Spring 2007 **Practice**

Write down your answers correctly in the boxes or spaces provided.

1. Perform the indicated operations. Express your answer as a polynomial in simplified form.

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

$x^2-2x+x-2-(x^2+2x+3x+6)$

$x^2-x-2-x^2-5x-6$

$-6x-8$

$-6x-8$ or $-2(3x+4)$

2. Factor completely: $4x^2-y^2$

$2x+y \quad 2x-y$

$(2x+y)(2x-y)$

3. Factor $\frac{x^2+x-2}{x^2+6x+8}$, then reduce the fraction to lowest terms.

$\frac{(x+2)(x-1)}{(x+4)(x+2)}$

$\frac{x-1}{x+4}$

4. Let $f(x)=2x^2-x$. Calculate $f(x+h)$. Expand completely.

$2(x+h)^2-(x+h)$

$2(x^2+2xh+h^2)-x-h$

$2x^2+4xh+2h^2-x-h$

$f(x+h)= 2x^2+4xh+2h^2-x-h$

5. Combine into a single fraction and simplify: $\frac{6x}{2x+1}-3\frac{(2x+1)}{2x+1}$

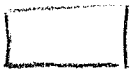
$\frac{6x-6x-3}{2x+1}$

$\frac{-3}{2x+1}$

6. Express as a simple fraction: $\dfrac{\frac{x+6}{5} \cdot \frac{1}{3}}{3}$

$\frac{x+6}{15}$

7. The area of a rectangle is 28 square centimeters and one side is 7 centimeters long. What is the perimeter of the rectangle?



$A = lw$
$28 = lw$
$28 = 7w$
$4 = w$

$2(7)+2(4)$
$14+8$

Perimeter = 22 cm
(include units)

8. Find the radius of a circle with area 10π square feet.

$A = \pi r^2$
$\frac{10\pi}{\pi} = \frac{\pi r^2}{\pi}$
$10 = r^2$
$\sqrt{10} = r$

Radius = $\sqrt{10}$ ft
(include units)

9. Find all solutions x which satisfy $\frac{7}{3}(6) - 4x(6) = \frac{3}{2}(6) + x(6)$

$14 - 24x = 9 + 6x$
$5 = 30x$
$\frac{5}{30} = x$

$x = \frac{5}{30}$ or $\frac{1}{6}$

10. Find all solutions (real or complex) of $3x^2 + 4x + 2 = 0$.

$x = \dfrac{-4 \pm \sqrt{16-4(3)(2)}}{2(3)}$

$= \dfrac{-4 \pm \sqrt{16-24}}{6} = \dfrac{-4 \pm \sqrt{-8}}{6}$

$x = \frac{-4 \pm \sqrt{-8}}{6}$ or $\frac{-4 \pm i\sqrt{8}}{6}$

or $\frac{-4 \pm 2i\sqrt{2}}{6}$ or $\frac{-2 \pm i\sqrt{2}}{3}$

11. Solve the equation $A = \frac{1}{2}bh_1 + bh_2$ for h_1 in terms of the other variables.

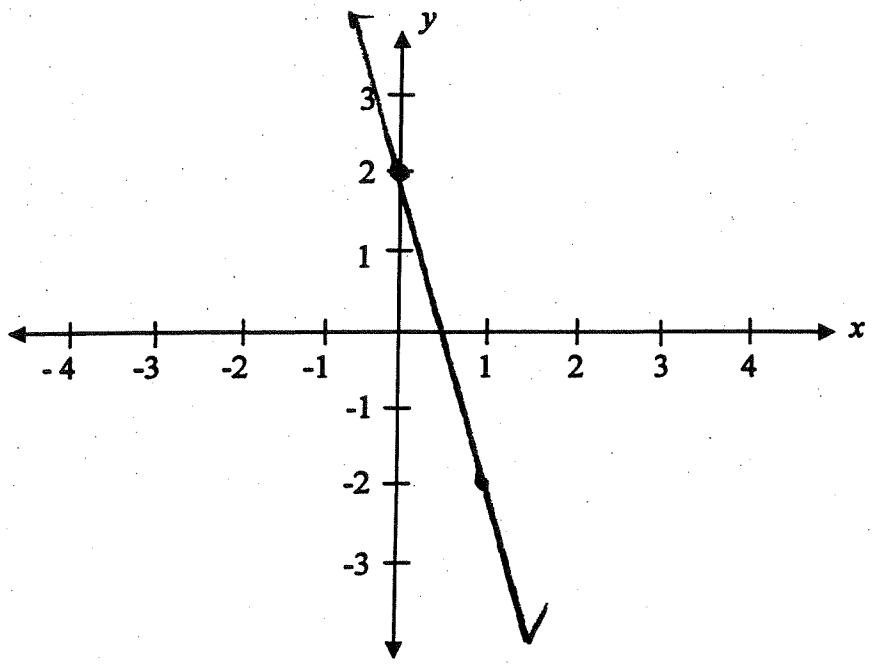
$\frac{A - bh_2}{\frac{1}{2}b} = \frac{\frac{1}{2}bh_1}{\frac{1}{2}b}$

$2A = bh_1 + bh_2$

$\frac{2A - bh_2}{b}$

$h_1 = \frac{A - bh_2}{\frac{1}{2}b}$ or $\frac{2A - bh_2}{b}$

12. Graph $y = 2 - 4x$. Clearly indicate the x- and y-intercepts.



13. Graph $y = -(x+1)(x-3)$. Clearly indicate all x- and y-intercepts.

x int
$x = -1$
$x = 3$

y int $(0, 3)$

$-1(x^2 - 2x - 3)$

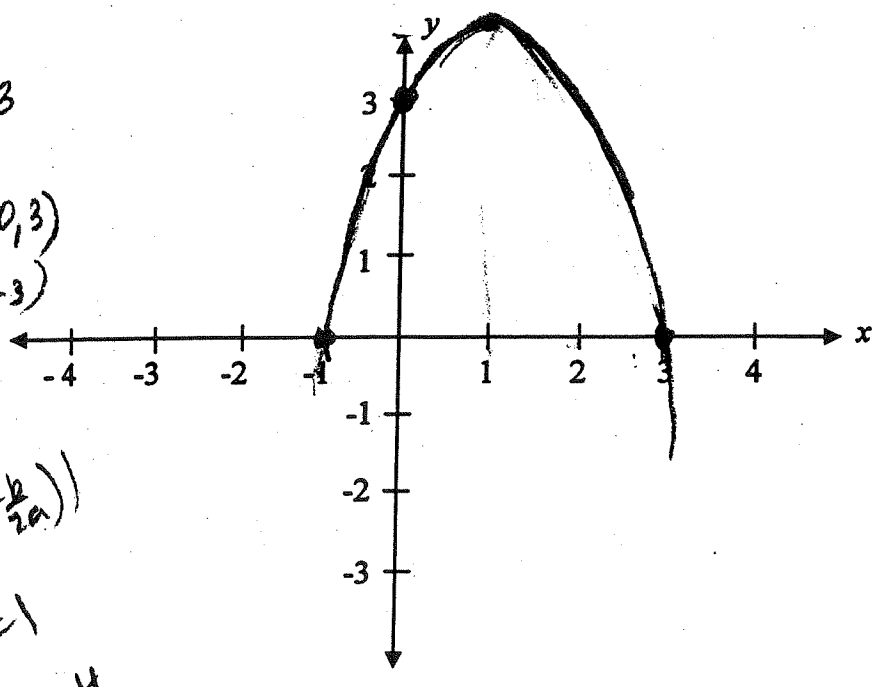
$-x^2 + 2x + 3$

vertex $f(-\frac{b}{2a})$

$(\frac{-b}{2a}$

$\frac{-2}{2(-1)} = 1$

$y = 4$



14. Write $\left(\frac{1}{16}\right)^{-\frac{1}{2}}$ without using exponents or radicals.

$\sqrt{16}$

4

15. Write $\left(x^2\right)^7$ using a single positive exponent.

x^{14}

16. Write $x^{\frac{1}{2}}x^{-4}$ using a single positive exponent.

$x^{1/2+-4}$

$x^{1/2+-8/2}$ $\quad x^{-7/2}$

$\frac{1}{x^{7/2}}$

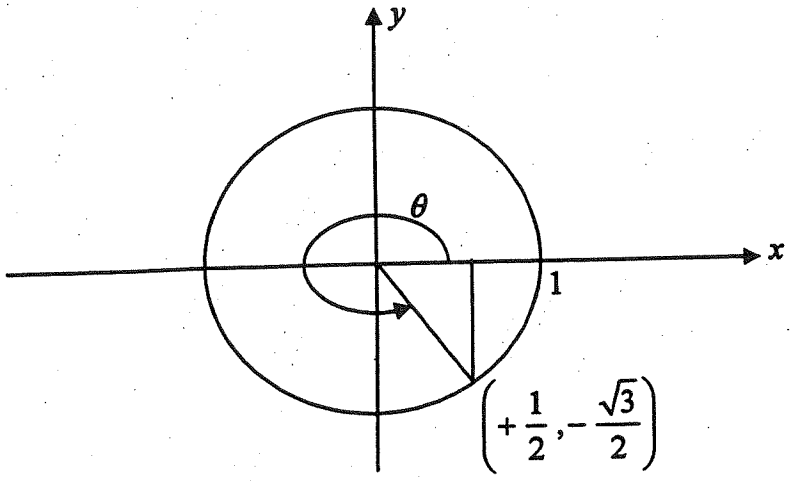
17. Find the value of 7^0.

1

18. Find the value of $\log_2 8$.

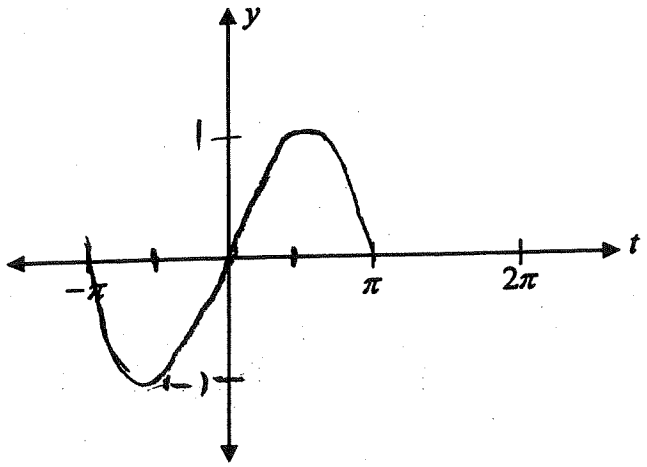
3

19. Find $\tan\theta$ using the given picture:

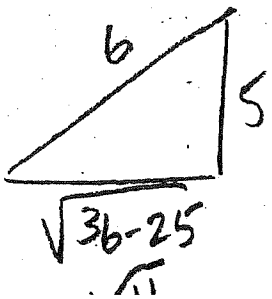


$\tan\theta =$ $-\sqrt{3}$

20. Sketch the graph of $y=\sin t$ on $[-\pi,\pi]$. Clearly number the y-axis.

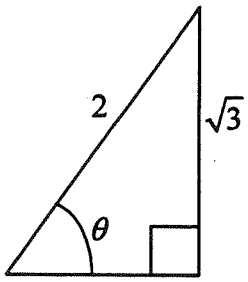


21. Let θ be an acute angle in a right triangle with the opposite leg having length 5 and the hypotenuse having length 6. Find $\cos\theta$. Give EXACT answer.



$\cos\theta =$ $\sqrt{11}$

22. What is θ, in degrees, in the diagram below?



$\theta =$ 60°

23. Find the exact value of $\sin\left(\frac{5\pi}{6}\right)$.

1/2

24. Express in terms of sine and cosine: $\sin x \cdot \tan x \cdot \csc x$. Simplify completely.

$\frac{\sin x}{\cos x} = \tan x$

25. Expand and simplify $1+(\sin t+\cos t)^2$.

$1+\sin^2 t+2\sin t\cos t+\cos^2 t$

$1 + 2\sin t\cos t$
or $2 + \sin 2t$