

SHOW ALL WORK ON THIS TEST OR ON SEPARATE PAPER. Circle answers.
TURN IN ALL WORKSHEETS. CALCULATORS ARE REQUIRED ON THIS TEST.

1. Given the points $(5, -3)$ and $(-3, 7)$, find:

a) slope

b) midpoint

c) distance

In 2 – 3, find the equation in $y = mx + b$ form

2. of a line with slope $-\frac{5}{4}$ and
passing through $(-6, 5)$

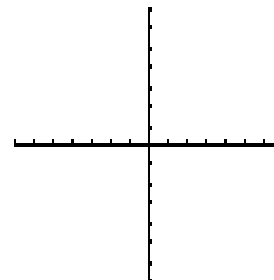
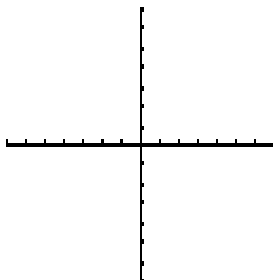
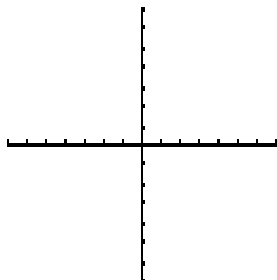
3. Find the equation of the perpendicular
bisector of the line segment between
 $(5, -3)$ and $(-3, 7)$

In 4 – 6, sketch the graphs. If they are parabolas, find the vertex.

4. $y + 2 = (x - 4)^2$

5. $y + 2 = -(x - 4)^2$

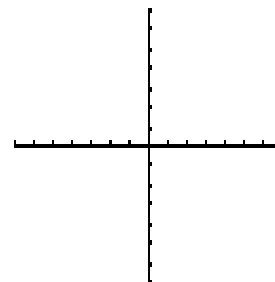
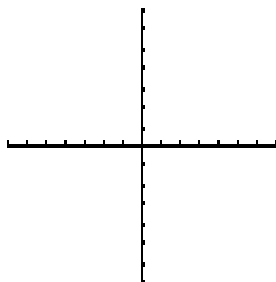
6. $x + 2 = -(y - 4)^2$



In 7 – 8, find the vertex (show work or explain how you did it!), and sketch the graph.

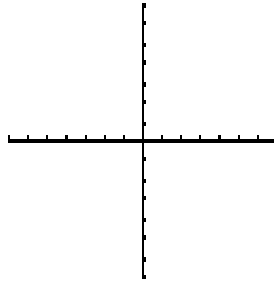
7. $y = -2x^2 + 12x - 5$

8. $x = y^2 + 8y - 4$



9. Find the center and radius by completing the square. Sketch.
 $x^2 + y^2 - 8x - 6y + 21 = 0$

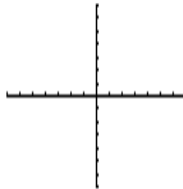
10. Find the equation of a circle whose center is at $(8, -3)$ and passing through $(2, 3)$.



11. Find the domain (give interval notation when appropriate).

a) $y = \frac{x^2 - 25}{\sqrt{x}}$ b) $y = \frac{x^2 - 9}{x^2 - 16}$ c) $y = \sqrt{4 - 5x}$ d) $xy = 6y - 4$

12. Given the equation $y = -\sqrt{x^2 - 49}$

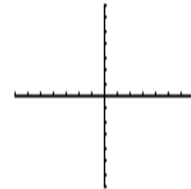


a) Domain:

b) Range:

c) Function?

13. Given the graph:



a) Domain:

b) Range:

c) Function?

14. Let $f(x) = \frac{4-3x}{x-4}$

a) $f(0) =$

b) $f(4) =$

c) $f(3x-7) =$

15. Let $f(x) = \frac{x-4}{2x}$ and $g(x) = x^2 - x$

a) find $f[g(x)]$ and simplify.

b) find $g[f(x)]$ and simplify.

16. Let $f(x) = x^2 + 4x$ and $g(x) = -2x - 6$

a) $(f+g)(-2) =$

b) $(f-g)(-2) =$

c) $(f \bullet g)(-2) =$

d) $(f/g)(-2) =$

e) $(f \circ g)(-2) =$

f) $(g \circ f)(-2) =$

17.
$$f(x) = \begin{cases} x^2 - 4 & \text{if } x \leq -3 \\ 6 & \text{if } -3 < x < 4 \\ -2x + 5 & \text{if } x \geq 4 \end{cases}$$

a) $f(5)$

b) $f(-5)$

c) $f(3)$

d) $f(-3)$

e) $f(4)$

f) $f(3.999)$

18. Given $f(x) = \frac{x}{3x-5}$, find $f^{-1}(x)$.

COLLEGE ALGEBRA EXAM 2 YG Solutions

1. $(5, -3)$ $(-3, 7)$

a) $m = \frac{y_2 - y_1}{x_2 - x_1}$
 $= \frac{7 - (-3)}{-3 - 5}$
 $= \frac{10}{-8} = \left(-\frac{5}{4}\right)$

b) midpt =
 $x = \frac{5 + (-3)}{2} = 1$
 $y = \frac{-3 + 7}{2} = 2$
 $(1, 2)$

c) $d = \sqrt{8^2 + 10^2}$
 $= \sqrt{164}$
 $= 2\sqrt{41}$

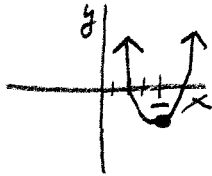
2. $m = -\frac{5}{4} (-6, 5)$

$y = mx + b$
 $5 = -\frac{5}{4}(-6) + b$
 $20 = 30 + 4b$
 $-10 = 4b$
 $b = -\frac{5}{2}$
 $y = -\frac{5}{4}x - \frac{5}{2}$

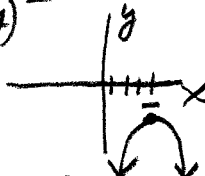
3. $(5, -3)$ $(-3, 7)$

See #1!
 midpt = $(1, 2)$
 $m = -\frac{5}{4}$ $m_{\perp} = \frac{4}{5}$
 $y = mx + b$
 $2 = \frac{4}{5}(1) + b$
 $10 = 4 + 5b$
 $6 = 5b$ $b = \frac{6}{5}$
 $y = \frac{4}{5}x + \frac{6}{5}$

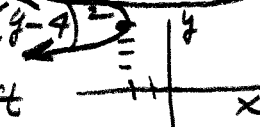
4. $y + 2 = (x - 4)^2$
 Parabola Opens Up
 $V(4, -2)$



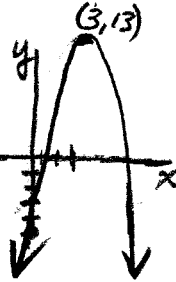
5. $y + 2 = -(x - 4)^2$
 $V(4, -2)$
 Opens Down



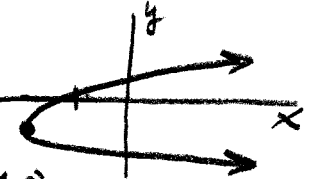
6. $x + 2 = -(y - 4)^2$
 $V(-2, 4)$
 Opens Left



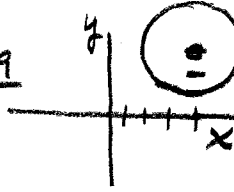
7. $y = -2x^2 + 12x - 5$
 Parabola Opens Down
 $x = \frac{-b}{2a} = \frac{-12}{-2(2)} = 3$
 $y = 13$
 $V(3, 13)$ $y_{int} = (0, -5)$



8. $x = y^2 + 8y - 4$
 Parabola Opens Right
 $y = \frac{-b}{2a} = \frac{-8}{2} = -4$
 $x = -20$
 $V(-20, -4)$ $x_{int} = (-4, 0)$



9. $x^2 - 8x + \underline{\quad} + y^2 - 6y + \underline{\quad} = -21$
 $x^2 - 8x + 16 + y^2 - 6y + 9 = -21 + 16 + 9$
 $(x - 4)^2 + (y - 3)^2 = 4$
 Circle Center $(4, 3)$ $r = 2$



10. $C(8, -3)$ through $(2, 3)$
 $r = \sqrt{6^2 + 6^2} = \sqrt{72}$ $r^2 = 72$
 $(x - 8)^2 + (y + 3)^2 = 72$

11a) $y = \frac{x^2 - 25}{\sqrt{x}}$
 $x > 0$
 $D: (0, \infty)$

b) $y = \frac{x^2 - 9}{x^2 - 16}$
 $D: \text{all } x \neq \pm 4$

c) $y = \sqrt{4 - 5x}$
 $4 - 5x \geq 0$
 $-5x \geq -4$
 $x \leq \frac{4}{5}$
 $D: (-\infty, \frac{4}{5}]$

d) $xy = 6y - 4$
 $xy - 6y = -4$
 $y(x - 6) = -4$
 $y = \frac{-4}{x - 6}$ $D: x \neq 6$

12. $y = -\sqrt{x^2 - 49}$
 $(-7, 0)$ $(7, 0)$
 $D: (-\infty, -7] \cup [7, \infty)$
 $R: (-\infty, 0]$
 $F: \text{Yes}$

13. $D: \text{all } x \neq \pm 3$
 $R: (-\infty, -3] \cup (0, \infty)$
 $F: \text{Yes}$

14. $f(x) = \frac{4 - 3x}{x - 4}$
 a) $f(0) = \frac{4}{-4} = -1$
 b) $f(4)$ is undef
 c) $f(3x - 7) = \frac{4 - 3(3x - 7)}{(3x - 7) - 4}$
 $= \frac{-9x + 25}{3x - 11}$

15. $f(x) = \frac{x - 4}{2x}$ $g(x) = x^2 - x$
 a) $f[g(x)] = \frac{(\quad) - 4}{2(\quad)}$
 $= \frac{x^2 - x - 4}{2(x^2 - x)}$
 $= \frac{x^2 - x - 4}{2x(x - 1)}$
 c) $g[f(x)] = (\quad)^2 - (\quad)$
 $= \left(\frac{x - 4}{2x}\right)^2 - \left(\frac{x - 4}{2x}\right)$
 $= \frac{x^2 - 8x + 16}{4x^2} - \frac{2x(x - 4)}{2x \cdot 2x}$
 $= \frac{x^2 - 8x + 16 - 2x^2 + 8x}{4x^2}$
 $= \frac{-x^2 + 16}{4x^2}$

16. $f(x) = x^2 + 4x$ $g(x) = -2x - 6$
 $f(-2) = -4$ $g(-2) = -2$
 a) $(f + g)(-2) = (-4) + (-2) = -6$
 b) $(f - g)(-2) = (-4) - (-2) = -2$
 c) $(fg)(-2) = (-4)(-2) = 8$
 d) $(f/g)(-2) = \frac{-4}{-2} = 2$
 e) $f[g(-2)] = f[-2] = -4$
 f) $g[f(-2)] = g[-4] = 2$

17a) $f(5) = -2(5) + 5 = -5$
 cat 3 = $(-5)^2 = 25$
 b) $f(-5) = (-5)^2 = 25$
 cat 1 = $(25)^2 = 625$
 c) $f(3) = 6$
 cat 2 = $(6)^2 = 36$
 d) $f(-3) = (-3)^2 = 9$
 cat 1 = $(9)^2 = 81$
 e) $f(4) = -2(4) + 5 = -3$
 cat 3 = $(-3)^2 = 9$
 f) $f(3999) = 6$
 cat 2

18. $f(x) = \frac{x}{3x - 5}$
 $y = \frac{x}{3x - 5}$ $f(x)$
 $x = \frac{y}{3y - 5}$ $f^{-1}(x)$
 $3xy - 5x = y$
 $3xy - y = 5x$
 $y(3x - 1) = 5x$
 $y = \frac{5x}{3x - 1} = f^{-1}(x)$