give us (x^2 - 4x + 5), and i *and* –i give us (x^2 + 1). Multiplying these and then multiplying the result by (2x + 3), results in the quintic polynomial $2x^5 – 5x^4 + 10x^2 – 2x + 15$. The coefficient of the quadratic term is **10.**
12. **D** The critical points are at -1, 1, and 3. Examining the sign of the expression for each interval results in the intervals between -1 and 1, including -1, and everything greater than or equal to 3. Thus $\mathbf{[-1,1)\cup[3,\infty)}$.
13. **A** The absolute value equation is equivalent to the conjunction: $4x-5 \le x+8$ *and* $4x-5 \ge -x-8$ whose solution is $x \le \frac{13}{4}$ *and* $x \ge -\frac{3}{5}$. The integers in this solution set are: 0, 1, 2, 3, and 4; their sum is 10.
14. **E** All are equivalent, so the correct response is None of These Answers, **NOTA.**
15. **B** To find the center of the circle, complete the square, giving $(x+1)^2+(y-2)^2 = 20$. The radius from the center of the circle (-1, 2) to the point of tangency (3, 4) has slope m = ½ so the slope of the tangent line is -2**.** To find the equation of the line, use point slope form: $y-4 = -2(x-3) \Rightarrow \mathbf{2x+y=10}$.
16. **C** The quadratic inequality is the *interior* of the ellipse centered at (3, -2) with a = 4 and b = 2, so its full area $A = 8\pi$. The region we have is the semi-ellipse (the left half) with area $\mathbf{4\pi}$.
17. **A** The abscissa of the vertex is $h = -b/2a$ = -24/6 = -4. Replacing x with -4 gives us the minimum value of the function: $3(-4)^2 + 24(-4) + 35$ = **-13.**
18. **D** $f(x+1) = 2017^{x+1} = (2017^x)(2017^1)$; $f(x+1) - f(x) = 2017(2017^x) - (2017^x)$. Factoring we have $(2017^x)(2017-1)$, which equals $\mathbf{2016(2017^x)}$**.**
19. **C** Take the log of each side of the equation: $\log(x^{\log x}) = \log(100x)$. Then $\log x(\log x) = \log 100 + \log x$, which gives us $(\log x)^2 – \log x – 2 = 0$, which factors to $(\log x - 2)(\log x + 1) = 0$, so $\log x = 2$ and $\log x = -1$. This gives us solutions of 100 and 0.1; the product of which is **10.**
20. **B** $x = 3y + 5 \Rightarrow 3y = x – 5 \Rightarrow \boldsymbol{f^{-1}(x) = \frac{x-5}{3}}$

21. **D** Separate this into two separate geometric sequences: 5/2 + 1 + 2/5 + … and -1/3 + 2/9 + -4/27 +… Each is an infinite convergent geometric sequence whose sum is defined by $S=\frac{a_1}{1-r}$. For the first sequence, r = 2/5, so S = 25/6. For the second sequence, r = -2/3, so S = -1/5. The sum of these two values is **119/30.**
22. **C** The possible cases are 3 boys and 2 girls; 4 boys and 1 girl; and all 5 boys. The number of ways these can occur are defined by $_5C_3$, $_5C_4$, and $_5C_5$, which equal 10, 5, and 1, respectively, so there are a total of 16 possibilities. The case we are considering, 3 boys and 2 girls, may occur in 10 different ways, so the probability is 10/16, or **5/8.**
23. **A** For inverse variation, $k = xy$ = (420)(1200). Rather than multiplying this out, let's rewrite in partially factored form: 2· 5 · 6 · 7 ·12 · 25· 4. If 75 chairs exist, then 75c = 2· 5 · 6 · 7 ·12 · 25· 4, with c representing the cost of each of the 75 chairs. We can easily solve for c by dividing by the factors of 75, which leaves us with the result c = 2· 5 · 2 · 7 ·12 · 4 = **$6,720.**
24. **B** By the rational root theorem, we can identify the possible values of the roots to be the signed factors of 10: ±1,±2, and ±5. Further inspection leads us to two possible sets of zeros that are each an arithmetic sequence. They are{-5, -2, 1} or {-1, 2, 5}. Using the factor theorem, we can construct the specific function in factored form: $f(x) =(x + 1)(x – 2)(x – 5)$, and verify by multiplying these factors. The product of these factors is $f(x) = x^3 – 6x^2 +3x + 10$, which indeed fits the given required relationship between the quadratic and linear terms, that is, n = -3. We can most efficiently find the value of f(-3) by substituting -3 into the factored form of $f(x)$, which gives us: f(-3) = (-3 +1)(-3 – 2)(-3 – 5) = (-2)(-5)(-8) = **-80.**
25. **D** The constant term of the expansion must be the term in which the exponents on the variable in the numerator and denominator cancel each other out. This will occur when the term ($2x^2$) is raised to the 3rd power, and when $\left(-\frac{1}{x}\right)$ is raised to the 6th power. The constant term is $\left(\frac{9!}{3!6!}\right)\left(2x^2\right)^3\left(-\frac{1}{x}\right)^6$, which equals (84)(8) = **672.**
26. **C** A^{-1} = ½ $\begin{bmatrix}3 & 1\\4 & 2\end{bmatrix}$; B^2 = $\begin{bmatrix}9 & 0\\-10 & 4\end{bmatrix}$. Their product is ½$\begin{bmatrix}17 & 4\\16 & 8\end{bmatrix}$ or $\begin{bmatrix}8.5 & 2\\8 & 4\end{bmatrix}$. The sum of the elements is **22.5.**
27. **C** By completing the square and converting the equation into standard form, we get $\frac{(y+2)^2}{9}-\frac{(x-3)^2}{(9/4)}=1$. This tells us that the asymptotes each pass through the center (3, -2), and their slopes are ±2. The equations of the asymptotes are $y = 2x – 8$ and $y = -2x + 4$, so the sum of their y-intercepts is **-4.**
28. **A** The factored form is $R(x) = \frac{(2x-3)(x+2)}{(x-5)(x+2)}$, which reduces to $R(x) = \frac{(2x-3)}{(x-5)}$. The point of discontinuity occurs when x = -2, which is (-2, 1). The vertical asymptote is x = 5; the horizontal asymptote is y = 2. The asymptotes intersect at (5, 2). The endpoints of the segment are thus (5, 2) and (-2, 1). Using the distance formula, we have $d = \sqrt{\left(5-{}^-2\right)^2+(2-1)^2}=\sqrt{49+1}=\sqrt{50}=\mathbf{5\sqrt{2}}$.
29. **A** Using properties of logarithms, the equation simplifies to $(x – 1)(x + 5) = 3 + 4$. Expanding and then factoring gives us $x^2 + 4x – 5 – 7 = 0$, or $(x + 6)(x – 2) = 0$. The only valid solution is **2**.
30. **A** Isolating the first radical, squaring both sides of the equation, and simplifying gives us $x+1=2\sqrt{x+4}$. Squaring and simplifying again gives us $x^2 – 2x – 15 = 0$, which factors to $(x – 5)(x + 3) = 0$. The only valid solution is **5.**