★ ANSWER KEY ★

Test Review: Exponential, Distance, Midpoint

(C) 1) $23^2 + b^2 = 83^2$

$529 + b^2 = 6889$

$-529 \quad -529$

$b^2 = 6360$

$b = \sqrt{6360} = \boxed{79.75}$

(A) 2) $20^2 + 21^2 = 29^2$

$400 + 441 = 841$

$841 = 841$ ✓ **yes**

(D) 3) $d = \sqrt{(-9 - -8)^2 + (-13 - \frac{5}{7})^2}$

$\sqrt{(-1)^2 + (-13.714)^2} = \sqrt{1 + 188.08}$

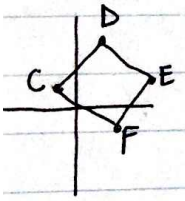
$d = \sqrt{189.08} \approx 13.75$

(C) 4) $M = \left(\frac{-14+10}{2}, \frac{5+6}{2}\right)$

$= \left(\frac{-4}{2}, \frac{11}{2}\right) = \boxed{\left(-2, \frac{11}{2}\right)}$

(D) 5) $d_{\overline{CD}} = \sqrt{(2-1)^2 + (6-1)^2}$

$\sqrt{9 + 25} = \sqrt{34}$

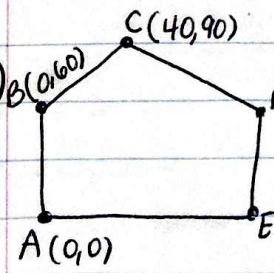


$d_{\overline{DE}} = \sqrt{(7-2)^2 + (3-6)^2}$

$\sqrt{25 + 9} = \sqrt{34}$

$A = l \cdot w = \sqrt{34} \cdot \sqrt{34} = \boxed{34}$

(C) 6)



$60 + 90 + 50 + 50 + 64 = \boxed{314}$

$d_{\overline{AB}} = 60$

$d_{\overline{AE}} = 90$

$d_{\overline{DE}} = 50$

$d_{\overline{BC}} = \sqrt{(40-0)^2 + (90-60)^2}$

$\sqrt{1600 + 900} = \sqrt{2500} = 50$

$d_{\overline{CD}} = \sqrt{(90-40)^2 + (50-90)^2}$

$\sqrt{2500 + 1600} = \sqrt{4100} \approx 64$

S(2,3) T(3,1) V(4,-3) W(-3,-1)

(C) 7) $d_{\overline{ST}} = \sqrt{(3-2)^2 + (1-3)^2}$

$= \sqrt{1+4} = \sqrt{5}$

$d_{\overline{TV}} = \sqrt{(4-3)^2 + (-3-1)^2}$

$\sqrt{1+16} = \sqrt{17}$

$d_{\overline{VW}} = \sqrt{(-3-4)^2 + (-1-3)^2}$

$= \sqrt{49+4} = \sqrt{53}$

$d_{\overline{SW}} = \sqrt{(-3-2)^2 + (-1-3)^2}$

$= \sqrt{25+16} = \sqrt{41}$

$\sqrt{5} + \sqrt{17} + \sqrt{53} + \sqrt{41} \approx \boxed{20 \text{ units}}$

(A) 8) B(-3,4) M(?) ← Need Midpt of CA first

C(3,3) A(-4,2)

$M_{\overline{CA} \text{ or } \overline{AC}} \left(\frac{3-4}{2}, \frac{3+2}{2}\right) = \left(\left(-\frac{1}{2}, \frac{1}{2}\right) = M\right)$

$d_{\overline{BM}} = \sqrt{\left(-\frac{1}{2} - -3\right)^2 + \left(\frac{1}{2} - 4\right)^2}$

$= \sqrt{(2.5)^2 + (-3.5)^2} = \sqrt{6.25 + 12.25}$

$= \sqrt{18.5}$ units

(C) 9) ★ parent function $y = 2^x$ has y-intercept at (0,1)

★ graph shifted down 2 spaces, so new equation is $y = 2^x - 2$

(D) 10) formula for growth is $y = a(1+r)^x$

decay is $y = a(1-r)^x$

★ since # in ( ) is less than 1, it means it's a decay.

★ $(1-r) = 0.96$

so $r = 0.04$, which is 4%

(A) 11) initial value is the 'a' in the formula $y = a(1+r)^x$ or $a(1-r)^x$
since 160,000 is in the place of the "a", then initial value is $160,000

(C) 12) * decay $y = a(1-r)^x$
$y = 450(1-0.15)^8$
$y = 450(0.85)^8$
$y = \boxed{122.62}$

(D) 13) $y = 3x^2+4$ has a vertex of (0,4) when graphed on calculator (checked min)
* if translating up 5 units it will move up on y-axis
4+5=9, so vertex will be (0,9)

(B) 14) $V = 60{,}000\left(1-\frac{2}{10}\right)^5$
$= 19{,}660.80$

(C) 15) $60{,}000 - 19{,}660.80$
$= \$40{,}339.20$

(C) 16) $a > 1$, graph more narrow
$0 < a < 1$, graph wider
since equation 1 has an 'a' of 5 and equation 2 has an 'a' of $\frac{1}{5}$, equation 2's graph is wider.

(D) 17) $r = 4.5\%$
$V = P(1+r)^t$
$V = 500(1+0.045)^7$
$V = 500(1.045)^7$
$V = \$680.43$