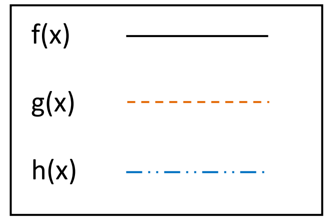
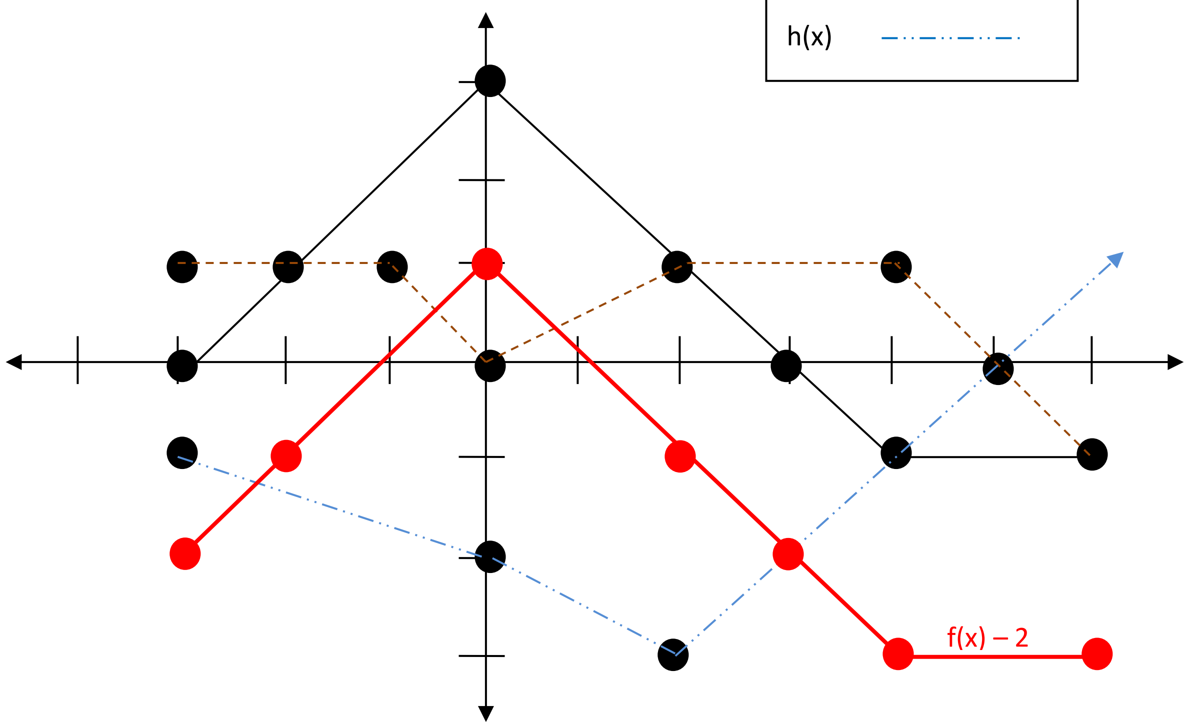
COLLEGE REVIEW MATH

SECTION 4B





Note: split problems up and use multiple graphs of this same series of functions

Find:

1) g(2) – h(2) = 1 – (-3) = 4

2) f(4) + g(4) = -1 + 1 = 0

3) max value of f(x) – h(x) 5

4) values of x where g(x) – f(x) > 0 -3 < x < -2 or 2 < x < 6

5) x-values where…

   where f(x) = g(x) -2, 2, 6

   where f(x) = h(x) 4

   where g(x) = h(x) 5

6) min value of h(x) – g(x) -4

7) ***Draw*** f(x) – 2 See above (in red)

Where is the graph of g(x) above f(x)?

Where is the graph of f(x) the furthest above h(x)? Then subtract the y-values.

Where is the graph of h(x) the furthest below g(x)? Then subtract the y-values.

Find their intersection points.

Use the following functions for the next section.

$f(x) = x^2 - 16$ $g(x) = 2x - 8$ $h(x) = x^3 + 1$

1) $(f + g)(x)$

$(x^2 - 16) + (2x - 8)$
$= x^2 + 2x - 16 - 8$
$= x^2 + 2x - 24$
$(f + g)(x) = x^2 + 2x - 24$

2) $(h - g)(x)$

$(x^3 + 1) - (2x - 8)$
$= x^3 + 1 - 2x + 8$
$= x^3 - 2x + 9$
$(h - g)(x) = x^3 - 2x + 9$

3) $(f \bullet h)(x)$

$(x^2 - 16)(x^3 + 1)$
$= x^5 + x^2 - 16x^3 - 16$
$= x^5 - 16x^3 + x^2 - 16$
$(f \bullet h)(x) = x^5 - 16x^3 + x^2 - 16$

4) $\left(\frac{f}{g}\right)(x)$

$\frac{x^2 - 16}{2x - 8}$
$= \frac{(x-4)(x+4)}{2(x-4)}$
$= \frac{x+4}{2}$
$\left(\frac{f}{g}\right)(x) = \frac{x+4}{2}$

COMPOSITION OF FUNCTIONS

Use the following functions for the next section.

$f(x) = 2x - 5$ $g(x) = \sqrt{x-3}$ $h(x) = 4x^2 + 3$

1) $f(g(h(-3)))$

$h(-3) = 4(-3)^2 + 3$
$= 39$
$g(39) = \sqrt{39 - 3}$
$= 6$
$f(6) = 2(6) - 5 = 7$
$f(g(h(-3))) = 7$

2) $h(f(g(19)))$

$g(19) = \sqrt{19 - 3}$
$= 4$
$f(4) = 2(4) - 5$
$= 3$
$h(3) = 4(3)^2 + 3 = 39$
$h(f(g(19))) = 39$

3) $h(g(f(2)))$

$f(2) = 2(2) - 5$
$= -1$
$f(-1) = \sqrt{-1 - 3}$
$= 2i$
$h(2i) = 4(2i)^2 + 3 = -16 + 3 = -13$
$h(g(f(2))) = -13$

4) $f(g(h(x)))$

$g(h(x)) = \sqrt{4x^2 + 3 - 3}$
$= \sqrt{4x^2}$
$= 2x$
$f(g(h(x))) = 2(2x) - 5$
$= 4x - 5$

5) $f(h(g(x)))$

$h(g(x)) = 4(\sqrt{x-3})^2 + 3$
$= 4(x - 3) + 3$
$= 4x - 12 + 3$
$= 4x - 9$
$f(h(g(x))) = 2(4x - 9) - 5$
$= 8x - 18 - 5$
$= 8x - 23$

6) $g(h(f(x)))$

$h(f(x)) = 4(2x - 5)^2 + 3$
$= 4(2x - 5)(2x - 5) + 3$
$= 4(4x^2 - 20x + 25) + 3$
$= 16x^2 - 80x + 100 + 3$
$= 16x^2 - 80x + 103$
$g(h(f(x))) = \sqrt{(16x^2 - 80x + 103) - 3}$

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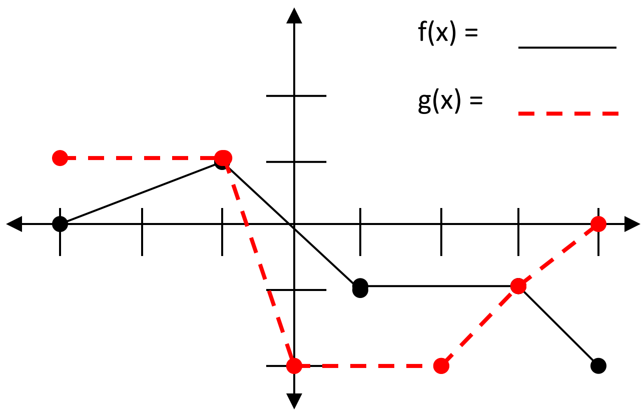
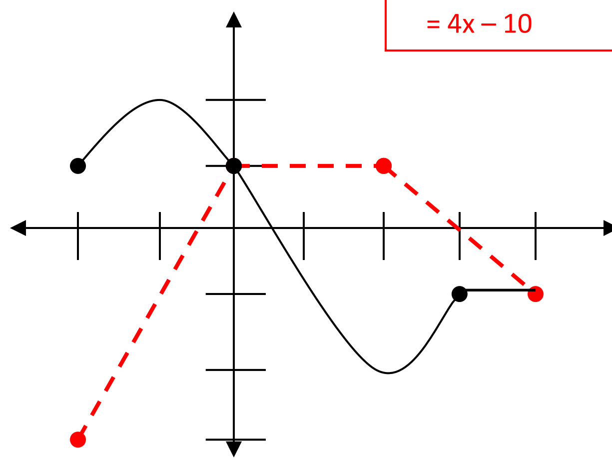
6) = $\sqrt{16x^2 - 80x + 100}$

= $\sqrt{(4x - 10)(4x - 10)}$

= 4x – 10

More practice.





1) f(1) + g(2) = -1 + (-2) = -3

2) g(-3) – f(4) = 1 – (-2) = 3

Where is f(x) – g(x) …

3) zero? @x = -1, 3

4) positive? -1 < x < 3

5) negative? -3 < x < -1 or 3 < x < 4

1) f(4) – g(4) = -1 – (-1) = 0

2) g(2) + f(3) = 1 + (-1) = 0

3) The minimum value of f(x) – g(x)?

-2 – 1 = -3

occurs @x = 2

4) The maximum value of f(x) – g(x)?

1 – (-3) = 4

occurs @x = -2

5) Values of x where f(x) = g(x) @x = 0, 4