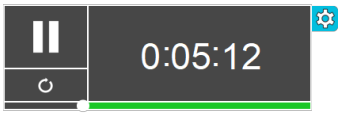
Warm-Up

. What is the smallest of 3 consecutive positive integers if the product of the smaller two integers is 5 less than 5 times the largest integer?



The larger leg of a right triangle is 3 cm longer than its smaller leg. The hypotenuse is 6 cm longer than the smaller leg. How many centimeters long is the smaller leg?

key on next page

2. What is the smallest of 3 consecutive positive integers if the product of the smaller two integers is 5 less than 5 times the largest integer?

1st: x
2nd: $x+1$
3rd: $x+2$

$1^{st} \times 2^{nd} = 5 \times 3^{rd} - 5$
$(x)(x+1) = 5(x+2) - 5$
$x^2 + x = 5x + 10 - 5$
$x^2 + x = 5x + 5$
$x^2 - 4x - 5 = 0$

$(x-5)(x+1) = 0$
$x - 5 = 0$ $\quad x + 1 = 0$
$\boxed{x = 5}$ $\quad x = -1$
↑ Answer must be positive

3. The larger leg of a right triangle is 3 cm longer than its smaller leg. The hypotenuse is 6 cm longer than the smaller leg. How many centimeters long is the smaller leg?

Small: x
Large: $x+3$
Hypot: $x+6$

$a^2 + b^2 = c^2$
$x^2 + (x+3)^2 = (x+6)^2$
$x^2 + (x+3)(x+3) = (x+6)(x+6)$
$x^2 + x^2 + 6x + 9 = x^2 + 12x + 36$
$2x^2 + 6x + 9 = x^2 + 12x + 36$
$-x^2 - 12x - 36 \quad -x^2 - 12x - 36$

$x^2 - 6x - 27 = 0$
$(x-9)(x+3) = 0$
$x - 9 = 0$ $\quad x + 3 = 0$
$\boxed{x = 9}$ $\quad x = -3$
↑ Length can't be negative

4. Which term is a factor of $3a^2 + 12a$?

Check page 8

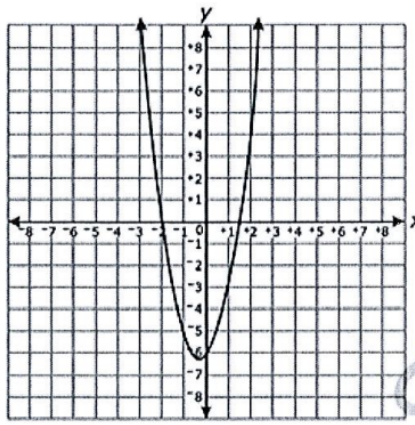
Complete Quadratic Functions EOC Prep WS

1 Which graph displays the function $f(x)=(2x + 3)(x - 2)$?

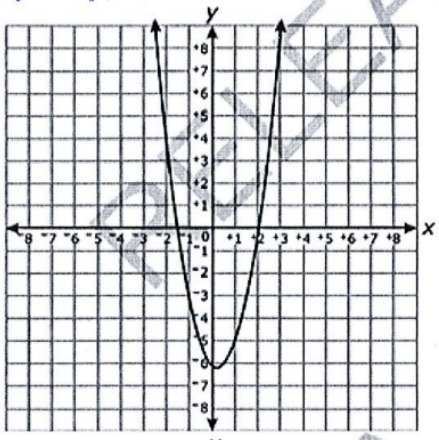
$2x = -3$ $x = 2$

$x = -3/2$

A



B



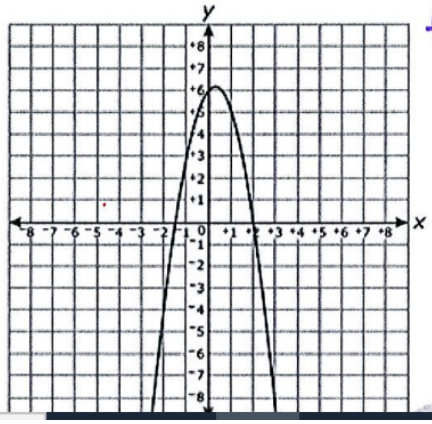
Roots:

$x = -1.5$

$x = 2$

"a" is positive so graph is facing up

C



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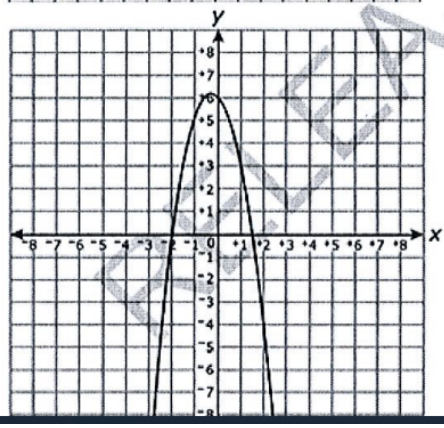


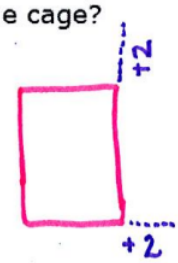
2 The floor of a rectangular cage has a length 4 feet greater than its width, w. James will increase both dimensions of the floor by 2 feet. Which equation represents the new area, N, of the floor of the cage?

A $N = w^2 + 4w$

B $N = w^2 + 6w$

C $N = w^2 + 6w + 8$

D $N = w^2 + 8w + 12$



Length: $w + 4 + 2 = w + 6$

Width: $w + 2$

A = Length x width

$A = (w+6)(w+2)$

$A = w^2 + 8w + 12$

3 Which expression is equivalent to $t^2 - 36$?

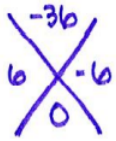
A $(t - 6)(t - 6)$

B $(t + 6)(t - 6)$

C $(t - 12)(t - 3)$

D $(t - 12)(t + 3)$

$t^2 + 0t - 36$

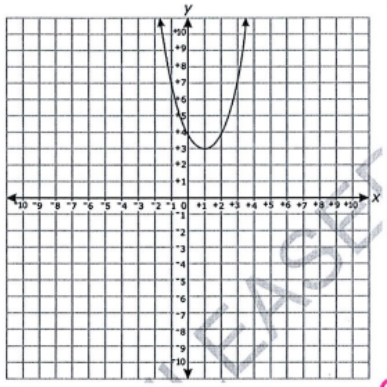


$(t+6)(t-6)$

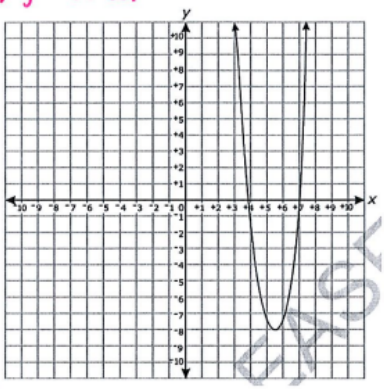
4 Which is the graph of the function $f(x) = 4x^2 - 8x + 7$?

y-intercept

A



B



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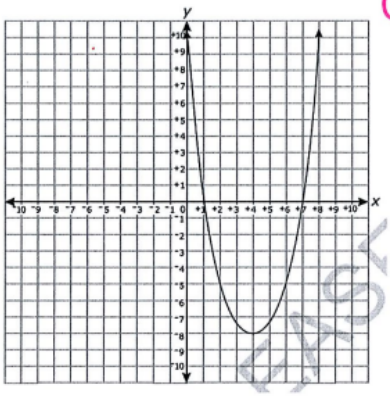

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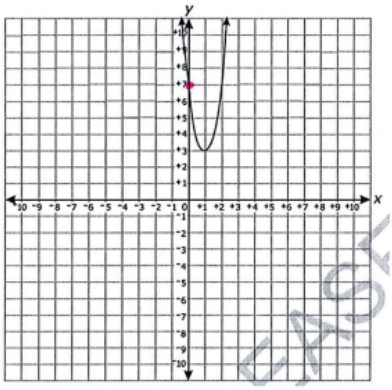

5 Suppose that the equation $V = 20.8x^2 - 458.3x + 3{,}500$ represents the value of a car from 1964 to 2002. What year did the car have the least value? ($x = 0$ in 1964)

minimum = axis of symmetry

A 1965

B 1970

C 1975

D 1980

$x = \frac{-b}{2a} = \frac{-(-458.3)}{2(20.8)}$

$= \frac{458.3}{41.6} = 11$ years

1964 + 11 = 1975

6 The number of bacteria in a culture can be modeled by the function $N(t) = 28t^2 - 30t + 160$, where t is the temperature, in degrees Celsius, the culture is being kept. A scientist wants to have fewer than 200 bacteria in a culture in order to test a medicine effectively. What is the ***approximate*** domain of temperatures that will keep the number of bacteria under 200?

A $-1.01°C < t < 2.03°C$

B $-0.90°C < t < 1.97°C$

C $-0.86°C < t < 1.93°C$

D $-0.77°C < t < 1.85°C$

$28t^2 - 30t + 160 = 200$

$28t^2 - 30t - 40 = 0$

$14t^2 - 15t - 20 = 0$

$a = 14 \quad b = -15 \quad c = -20$

$x = \frac{15 \pm \sqrt{(-15)^2 - 4(14)(-20)}}{2(14)}$

$x = \frac{15 \pm 36.7}{28}$

$x = \frac{15 + 36.7}{28} = 1.8$

$x = \frac{15 - 36.7}{28} = -0.775$

7 Which equation has exactly one real solution?

A $4x^2 - 12x - 9 = 0$

B $4x^2 + 12x + 9 = 0$

C $4x^2 - 6x - 9 = 0$

D $4x^2 + 6x + 9 = 0$

graph, then look to see which one only crosses the x-axis once!

8 The sum of two numbers is 24. The sum of the squares of the two numbers is 306. What is the product of the two numbers?

A 119
B 128
C 135
D 144

$x+y=24$, $x^2+y^2=306$, $y=24-x$

$x^2+(24-x)^2=306$
$x^2+(24-x)(24-x)=306$
$x^2+576+48x+x^2=306$
$2x^2-48x+576=306$
$2x^2-48x+270=0$
$x^2-24x+135=0$
$(x-15)(x-9)=0$
$x-15=0$ $x-9=0$
$x=15$ $x=9$
$15\times9=135$

9 The heights of two different projectiles after they are launched are modeled by $f(x)$ and $g(x)$. The function $f(x)$ is defined as $f(x) = -16x^2 + 42x + 12$. The table contains the values for the quadratic function g.

$-16x^2+40x+9$
table into TAT

x	$g(x)$
0	9
1	33
2	25

f(x) max: 39.6 feet
g(x) max: 34

What is the ***approximate*** difference in the maximum heights achieved by the two projectiles?

A 0.2 feet
B 3.0 feet
C 5.4 feet
D 5.6 feet

$39.6-34.0=5.6$ feet

10 Which expression is equivalent to $-3x(x-4)-2x(x+3)$?

(1) $-x^2-1$
(2) $-x^2+18x$
(3) $-5x^2-6x$
(4) $-5x^2+6x$

$-3x^2+12-2x^2-6$
$-5x^2+6$

11 The length of a rectangle is 3 inches more than its width. The area of the rectangle is 40 square inches. What is the length, in inches, of the rectangle?

(1) 5
(2) 8
(3) 8.5
(4) 11.5

Length: $w+3$
Width: w
Area: LW

$(w+3)(w)=40$
$w^2+3w=40$
$w^2+3w-40=0$
$(w+8)(w-5)=0$
$w+8=0$ $w-5=0$
$w=-8$ $w=5$
↑ can't be negative

12 Which expression represents $36x^2-100y^6$ factored completely?

(1) $2(9x+25y^3)(9x-25y^3)$
(2) $4(3x+5y^3)(3x-5y^3)$
(3) $(6x+10y^3)(6x-10y^3)$
(4) $(18x+50y^3)(18x-50y^3)$

$4(9x^2-25y^6)$
$4(3x-5y^3)(3x+5y^3)$

13 What are the roots of the equation $x^2-5x+6=0$?

(1) 1 and -6
(2) 2 and 3
(3) -1 and 6
(4) -2 and -3

$(x-2)(x-3)=0$
$x-2=0$ $x-3=0$
$x=2$ $x=3$

14 Which expression is equivalent to $64 - x^2$?

(1) $(8 - x)(8 - x)$
(2) $(8 - x)(8 + x)$
(3) $(x - 8)(x - 8)$
(4) $(x - 8)(x + 8)$

Difference of Squares
$x^2 - y^2 = (x-y)(x+y)$

15 The equation of the axis of symmetry of the graph of $y = 2x^2 - 3x + 7$ is

(1) $x = \frac{3}{4}$
(2) $y = \frac{3}{4}$
(3) $x = \frac{3}{2}$
(4) $y = \frac{3}{2}$

$x = \frac{-b}{2a} = \frac{-(-3)}{2(2)} = \frac{3}{4}$

16 The roots of the equation $3x^2 - 27x = 0$ are

(1) 0 and 9
(2) 0 and −9
(3) 0 and 3
(4) 0 and −3

$3x(x-9) = 0$
$3x = 0 \quad x - 9 = 0$
$x = 0 \quad x = 9$