Regents Exam Questions   Name: _____
A.CED.A.1: Modeling Exponential Functions
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1 Cassandra bought an antique dresser for $500. If the value of her dresser increases 6% annually, what will be the value of Cassandra's dresser at the end of 3 years to the *nearest dollar*?
1) $415
2) $590
3) $596
4) $770

2 The current student population of the Brentwood Student Center is 2,000. The enrollment at the center increases at a rate of 4% each year. To the *nearest whole number*, what will the student population be closest to in 3 years'?
1) 2,240
2) 2,250
3) 5,488
4) 6,240

3 The population of Henderson City was 3,381,000 in 1994, and is growing at an annual rate of 1.8%. If this growth rate continues, what will the approximate population of Henderson City be in the year 2000?
1) 3,696,000
2) 3,763,000
3) 3,798,000
4) 3,831,000

4 The Ebola virus has an infection rate of 11% per day as compared to the SARS virus, which has a rate of 4% per day. If there were one case of Ebola and 30 cases of SARS initially reported to authorities and cases are reported each day, which statement is true?
1) At day 10 and day 53 there are more Ebola cases.
2) At day 10 and day 53 there are more SARS cases.
3) At day 10 there are more SARS cases, but at day 53 there are more Ebola cases.
4) At day 10 there are more Ebola cases, but at day 53 there are more SARS cases.

5 Sheba opened a retirement account with $36,500. Her account grew at a rate of 7% per year compounded annually. She made no deposits or withdrawals on the account. At the end of 20 years, what was the account worth, to the *nearest dollar*?
1) $87,600
2) $130,786
3) $141,243
4) $1,483,444,463

6 Adrianne invested $2000 in an account at a 3.5% interest rate compounded annually. She made no deposits or withdrawals on the account for 4 years. Determine, to the *nearest dollar*, the balance in the account after the 4 years.

7 Kirsten invested $1000 in an account at an annual interest rate of 3%. She made no deposits or withdrawals on the account for 5 years. The interest was compounded annually. Find the balance in the account, to the *nearest cent*, at the end of 5 years.

8 Dylan invested $600 in a savings account at a 1.6% annual interest rate. He made no deposits or withdrawals on the account for 2 years. The interest was compounded annually. Find, to the *nearest cent*, the balance in the account after 2 years.

9 A bank is advertising that new customers can open a savings account with a $3\frac{3}{4}\%$ interest rate compounded annually. Robert invests $5,000 in an account at this rate. If he makes no additional deposits or withdrawals on his account, find the amount of money he will have, to the *nearest cent*, after three years.

10 On January 1, 1999, the price of gasoline was $1.39 per gallon. If the price of gasoline increased by 0.5% per month, what was the cost of one gallon of gasoline, to the *nearest cent*, on January 1 one year later?

11 On the day Alexander was born, his father invested $5000 in an account with a 1.2% annual growth rate. Write a function, $A(t)$, that represents the value of this investment t years after Alexander's birth. Determine, to the *nearest dollar*, how much more the investment will be worth when Alexander turns 32 than when he turns 17.

12 Marilyn collects old dolls. She purchases a doll for $450. Research shows this doll's value will increase by 2.5% each year. Write an equation that determines the value, V, of the doll t years after purchase. Assuming the doll's rate of appreciation remains the same, will the doll's value be doubled in 20 years? Justify your reasoning.

13 In a science fiction novel, the main character found a mysterious rock that decreased in size each day. The table below shows the part of the rock that remained at noon on successive days.

Day	Fractional Part of the Rock Remaining
⋮	⋮
$\equiv$	$\vdots$
$\equiv$	$\vdots$
$\vdots$	$\vdots$

Which fractional part of the rock will remain at noon on day 7?

1) $\dfrac{1}{128}$

2) $\dfrac{1}{64}$

3) $\dfrac{1}{14}$

4) $\dfrac{1}{12}$

14 Daniel's Print Shop purchased a new printer for $35,000. Each year it depreciates (loses value) at a rate of 5%. What will its approximate value be at the end of the fourth year?
1) $33,250.00
2) $30,008.13
3) $28,507.72
4) $27,082.33

15 The value of a car purchased for $20,000 decreases at a rate of 12% per year. What will be the value of the car after 3 years?
1) $12,800.00
2) $13,629.44
3) $17,600.00
4) $28,098.56

16 The Booster Club raised $30,000 for a sports fund. No more money will be placed into the fund. Each year the fund will decrease by 5%. Determine the amount of money, to the *nearest cent*, that will be left in the sports fund after 4 years.

17 A used car was purchased in July 1999 for $11,900. If the car depreciates 13% of its value each year, what is the value of the car, to the *nearest hundred dollars*, in July 2002?

18 A car was purchased for $25,000. Research shows that the car has an average yearly depreciation rate of 18.5%. Create a function that will determine the value, $V(t)$, of the car t years after purchase. Determine, to the *nearest cent*, how much the car will depreciate from year 3 to year 4.

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Answer Section

1 ANS: 3

$500(1+0.06)^3 \approx 596$

REF: 080929ia

2 ANS: 2

$2000(1+0.04)^3 \approx 2249$

REF: 081124ia

3 ANS: 2

$3,381,000(1.018)^6 \approx 3,763,000$

REF: fall9916b

4 ANS: 3

$E(10) = 1(1.11)^{10} \approx 3$ $S(10) = 30(1.04)^{10} \approx 44$

$E(53) = 1(1.11)^{53} \approx 252$ $S(53) = 30(1.04)^{53} \approx 239$

REF: 081721ai

5 ANS: 3

$36500(1.07)^{20} \approx 141243$

REF: 081422ia

6 ANS:

$A = P(1+R)^t = 2000(1+0.035)^4 \approx 2295$

REF: 081333ia

7 ANS:

$1000(1.03)^5 \approx 1159.27$

REF: 011433ia

8 ANS:

$A = 600(1.016)^2 \approx 619.35$

REF: 061529ai

9 ANS:

5,583.86. $A = P(1+R)^t = 5000(1+0.0375)^3 \approx 5583.86$

REF: 060935ia

10 ANS:

1.48. $1.39(1.005)^{12} \approx 1.48$

REF: 010525b

11 ANS:
$A(t) = 5000(1.012)^t$ $A(32) - A(17) \approx 1200$

REF: 081934ai

12 ANS:
$V = 450(1.025)^t$; No, $450(1.025)^{20} < 2 \cdot 450$

REF: 011933ai

13 ANS: 2
$R = 0.5^{d-1}$

REF: 011006ia

14 ANS: 3
$35000(1 - 0.05)^4 \approx 28507.72$

REF: fall0719ia

15 ANS: 2
$20000(.88)^3 = 13629.44$

REF: 061124ia

16 ANS:
24,435.19. $30000(.95)^4 \approx 24435.19$

REF: 011138ia

17 ANS:
$7,800. $11900(1 - 0.13)^3 \approx 7800$

REF: 080221b

18 ANS:
$V(t) = 25000(0.815)^t$ $V(3) - V(4) \approx 2503.71$

REF: 081834ai