F.IF.C.9: Comparing Functions 2
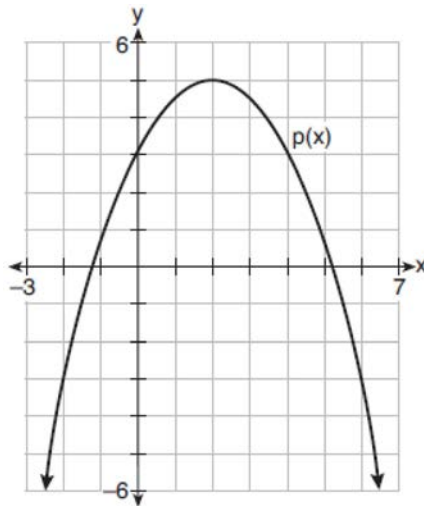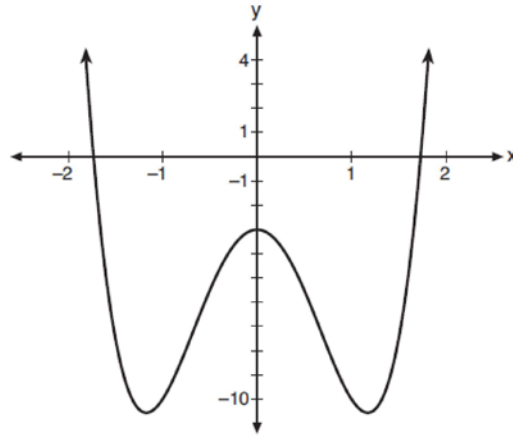
1   Consider $f(x) = 4x^2 + 6x - 3$, and $p(x)$ defined by the graph below.

The difference between the values of the maximum of p and minimum of f is
1)   0.25   3)   3.25
2)   1.25   4)   10.25

2   Which function has the greatest y-intercept?
1) $f(x) = 4\sin(2x)$ 3) $h(x) = 5e^{2x} + 3$
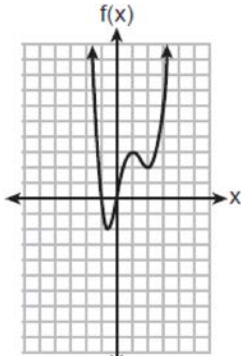2) $g(x) = 3x^4 + 2x^3 + 7$ 4) $j(x) = 6\log_2(3x + 4)$

3   Consider the function $p(x) = 3x^3 + x^2 - 5x$ and the graph of $y = m(x)$ below.
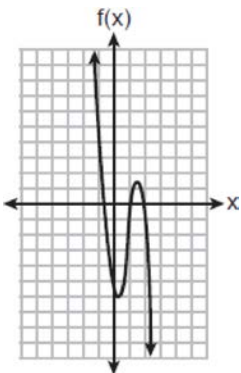
Which statement is true?
1) $p(x)$ has three real roots and $m(x)$ has two real roots.
2) $p(x)$ has one real root and $m(x)$ has two real roots.
3) $p(x)$ has two real roots and $m(x)$ has three real roots.
4) $p(x)$ has three real roots and $m(x)$ has four real roots.

4   Which function has the characteristic as $x \to -\infty, f(x) \to -\infty$?

1)

2)

3) $f(x) = 5(4)^{-x}$

4) $f(x) = -\log_5(-x)$

5 Which statement regarding the graphs of the functions below is *untrue*?
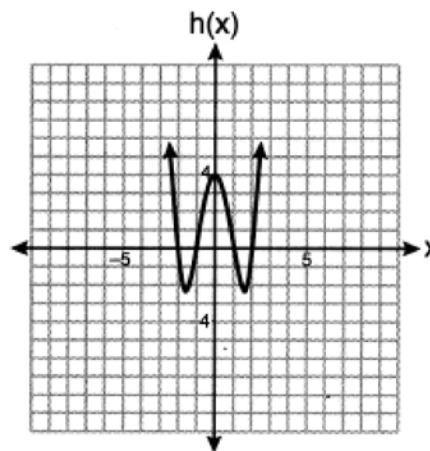
$$f(x) = 3\sin 2x, \text{ from } -\pi < x < \pi$$
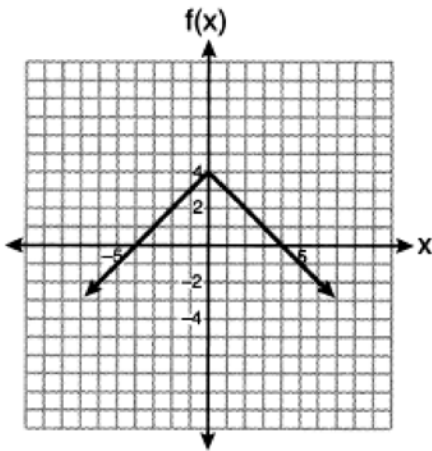
$$g(x) = (x - 0.5)(x + 4)(x - 2)$$

$$h(x) = \log_2 x$$

$$j(x) = -|4x - 2| + 3$$

1) $f(x)$ and $j(x)$ have a maximum y-value of   3) $g(x)$ and $j(x)$ have the same end
    3.   behavior as $x \to -\infty$.
2) $f(x)$, $h(x)$, and $j(x)$ have one y-intercept.   4) $g(x)$, $h(x)$, and $j(x)$ have rational zeros.

6 Which function has a maximum y-value of 4 and a midline of $y = 1$?

f(x)

h(x)

1)   3)
2) $g(x) = -3\cos(x) + 1$ 4) $j(x) = 4\sin(x) + 1$

7 The x-value of which function's x-intercept is larger, f or h? Justify your answer.

$$f(x) = \log(x - 4)$$

x	h(x)
−1	6
0	4
1	2
2	0
3	−2

8 Consider the function $h(x) = 2\sin(3x) + 1$ and the function q represented in the table below.

x	q(x)
−2	−8
−1	0
0	0
1	−2
2	0

Determine which function has the *smaller* minimum value for the domain $[-2,2]$. Justify your answer.

3

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Answer Section

1 ANS: 4

The maximum of p is 5. The minimum of f is $-\frac{21}{4}$ ($x = \frac{-6}{2(4)} = -\frac{3}{4}$

$f\left(-\frac{3}{4}\right) = 4\left(-\frac{3}{4}\right)^2 + 6\left(-\frac{3}{4}\right) - 3 = 4\left(\frac{9}{16}\right) - \frac{18}{4} - \frac{12}{4} = -\frac{21}{4}).$ $\frac{20}{4} - \left(-\frac{21}{4}\right) = \frac{41}{4} = 10.25$

REF: 011922aii

2 ANS: 4

$f(0) = 4\sin(2(0)) = 0;$ $g(0) = 3(0)^4 + 2(0)^3 + 7 = 7;$ $h(0) = 5e^{2(0)} + 3 = 8;$ $j(0) = 6\log_2(3(0) + 4) = 12$

REF: 082310aii

3 ANS: 1   REF: 081804aii

4 ANS: 4   REF: 062309aii

5 ANS: 2

$h(x)$ does not have a y-intercept.

REF: 011719aii

6 ANS: 2   REF: 062222aii

7 ANS:

$0 = \log_{10}(x - 4)$ The x-intercept of h is $(2,0)$. f has the larger value.

$10^0 = x - 4$

$1 = x - 4$

$x = 5$

REF: 081630aii

8 ANS:

q has the smaller minimum value for the domain $[-2,2]$. h's minimum is $-1\left(2(-1) + 1\right)$ and q's minimum is -8.

REF: 011830aii

1