

Exponential Functions

1 Which equation describes this scenario?

A rabbit population starts at 500. Each subsequent yearly breeding season it grows by 6%. After 7 years it has increased to a population of 751 rabbits.

A $751 = 600 \cdot (1 + 0.05)^{(7)}$

B $751 = 500 \cdot (1 + 0.06)^{(7)}$

C $751 = 700 \cdot (1 + 0.06)^{(5)}$

2 Which scenario describes this equation?

$$838 = 500 \cdot (1 + 0.09)^{(6)}$$

A A savings account starts with \$900. Each subsequent quarter it earns 5% in interest. After 6 quarters it has \$838.

B A savings account starts with \$500. Each subsequent quarter it earns 9% in interest. After 6 quarters it has \$838.

3 Which scenario describes this equation?

$$587 = 800 \cdot (1 - 0.06)^{(5)}$$

A A charitable endowment starts with \$800. Each weekly it disburses 6% of its remaining funds. After 5 weeks its funds have decreased to \$587.

B A charitable endowment starts with \$600. Each weekly it disburses 8% of its remaining funds. After 5 weeks its funds have decreased to \$587.

4 Which scenario describes this equation?

$$514 = 300 \cdot e^{(0.06 \cdot 9)}$$

A An insect population starts at 300. It grows continuously at 6% growth per week. After 9 weeks it has increased to a population of 514.

B An insect population starts at 900. It grows continuously at 6% growth per week. After 3 weeks it has increased to a population of 514.

6 In this model of continuous growth of a bacteria population, which term represents the rate?

$$P = P_0 \cdot e^{(r \cdot t)}$$

rate = ?

A r

B F

C t

5 What does this term represent in a model of growth of an insect population that breeds once per year?

$$P = P_0 \cdot (1 + r)^{(t)}$$

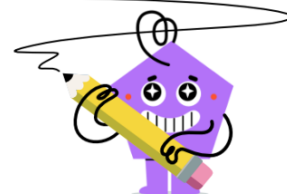
$t = ?$

A $t = \text{final population}$

B $t = \text{rate}$

C $t = \text{time}$

D $t = \text{starting population}$



Exponential Functions

- 7** What is the value of the final debt given this model of a growth in credit card debt with monthly interest?

$$D = 300 \cdot (1 + 0.05)^{(4 \cdot 3)}$$

- | | |
|---|-----------|
| A | $D = 635$ |
| B | $D = 538$ |
| C | $D = 460$ |
| D | $D = 720$ |

- 8** What is the value of the final population given this model of a growth of a rabbit population (yearly breeding cycle)?

$$P = 300 \cdot (1 + 0.02)^{(7)}$$

- | | |
|---|-----------|
| A | $P = 210$ |
| B | $P = 344$ |
| C | $P = 225$ |
| D | $P = 335$ |

- 9** What is the time in this equation for a growth in credit card debt with yearly interest?

$$246 = 200 \cdot (1 + 0.03)^{(7)}$$

- | | |
|---|-----------|
| A | $t = 245$ |
| B | $t = 7$ |
| C | $t = 200$ |

- 10** What is the value of the final population given this model of a continuous decline of a whale population?

$$P = 200 \cdot e^{(-0.08 \cdot 9)}$$

- | | |
|---|-----------|
| A | $P = 122$ |
| B | $P = 66$ |
| C | $P = 121$ |
| D | $P = 97$ |

- 11** What is the value of the final downloads given this model of a continuously compounding growth of app downloads?

$$A = 200 \cdot e^{(0.03 \cdot 5)}$$

- | | |
|---|-----------|
| A | $A = 325$ |
| B | $A = 232$ |
| C | $A = 170$ |
| D | $A = 205$ |

- 12** What is the value of the final population given this scenario?

An insect population starts at 200. It grows continuously at 9% growth per month. After 7 months it has increased to a certain population.

- | | |
|---|-----------|
| A | $P = 435$ |
| B | $P = 250$ |
| C | $P = 375$ |

- 13** Solve for x

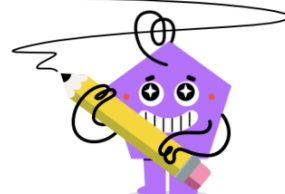
$$3^x = 27^{23}$$

- | | | | |
|---|-----------|---|-----------|
| A | $x = 123$ | B | $x = 21$ |
| C | $x = 105$ | D | $x = 63$ |
| E | $x = 69$ | F | $x = 117$ |

- 14** Simplify and solve for n

$$5^{(n+7)} = 25^n$$

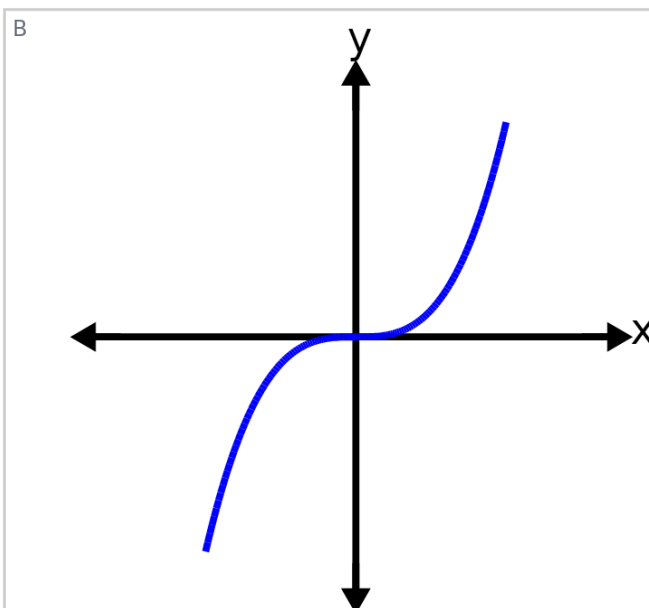
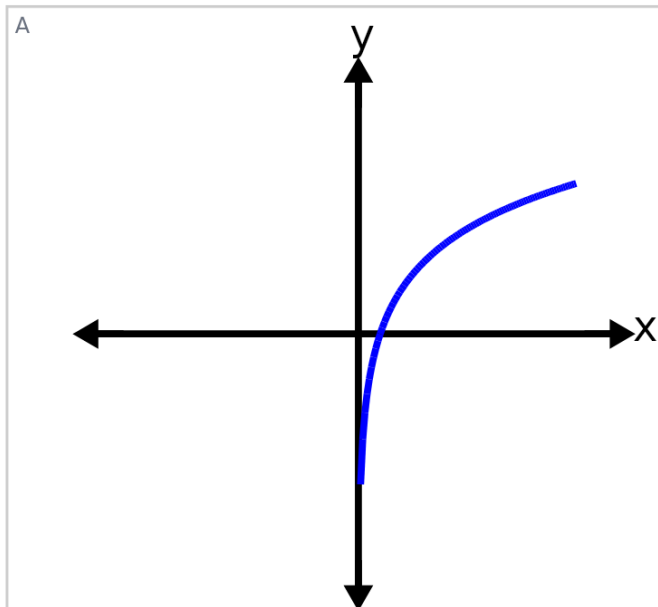
- | | | | |
|---|---------|---|---------|
| A | $n = 7$ | B | $n = 6$ |
|---|---------|---|---------|



Exponential Functions

15 Which graph would this formula create?

$$y = \log(x)$$



16 Simplify and solve for m

$$2^{(m+5)} = 8$$

A

$$m = -2$$

B

$$m = -1$$

17 Solve for the missing exponent

$$4^x = \frac{1}{64}$$

A

$$x = -13$$

B

$$x = 4$$

C

$$x = -2$$

D

$$x = -3$$

E

$$x = -4$$

F

$$x = -10$$

18 Solve for the missing exponent

$$\left(\frac{1}{10}\right)^x = \frac{1}{100}$$

A

$$x = -4$$

B

$$x = 10$$

C

$$x = 2$$

D

$$x = -6$$

E

$$x = -7$$

F

$$x = -3$$

19 Simplify and solve for z

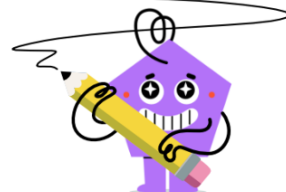
$$2^{\left(\frac{z+4}{z-2}\right)} = 8$$

A

$$z = 7$$

B

$$z = 5$$



Exponential Functions

20 Simplify and solve for m

$$3^{\left(\frac{m+64}{m}\right)} = 9$$

A

$$m = 66$$

B

$$m = 64$$

21 Simplify and solve for m

$$7^{\left(\frac{m+3}{2}\right)} = 49^m$$

A

$$m = 1$$

B

$$m = 3$$

22 Solve for the missing exponent (x) in reduced form

$$(4^n)^6 = 64^x$$

A

$$x = \frac{4n}{3}$$

B

$$x = 2n$$

C

$$x = \frac{6n}{2}$$

D

$$x = \frac{2}{4n}$$

E

$$x = 9n$$

F

$$x = \frac{4}{3n}$$

23 Solve for the missing exponent (x) in reduced form

$$(2^3)^n = 16^x$$

A

$$x = \frac{3n}{4}$$

B

$$x = \frac{6n}{4}$$

C

$$x = 3n$$

D

$$x = \frac{2n}{4}$$

E

$$x = 12n$$

F

$$x = 4n$$

24 Solve for the missing exponent (x) in reduced form

$$32^n = 4^x$$

A

$$x = \frac{5n}{2}$$

B

$$x = \frac{4}{5n}$$

C

$$x = \frac{2n}{2}$$

D

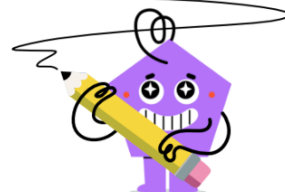
$$x = \frac{10n}{2}$$

E

$$x = 5n$$

F

$$x = 6n$$



Exponential Functions

- 25** Solve for the missing exponent (x) in reduced form

$$32^n = (2^x)^{10}$$

A

$$x = \frac{2}{4n}$$

B

$$x = \frac{n}{2}$$

C

$$x = 8n$$

D

$$x = 7n$$

E

$$x = 5n$$

F

$$x = \frac{8}{5n}$$

- 26** What is the value of the final debt given this scenario?

A credit card starts with \$500 of debt. Each subsequent quarter it grows by 3% in interest. After 8 quarters the debt has grown to a certain amount.

A

$$D = 460$$

B

$$D = 665$$

C

$$D = 633$$

- 27** Solve for the missing exponent (x) in reduced form

$$4^n = 2^x$$

A

$$x = 2n$$

B

$$x = 3n$$

C

$$x = 4n$$

D

$$x = \frac{3n}{2}$$

E

$$x = \frac{3}{2n}$$

F

$$x = \frac{6n}{1}$$