1. **C**. $\sqrt{g-2}=2x; g(x)=4x^2+2$ so g(3)=38

2. **B**. $3^3 \bullet 9^9 = 3^3(3^2)^9 = 3^{3+18} = 3^{21}$

3. **A**. $r^2 = 42 - r; r = 6$ and likewise $k^2 = 6 - k$ for solution k=2.

4. **D**. The graph of $g|x-1|$ is shifted right one unit, not changing the range, and then right of the y-axis is reflected, and since all range values are kept (low, high and all between due to domain all reals) then the range is not changed.

5. **A**. $-(x-1)+(3x+4)$ = 2x+5

6. **B**. $\frac{1}{4a} = \frac{1}{4\left(\frac{1}{8}\right)} = 2$ so A=2 and B= -2 and A-B= 4.

7. **C**. An inverse of f and f will meet on the line x=y.

8. **C.** Repeat x values – fails the "vertical line "test."

9. **A**. $7 + k = \frac{8}{k}$ which solves to k= -8 or 1. The positive value is 1.

10. **D**. Choice D is a sideways parabola.

11. **C**. $f(x) = \frac{a_1}{1-r} = \frac{x/2}{1+1/2} = \frac{x}{3}$ and so f(a) gives $\frac{a}{3} = 1$ to give a=3.

12. **B** When the y-coordinates are equal, the slope of the line is undefined.

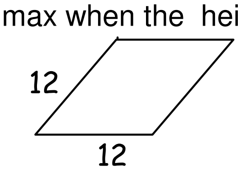
13. **C**. The graph of f is a half-circle with radius 2 (square both sides). So b=2 in the parabola. Now since (2,0) is also shared, $a(2)^2 + 2 = 0$ and a=-1/2. The value of a/b is then -1/4.

14. **C**. $f(x) = \left|x\sqrt{2}\right|$ and so $(4\sqrt{2})^2 = 32$.

15. **B.** 1/(5/2)= 2/5 = 0.4

16. **C**. $\frac{x}{360}\left(\pi x^2\right) = \pi$ gives $x^3 = 360,$ so x=k=$\sqrt[3]{360} = 2\sqrt[3]{45}$.

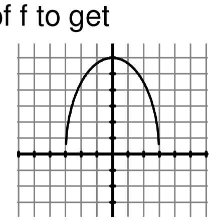
17. **A**. The max value of the area is when x is 90 degrees, and the rhombus is a square (since base times height is max when the height is maximum). To get A(45) we use bh= 12(6$\sqrt{2}$)=72$\sqrt{2}$




18. **B**. P(x)-2 must be 3 to give P(p-2)=2. So p(x)=5 is obtained when the inner "P" is 6.

19. **A**. 20% of 40 is 8 L of salt. So w(10)=40 since $\frac{8}{40+x} = \frac{1}{10}$ for 10%, which solves to x=40. Likewise $\frac{8}{40+x} = \frac{1}{20}$ for 5% solves to x=120 and 40-120= -80.

20. **C**. Square both sides of f to get $4x^2 + y^2 = 36$ so the graph is the top half



an ellipse with height 6, and intercepts 3 and -3. y=x+3 hits the left intercept and another point in QI.

21. **A**. $\frac{x-1}{x+3}=2$ solves to x= -7.

22. **C**. $x^2(x+3)-4(x+3)=(x^2-4)(x+3)$ and roots are -3, -2, 2 so b+c= -2+2=0.

23. **D**. f(1): 1+a(2)+b(3)=7 gives 2a+3b=6. f(0): a+2b=2. Solve to get a=6 and b= -2.f(-1)=-+0-2

24. **D**. To get the 4th term of the sequence 3, (4-10), … the common difference is -9. So the first terms are 3, -6, -15, -24.

25. **C**. $(1+i)^4+(1+i)^5$ = $(2i)^2+(2i)^2(1+i)$ = -4 +-4(1+i) = -8-4i. So a= -8 and b= -4 so b-a = 4.

26. **A**. $\log(x-1)+1=\log(2x)$, $\log(x-1)-\log(2x)=-1$, $\log\left(\frac{x-1}{2x}\right)=-1$ so $\frac{x-1}{2x}=10^{-1}$

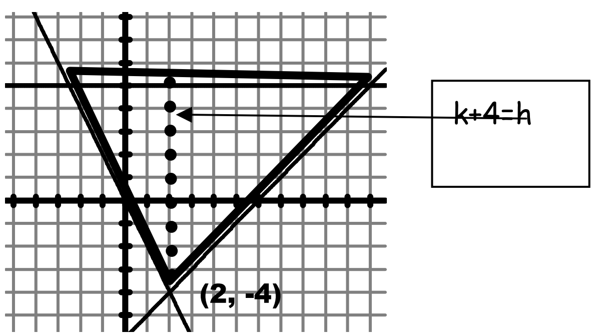
$\frac{x-1}{2x}=\frac{1}{10}$ which solves to 5/4 and 16x is 20.

27. **D**. The middle term of $f(x,4)=(1+x)^4$ has coefficient $C(4,2)=6$ and the middle term of $f(x,6)=(1+x)^6$ is C(6, 3) = 20.

28. **C**. $f(3)=f(1)+f(2)=4$ and $f(4)=f(3)+f(2)+f(1)=4+4$=8. $f(5)=8+8=16$ and f(6)=32.

29. **A**. f is always 7.

30. **C**.




The intersection of f and g is (2, -4). The line y=k will then give height of the triangle to be 4+k (the distance between – 4 and positive k). The intersection of the negative slope line and y=k is given by -2x=k is x= -k/2 and the intersection of the other line and y=k is given by x-6=k is x=k+6. This gives the base of the triangle to be the distance between the x-coordinates of these two intersections, which is (k+6)-(-k/2) = k+6+k/2. Now we have $\frac{1}{2}bh=\frac{1}{2}(k+6+\frac{k}{2})(4+k)$

which expands to $\frac{3}{4}k^2+6k+12$. Setting this equal to 147 and multiplying by 4 gives $3k^2+24k=540$ and dividing by 3 gives $k^2+8k-180=0$. (k-10)(k+18)=0 for positive k=10.